December 2013/$5

AIR FORCE MAGAZINE

Journal of the Air Force Association

The F-35's Time to Climb

Adriana Valadez: A Hero Saves a Hero

Ralph Parr

Doctrine Next


HYPERSONIC INNOVATION AND RECOGNITION.
The X-51A Waverider team has received the 2013 John R. Alison Award from the Air Force Association for most outstanding contribution by industry to national defense. The scramjet-powered aircraft recently flew the longest air-breathing hypersonic flight in history. Its success signals an era of advancement no less dramatic than the beginning of the Jet Age. Boeing, the Air Force Research Laboratory and Aerojet Rocketdyne are honored to share this prestigious award.
BOEING

Journal of the Air Force Association
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About the cover: TSgt. Brian West marshals an F-35 at Eglin AFB, Fla., in July 2011. See "Climb Time for the F-35," p. 22. USAF photo by Samuel King Jr.

FEATURES

Journal of the Air Force Association

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DEPARTMENTS

Editorial

By **Adam J. Hebert,** Editor in Chief

The Triad: Now, But Maybe Not Forever

America's nuclear arsenal has profoundly changed since the late Cold War. Every President since Reagan has sought to eliminate nuclear weapons, albeit in a manner that protects US interests. Absent a new threat, further reductions are likely, but reductions in both warhead numbers and delivery systems must be made deliberately and with great care.

In 1987, the US had about 13,600 strategic nuclear warheads ready for use against the Soviet Union. As of Sept. 1, 1,688 remained operational, a reduction of 88 percent. The US is headed down to 1,550 deployed warheads by 2018, to meet the terms of the New START agreement.

In the 1990s, there were 500 missiles sitting in hardened silos; the inventory is heading down to 420. The Air Force's 10-warhead Peacekeeper ICBM is gone. Minuteman III ICBMs used to carry up to three warheads; soon they will all hold a single weapon.

The story is similar on the bomber front. The B-1 bomber sat out the 1991 Persian Gulf War because it was strictly a nuclear weapons platform. Today the B-1, active over Afghanistan for conventional operations, has no nuclear mission whatsoever. USAF in recent years retired the stealthy Advanced Cruise Missile and cut the Air Launched Cruise Missile inventory.

There have been similar changes and reductions to the Navy's fleet of Ohio-class ballistic missile submarines and their Trident missiles.

The Air Force, the Navy, and the nation have continually studied and adjusted the US nuclear force structure to address changing conditions, budget limitations, and arms control requirements.

Specific weapon systems have come and gone, but since 1960 the nuclear Triad has endured. The Triad, which refers to the ability to deliver nuclear weapons via bomber, land-based ballistic missile, and submarine-launched ballistic missile, provides the nation with a versatile and secure deterrent.

As US nuclear weapons numbers decline, however, the necessity of the Triad is frequently questioned.

"I'm a believer in the Triad," said Gen. Mark A. Welsh III, Air Force Chief of Staff, in a November meeting with defense reporters. "I think the three legs of the Triad really do give us flexibility, responsiveness, and survivability in a way that you might not get with any one or two legs."

Indeed, each leg of the Triad offers unique benefits.

Sea-launched ballistic missiles make up the bulk of the nation's strategic arsenal. Boomers silently roam the world's oceans, carry massive weapon loads, and can launch from relatively near their potential targets. They are considered the most survivable leg of the Triad.

Each leg of the Triad offers unique benefits.

The land-based ICBMs are responsive—they can hit a target anywhere on Earth in 35 minutes. They are relatively inexpensive to maintain and demonstrate extraordinarily high reliability. ICBMs are also stabilizing, as an enemy would have to use two or three nuclear weapons against each US silo to be reasonably sure of destroying a single American nuclear weapon. There is little incentive to target them.

Bombers offer flexibility. They can stage from bases worldwide and attack from various directions and altitudes, complicating an enemy's defensive plans. B-2s are stealthy, and B-52s can utilize both gravity bombs and nuclear-tipped cruise missiles. Bombers also send powerful signals—governments notice their presence on Guam or when they appear over places like South Korea. They can also be recalled even after being launched for an attack.

All three legs of the Triad will need replacement over the next few decades. "We are studying options to recapitalize the responsive land-based ballistic missile capability," Air Force Gen. C. Robert Kehler, then head of US Strategic Command, stated in recent testimony. "We are developing a modern long-range penetrating bomber and replacement cruise missile while … proceeding with the Ohio-class replacement program to maintain an assured and survivable at-sea capability."

To preserve the Triad, the US will need to produce new bombers, submarines, ICBMs, and cruise missiles over the next 20 years. This will foster even more discussion about what is needed and what can be afforded—hopefully in that order. "I think the whole nuclear deterrence strategy is something that we should be thinking about all the time," said Welsh. "I think it constantly evolves."

If fewer weapons are needed to meet future security needs—a good thing—the numbers of weapons will continue to come down. But large modernization costs could then spell the end of the Triad in the 2030s.

Many useful systems have been retired over time, and the Air Force has made clear in recent years that much more money can be saved by retiring entire fleets than by making across-the-board reductions in capabilities.

"The cost of modernizing the nuclear infrastructure is not small, and so I think that will lead to a very honest debate about where can we afford to invest, where must we invest, and how does that relate to a strategy going forward," said Welsh. For example, USAF's next generation bomber may be fielded as a conventional weapons platform first and add nuclear capability at a later date.

"We will likely have at least one, hopefully two, legs of this [Triad] to execute for quite some period of time, and we have to do it well," Welsh said.

The massive, state-on-state great power conflicts that characterized the first half of the 20th century became a thing of the past with the advent of nuclear weapons. Since 1945, the wars involving nuclear powers have been limited. Nuclear weapons have made the world a less-deadly place because of their incredible destructive power and the nightmare scenarios associated with nuclear war.

The US has removed 12,000 strategic nukes and many platforms from service over the past 25 years. Another 25 years brings today's delivery systems past their useful lives.

Until Russian, Chinese, and anyone else's nuclear weapons are considered as benign as British and French nukes, however, the US will require a safe, reliable deterrent. Whether this will include a Triad over the long term remains to be seen. ■


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Letters

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A Snub and a War

John T. Correll's brilliant piece of work covers an event that set the course America would follow for decades to come *["The First Domino," October, p. 54].* Our involvement in Vietnam still affects military planning today, and politicians are wary of any future involvements that could turn out for us as Vietnam did.

The picture of President Dwight Eisenhower and Secretary of State John Foster Dulles on p. 68 shows the two men who could have kept us out of Vietnam. But neither saw the situation as it really was. On p. 415 of Ted Morgan's book *Valley of Death,* Eisenhower even disavows his own "domino theory."

"Unilateral intervention is off the table," Eisenhower said. Even if it were tried, "we would have to take it to Congress and fight for it like dogs." He also expressed his "hostility to the notion that because we might lose Indochina we would necessarily have to lose the rest of Southeast Asia." So much for the "domino theory" by the man who developed it.

And later, during the Geneva Convention, Dulles turned his back on Zhou Enlai rather than shake hands with him. How many Americans went to their deaths because of the arrogance of that Cold War warrior?

Maj. Vern J. Pall,
USAF (Ret.)
Tucson, Ariz.

Mr. Correll's description of the battle is very graphic and was indeed horrific for both sides. The French clearly underestimated the resolve of both the leadership and the soldiers of the Viet Minh communists. General Giap was brilliant. Not mentioned in the article was the fact that many of those artillery pieces that were finally embedded into those mountains got there by boring tunnels from the opposite side, until they got into firing position, looking down into the valley below—an incredible feat. Also not mentioned was the use of delayed-fuse explosive rounds from mortar and artillery. General Giap's effective use of these explosives literally collasped the walls and ceilings and entombed many of the bases underground facilties, along with men and equipment.

My recollection of our involvement, both during and after the battle of Dien Bien Phu, was that the US never really left the area. Mr. Correll's article correctly states that once the country was partitioned at the 17th parallel, the Viet Minh communists got the north, and the south went to the last existing monarch and his prime minister. The Geneva Accords called for elections in 1956, but they were never held, due mainly to our interventions. Eventually the south declared independence, and the French left, but the US never did. After the placement of Ngo Dinh Diem as President of South Vietnam, the US became its major ally, and following Diem's visit to the US in 1957, we very slowly and gradually increased our aid and assistance. Our policies toward communism's expansion were very clear, and the "Cold War" was beginning to heat up in Europe and elsewhere around the world. In 1960, after the major declarations of the communists in North Vietnam to reunify the country at all costs, and the follow-on meeting with VP Johnson and Diem, in Saigon, our assistance and aid really started to dramatically increase.

When I first arrived in Southeast Asia in early 1962, our presence was very real. Thailand was getting a lot of our attention due to communist Laotian insurgents crossing the border into that country. Downtown Bangkok was relatively quiet during the week; however, it took on a more "noisy" atmosphere during the weekends, when literally hundreds of US soldiers came on "liberty passes." The "Tent City" at Tan Son Nhut Air Base in Saigon was huge. I also flew to other air bases as well, e.g. to Da Nang and Nha Trang, and the US Army and Air Force "advisors" were everywhere. In April 1963, I took part in a four month-long deployment installing air navigational aids at Nha Trang Air Base. A very large US Army hospital was already in place. They could perform major open heart surgery at this hospital, and our wounded "advisors" received excellent care. It was also "home" to the 5th Army Special Forces. It is kinda hard to say exactly "when" the US was actually "drawn into Vietnam," but for me, and for the many thousands of soldiers and airmen who served there during this time frame, it was certainly before 1964.

CMSgt. Gerald L. Richard,
USAF (Ret.)
Warrenton, Va.

On p. 65, the picture caption identifies Dien Bien Phu as being in South Vietnam. If I recall correctly, there was no north or south at that time, it was just Vietnam. Also, if memory serves, Dien Bien Phu would have been in what became North Vietnam. Am I correct?

Bob Roit
Poolesville, Md.

■ *The caption was wrong, but the text of the article had it right. Dien Bien Phu was in the far northwestern part of Tonkin, near the border with Laos. The French had traditionally administered Vietnam as three separate regions in the Indochina Union: Cochin China in the South, Annam in the middle, and Tonkin in the north. The French made several gestures at forming a nominally independent Vietnam within the Indochina Union but met with marginal success.*

*Headquarters for the French Expeditionary Force was in Saigon but headquarters for the Tonkin theater, of which Dien Bien Phu was a part, was at Hanoi. Then and later, "North Vietnam" was a shorthand term rather than the actual name of a country. After partition by the Geneva Accords of 1954, the nation north of the Demilitarized Zone was the "Democratic Republic of Vietnam," but the Americans in Southeast Asia called it North Vietnam.—*John T. Correll

We Make Both Sides Mad

While both sides of an argument deserve to be heard, they should be at least somewhat rational and backed up with facts. The letter you published from Colonel Sexton *["Letters: Women Titans," October, p. 10]* was devoid of both. As

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someone who served with some outstanding female airmen I was insulted by his unsubstantiated opinions. Please try to do a better job in showing the other side of an argument or I will look to other sources for military opinion.

Sean M. Mallory
Edinboro, Pa.

Retired Col. Michael Sexton's comments in the October 2013 issue in reference to the article "Women In Combat" *[August, p. 30]* are dead on: "Air dominance is impacted by more than just aging systems, and one would hope that at least AFA would tackle the truth about manning developments, focus on what makes military sense, and not become a cheerleader for insane policies."

I have been an AFA life member for over 30 years and have noticed, just as Colonel Sexton did, that *Air Force Magazine* rubber stamps questionable USAF policies and seems more concerned with political correctness than actual discussion of the issues. The title "Women in Combat" was simply a segue for a listing of statistical data of women's upward movement in USAF and a platform to trumpet the success of social engineering and affirmative action in the US military.

On p. 38 of the May 2013 issue of *Air Force Magazine* (the "USAF Almanac" issue) is a table titled "Number and Percentage of Active Duty Airmen by Gender." It provides data that *Air Force Magazine* publishes every year but has never analyzed or acknowledged. The table shows that in 1970 the total number of USAF officers was 129,803, of which 3.6 percent were female. In 1990 the total number of USAF officers was 100,045 of which 13.3 percent were female.

In a 20-year period the total number of USAF officers decreased by 29,758 (23 percent) and yet the percentage of female officers increased by [nearly 200 percent]. Statistically, there is no way such a dramatic change in the officer force could have occurred without external interference. The increase could not happen through recruiting; it had to be done through promotion. Senior USAF leadership would claim that the promotion system is unbiased and yet the data shows that to be false. Berkley vs. The United States proves it to be false.

The 20-year period of 1970 to 1990 is a perfect example of social engineering and affirmative action rampant in the US military. No group can be given preferential treatment without another group being put at a disadvantage. It is a dirty little secret but you are the ones who resurrected it. Shame on you.

Maj. Paul C. Hooper,
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Fort Walton Beach, Fla.

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Aperture

By John A. Tirpak, Executive Editor

Space Command at rock bottom; No more Space Fence; What will become of North Korea? China waiting in the wings? ....

NO DIALING FOR DOLLARS

The ongoing sequester is causing huge headaches for Air Force Space Command. Its commander, Gen. William L. Shelton, is doing all he can to find work-arounds, but with all "no fail" missions, he says there's little he can do to dial down expenses without fundamentally hurting the nation's military space enterprise.

"I'm down to what I consider to be the bare minimum capability," Shelton said in an October interview. "You can't say, 'OK, I'll just live with one less SBIRS [Space Based Infrared System] satellite.' That opens up a hole in the constellation. You can't just say 'I'll live with one less Advanced EHF satellite'—another hole in the constellation. You can't say, 'I'll just do without some of my ground systems' because that opens up a hole in your ability to be global."

He confessed envy of his fellow major command chiefs, who can reduce flying hours to reap immediate savings.

"My friends in the other majcoms that have airplanes, … that's a rheostat that they can adjust," he explained. "They can decrease their flying hour program and that saves them a lot of money" although "admittedly [with] an impact on readiness and combat capability." But he lacks any such flexibility.

"I don't have any similar rheostats where I can just reduce ops tempo and produce savings that would pay the bills for sequester," Shelton said.

In September, Air Combat Command chief Gen. G. Michael Hostage III and Air Mobility Command boss Gen. Paul J. Selva made headlines by warning that continued sequestration might force the Air Force to take vertical cuts—such as elimination of whole weapon systems, like the A-10 close air support aircraft and KC-10 tanker—to ensure that whatever systems remain are properly funded and ready for war.

Shelton can't do that, either.

"It's not an option, unless the nation decides we don't want to have … missile warning, protected communications, global wideband communications," or space situational awareness, Shelton said. "It's those kinds of capabilities that are important to the nation and to the joint warfighter which I'm charged to provide, and I don't see any way to back off on those."

He asserted, "We're to rock bottom" in terms of still being able to provide the functions AFSPC is tasked with.

"As sequestration continues to take roughly 10 percent per year, every year, you get to the place where you're out of airspeed and ideas. And that's where I am for [Fiscal 2015]. Unless there's an adjustment in the overall priorities of the Air Force and Department of Defense, I really have no place left to go," he said.

Shelton added that he could close down every AFSPC ground station "and it wouldn't really pay the bill" demanded by the sequester. "So that's why I'm saying, I'm really kind of out of tricks, here. And this is just the operations and maintenance side."

As for investment accounts, Shelton said they are "getting hit every year," and these cuts are building "a backlog of payments … so you're forced to stretch out programs, … reduce capability, … somehow adjust each of those programs." The other option is to "downright kill" some programs, but "on the space side, everything we're doing is really replacement capability; it's not anything that's a brand-new development."

USAF photo by SSgt. Christopher Boltz

Shelton: Space is at rock bottom.

Shelton said he's taking "$100 million worth of risk in weapon system sustainment just to get through the year." For Fiscal 2014, there will be "deferred system engineering, deferred depot maintenance, deferred spare parts that don't get bought," he explained. "So we are getting increasingly into a break/fix mentality, rather than the standard preventive maintenance activities that we would like to do." Making those cuts represents "a lot of risk, but you can only do that for one year. So come [Fiscal 2015], I have no idea how we're going to adjust to even further reductions if sequestration continues."

DON'T FENCE ME IN

Air Force Space Command closed its old Space Fence in September, a move that saved only $14 million but highlighted the lengths AFSPC has gone in order to meet sequester targets. A new Space Fence is needed to get a better handle on tracking space debris, but budget tightening has delayed the program.

"While $14 million may not sound like much money, I am literally scraping together pennies to make nickels, nickels to make dimes," said Shelton.

The old Space Fence beamed a wall of energy into orbit from three locations across the southern US, detecting objects as they passed through the beam. When it went dark, AFSPC used an optimization system to realign other sensors in its space surveillance network to "take up the slack," Shelton said. This included repurposing radars in Florida and North Dakota. It has worked well, and "there is no gap in capability" relative to what AFSPC had under the old Space Fence.

However, neither system offered the granularity that AFSPC thinks it needs.

"The models tell us there's about 500,000 man-made objects in space right now," Shelton explained. "We routinely track 23,000 of those because of the limits of our sensitivity." The smallest items AFSPC can track now are about 10 centimeters (four inches), but objects are "lethal down to about two centimeters." Between one centimeter and 10 centimeters, there are probably about "470,000 objects that we're not tracking."

A new Space Fence in the works will increase sensitivity to track objects as small as five centimeters (two inches), he said.


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The command was ready to award a contract "in the late spring, early summer," but the Defense Department's Strategic Choices and Management Review put a hold on it, he said. The earliest a contract could be awarded now will be next spring, "which is going to give us about a one-year delay in the initial operational capability," Shelton noted. "Plus it'll cost us an additional $70 million" because stretching the program requires keeping people waiting.

The program may not get the go-ahead now, he acknowledged. That would leave AFSPC unable to track "hundreds of thousands" of objects. It would also compel AFSPC to undertake service life extensions and upgrades "in our other sensors to accommodate the loss of the capability of that new fence."

The movie "Gravity," which hit theaters in the fall, was an excellent primer for the general public on the hazard space debris presents to "fragile spacecraft," Shelton said.

"We don't see enough" of the dangerous space junk on orbit, he said. "We know that translates into hazards, … particularly in low Earth orbit, … [to] things like the International Space Station" and "some of our highest-value assets for national technical means" of collecting intelligence.

Separately, he needs to fund a replacement for the Space Based Space Surveillance system, a satellite that will "probably run out of life in the 2017-2018 time frame," Shelton said. It's a "must have" and he's hoping it survives the pre-Fiscal 2015 budget scrub. The good news is that members of Congress seem to be supportive of a new Space Fence and the SBSS, he said.

ASIAN FUSION

With frequent famines, a ruined economy, crumbled industry and a large, potentially nuclear-equipped military, North Korea seems ripe for a sudden, violent political collapse—with regional repercussions so severe and chilling that plans must be made now to deal with them, or they will be even worse, according to a new RAND study.

"Preparing for the Possibility of a North Korean Collapse," by Bruce W. Bennett, suggests that North Korea could fall apart in years or even months, "causing an immense humanitarian disaster" that would destabilize the region and could create the conditions for accidental war between the US-South Korean alliance and China.

Conditions are already near intolerable in the "Hermit Kingdom," Bennett argued. "Considerable violence and upheaval" would attend the assassination of Kim Jong Eun—who reportedly survived such an attempt last year—especially with no clear successor in sight, he wrote. Bennett predicted factions within the North Korean military would quickly move to seize power if Kim were absent, causing civil war. Millions of North Koreans could become refugees, heading for South Korea or China. Neither country, he said, wants the influx of people or has the immediate capacity to deal with it.

All three countries—the US, South Korea, and China—would likely have to intervene militarily. Both the US-South Korea alliance and China would have "significant incentives to advance rapidly" into North Korea, especially in a dash to seize the North's nuclear facilities, Bennett asserted. This could lead "to a risk of accidental combat between them." The indigenous military factions would have to be neutralized to ensure food aid is not "immediately stolen" from the people who need it.

"In the zeal of the moment, the inevitable accidents could escalate into major combat between the ROK [Republic of Korea] and US forces and the Chinese forces, one of the worst possible outcomes." Even if that's avoided, "the North Korean military forces would almost certainly oppose both interventions in some combination of regular combat, insurgency, and criminal behavior," Bennett forecast. This could be extremely damaging to the South. It could suffer missile and artillery attacks on its cities and attacks on government and infrastructure from North Korean special forces. These could be made worse by use of weapons of mass destruction, and the US and Japan "would not be immune" to homeland attacks by missile or terrorist action.

The US and South Korean Presidents agreed at 2009 and 2013 summits that peaceful unification is their goal. But if China ends up controlling the North, the peninsula is doomed to partition "for at least many more decades," Bennett warned.

MANAGING ONE KOREA

As a starting point, Bennett continued, an information operations campaign is needed to overcome decades of North Korean public indoctrination painting the US and South Korea—portrayed as a US puppet—as the source of all of the North's problems. The North Korean public must be convinced that a better life would result from unification.

A nationwide aid distribution plan must be developed to keep the North Koreans in their homes, Bennett said, and it would have to be a military operation because of the scale of the effort as well as the need to prevent the aid from being seized by military units. This operation would probably have to be led by an air campaign against the North's air defense network so that relief aircraft can get through.

"Local" Democratic People's Republic of Korea (DPRK) officials would have to be turned with promises of amnesty and their forces swiftly disarmed, putting those troops to work on national reconstruction and infrastructure projects, Bennett said. It would be useful to keep some number of DPRK officers and troops in uniform "for a year or more" to impose military discipline and complete debriefing, among other things.

A tough problem would be gaining quick control of the DPRK's nuclear capabilities. They are dispersed and many are at sites not yet known, Bennett said. On the plus side, the presence of unsecured WMD might be a reason that US/South Korean and Chinese forces might cooperate, he noted.

As with German reunification in the 1990s, a thorny issue will be property, since the DPRK technically "owns" nearly everything in North Korea. Ownership could be conferred on those already in place if they agree to stay on for some period of time, Bennett suggested, thus attenuating the refugee problem and reducing the economic problems of people selling their newfound property immediately to secure a financial windfall. South Korea "should plan to compensate pre-North Korea landowners," he said.

China is the wild card. Certainly it would not want a massive US military presence on its frontier, Bennett said. It may try to beat the US to DPRK nuclear facilities and seize them and would likely create a buffer zone inside North Korean borders to keep refugees in camps instead of allowing them into China. China would be interested in North Korean ports and its "mineral wealth." But it would also want a rapid return to stability in the region.

South Korea is slated to reduce its Army from 22 divisions to 12 in the next 10 years, meaning it would have "insufficient forces, even with significant US participation, to fully handle the various challenges of North Korean collapse," Bennett observed. The Chinese might help—but at the price of its annexation of "some significant portion of the North."

Consequently, Bennett suggested the US and South Korea engage now with China on developing cooperative plans for North Korea's collapse. "China appears to be increasingly ready to address this difficult issue," he said.

For its part, South Korea should begin preparing its people for the costs and difficulties that will attend unification, Bennett said. The South Korean Army should "sustain more combat power as its size decreases in coming years," he recommended. South Korea needs to strengthen its military reserve system, and Bennett suggested that "third-country forces" might be brought into unification planning, as well. ■

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Air Force World

By **Merri M. Shaffer,** Associate Editor

Strategic, Global, Mighty Changes

Lt. Gen. James M. Kowalski assumed duties as deputy commander of US Strategic Command at Offutt AFB, Neb., in late October. The Senate on Oct. 12 confirmed Kowalski's nomination for the post. President Obama had announced it in July.

Kowalski had led Air Force Global Strike Command at Barksdale AFB, La., since January 2011. At AFGSC, he had played an integral role in the command since its beginnings in January 2009.

Lt. Gen. Stephen W. Wilson assumed command from Kowalski. Wilson, who now oversees the nation's ICBM force and nuclear-capable bombers, received a third star for this assignment. He comes to AFGSC from Barksdale's 8th Air Force, having led it since June 2011.

Replacing Wilson at the helm of "The Mighty Eighth" is Maj. Gen. Scott A. Vander Hamm, who assumed command during a separate ceremony. He received his second star for the new post. The numbered air force manages the Air Force's nuclear-capable B-2 and B-52 bombers.

The Next "Next Tanker"

Even as the first KC-46A aerial tankers are taking shape at Boeing's assembly plant in Everett, Wash., the Air Force has begun defining requirements for the next leg of its 40-year air refueling recapitalization plan, according to Maj. Gen. John F. Thompson, program executive officer for tankers.

In an Oct. 28 interview, Thompson said the Air Force proposed spending some $1 million in Fiscal 2014 and $1.5 million in Fiscal 2015 to start "future tanker capabilities work" on the KC-Y.

Air Mobility Command and the Air Force Life Cycle Management Center are ready to do "prerequirements work so that we can begin to take a look at what KC-Y will do," said Thompson. The KC-Y will have to have "all the basic capabilities" of a tanker-airlifter, he said. The Air Force will also have to sort out such issues for KC-Y in coming years, as: "how close to contested airspace we'll fly [it], what sort of defensive systems do we need to have in it, what's the optimum altitude it will refuel at, [and] how much gas it should carry."

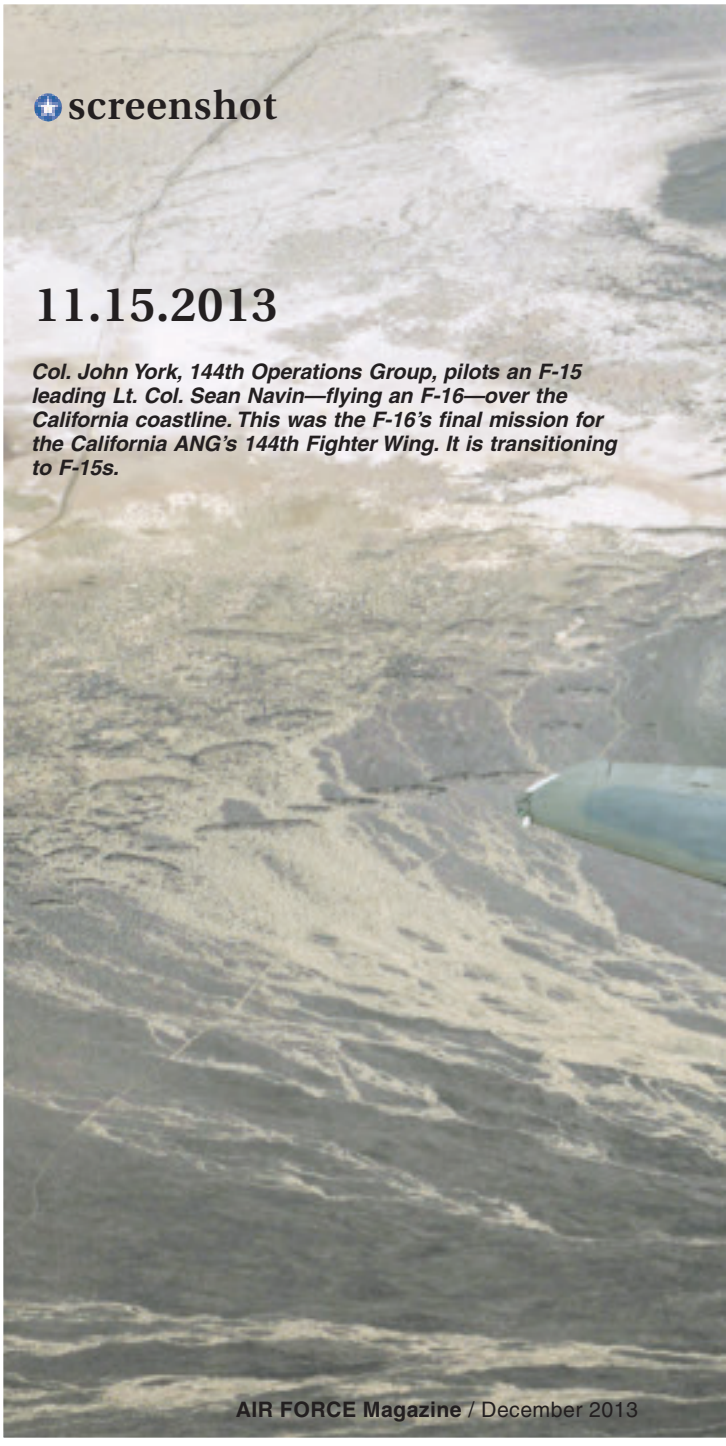
The service will recapitalize the KC-135 fleet in three increments: KC-X, KC-Y, and KC-Z. Previously, the KC-X and Y had been identified with replacing only the KC-135 and the KC-Z with supplanting the KC-10. Now, though, how the KC-10 will be recapitalized "has not been determined," a spokesman said.

Boeing is scheduled to deliver 179 KC-46s by 2027. To keep recapping the 1950s-vintage KC-135s without a break will mean the KC-Y needs to get going around 2025.

—John A. Tirpak

Acquisition-Reform Initiative

House Armed Services Committee Chairman Rep. Buck McKeon (R-Calif.) tapped HASC Vice Chairman Rep. Mac Thornberry (R-Tex.) and Ranking Member Rep. Adam Smith (D-Wash.) to lead a long-term effort to reform Defense Department acquisition.



Col. John York, 144th Operations Group, pilots an F-15 leading Lt. Col. Sean Navin—flying an F-16—over the California coastline. This was the F-16's final mission for the California ANG's 144th Fighter Wing. It is transitioning to F-15s.

"We cannot afford a costly and ineffective acquisition system, particularly when faced with devastating impacts of repeated budget cuts and sequestration," said McKeon in announcing the initiative during an Oct. 29 HASC hearing on acquisition reform. McKeon said Congress and DOD must "look past Band-Aid fixes and parochial interests and have the courage to implement meaningful, lasting reform."

In an Oct. 29 opinion piece published on the Real Clear Defense website, Thornberry gave credit to Defense Secretary Chuck Hagel for the plan to cut 20 percent of DOD headquarters personnel over the next few years, but said that effort alone would not solve the "enormous" cost of the current acquisition system.

"It will take Republicans and Democrats, House and Senate, Defense Department and military services, industry and trade associations, as well as smart, experienced individuals in and out of government all working together to fix these problems," wrote Thornberry.

Jackson: Don't Merge Guard and Reserve

Lt. Gen. James Jackson, Air Force Reserve chief, urged members of the congressionally mandated commission studying the Air Force's structure not to advocate merging the Air National Guard and Reserve.

"I believe the nation benefits from the synergistic value of a three-component Air Force consisting of the Active Duty, Air Force Reserve, and Air National Guard," said Jackson in his Oct. 24 testimony in Arlington, Va. "I do not believe combining the AFR and ANG is beneficial or value-added to our nation," he said, noting the idea has surfaced "many times during the 65 years of our history, yet has never materialized."

The eight-member National Commission on the Structure of the Air Force is charged with making recommendations to Congress by Feb. 1 on how best to configure the Air Force to meet current and future mission requirements with available resources.

USAF photo by MSgt. David J. Loeffler

F-35A Training Squadron

Officials at Luke AFB, Ariz., reactivated the 61st Fighter Squadron, the first of six such units at the base that will train pilots to fly the F-35A strike fighter. The ceremony took place on Oct. 25, reported the *Arizona Republic.*

The unit, dubbed the "Top Dogs," is expected to receive its first F-35A in January and will be at full strength in about two years when it will have 24 F-35As, according to the newspaper.

Initially, the squadron will train the pilots who will serve as instructors at Luke. By 2015, the instructors are expected to begin training pilots who will go on to serve in F-35A combat-ready units. Overall, the Air Force plans to station up to 144 F-35As at Luke for pilot training, announced base officials back in June.

SR-72 Mach 6

Lockheed Martin's Skunk Works is developing an unmanned hypersonic strike aircraft called the SR-72 that is designed to travel at six times the speed of sound—twice the speed of the company's famed SR-71 Blackbird surveillance airplane, announced the company. The SR-72 could be operational by 2030, according to the company's Nov. 1 news release.

"Hypersonic aircraft, coupled with hypersonic missiles, could penetrate denied airspace and strike at nearly any location across a continent in less than an hour," said Brad Leland, Lockheed Martin's hypersonics program manager. "Speed is the next aviation advancement to counter emerging threats in the next several decades. The technology would be a game-changer in theater, similar to how stealth is changing the battlespace today."

For the past several years, Skunk Works and Aerojet Rocketdyne have been developing a method to integrate an off-the-shelf turbine engine with a supersonic combus-

Bucking the Trend

If the current drawdown in US military spending were to follow historical trends, the Defense Department would be spending—for "the first time in modern history"—more money on developing new technologies than in procuring equipment, said Todd Harrison, a senior fellow with the Center for Strategic and Budgetary Assessments.

However, thus far during the downturn, which began in Fiscal 2010, the military is bucking that trend, he said, citing a new CSBA report during a media briefing in Washington, D.C, on Oct. 24. That's because the ratio of procurement funding to research, development, test, and evaluation funding actually has "steadily increased," meaning the Pentagon has cut RDT&E funding proportionately more than procurement funding, said Harrison.

Harrison noted the Pentagon's Fiscal 2014 budget request includes $99 billion for procurement and $68 billion for RDT&E. The largest procurement chunk, some $33.8 billion, would go toward buying new aircraft, with the Air Force having $10.8 billion of that.

The Pentagon also asked for $16.5 billion in Fiscal 2014 for classified programs, "nearly all" of it for Air Force activities.

—Amy McCullough

Cruzin' in Brazil: ***A1C Antonio Garza readies an F-16 at Natal AB, Brazil. Six F-16s and a KC-135, along with more than 130 airmen, were in the country to participate in the multilateral exercise CRUZEX 2013. Several South American countries, the US, and Canada, are taking the opportunity to hone cooperation skills between forces.***

USAF photo by SrA. Camilla Elizeu

The War on Terrorism

Operation Enduring Freedom

Casualties

By Nov. 18, a total of 2,290 Americans had died in Operation Enduring Freedom. The total includes 2,287 troops and three Department of Defense civilians. Of these deaths, 1,796 were killed in action, while 494 died in noncombat incidents.

There have been 19,475 wounded in action during OEF.

First C-130H Mission

Just one day after receiving its first two C-130H airplanes, the Afghan air force conducted its first C-130H operational mission, according to NATO air advisors in Kabul.

Advisors accompanied the AAF's first two C-130 pilots on the flight from Kabul International Airport to Kandahar Airfield on Oct. 10, bringing several pallets of main landing gear parts for Mi-17 helicopters, along with maintenance gear and office supplies for the AAF's Kandahar Air Wing, according to an October news release from the advisors.

"The fact that we already have the C-130s flying … is a big step," said Maj. Chris Garcia, a coalition advisor. The C-130s will be the mainstay of AAF airlift capability.

Before their arrival, the Afghans relied on C-208s and Mi-17s for aerial transport.

Manas Winds Down

The US military has begun the process of relocating from the Transit Center at Manas, Kyrgyzstan, and plans to complete the transfer of Manas back to the Kyrgyz government by July 2014 when the lease agreement for use of facilities there expires, announced the Defense Department.

The Kyrgyz government has hosted the TCM for more than 12 years, according to DOD's Oct. 18 release. The handover of Manas—an important air mobility hub for the movement of US military personnel and equipment into and out of Afghanistan—is scheduled to be completed a half-year before the pullout of US combat forces from Afghanistan is done. To compensate for the loss of Manas, Romania has stepped up.

Defense Secretary Chuck Hagel and Romania's Defense Minister Mircea Dusa on Oct. 18 finalized an agreement in Washington, D.C., for Romania to support that flow of US forces, according to a separate statement.

Over the past few years, the US military has been testing the feasibility of using Mihail Kogalniceanu Air Base in southeastern Romania near the Black Sea as a hub for that purpose.

Post-2014 Afghan Training Mission

NATO's planning for Resolute Support—the Afghan training mission that will commence following the end of the Alliance's combat operations in Afghanistan in 2014—is on track, said Defense Secretary Chuck Hagel in October at NATO headquarters in Brussels. Hagel emphasized the importance of quickly completing a bilateral security agreement with the Afghan government.

NATO Secretary General Anders Fogh Rasmussen told reporters Oct. 23 that Afghan forces are now leading more than 1,000 security patrols a day—most without any support from NATO forces.

"All this will put them in a strong position as they prepare to assume full responsibility for security at the end of 2014," he said.

Closing Down FOB Salerno

Six airmen assigned to the 744th Expeditionary Airlift Squadron at Bagram Airfield, Afghanistan, plus their C-130, recently helped close down Forward Operating Base Salerno in eastern Afghanistan by flying out the last US military personnel from there, according to an Oct. 29 Bagram news release.

"This mission was unique," said SSgt. Matt Pockette, C-130 loadmaster with the unit. "We had to deal with people walking up to the aircraft at the last minute to get on with extra baggage and cargo."

Overall, the C-130 lifted out 250 passengers, two all-terrain vehicles, and 2,500 pounds of baggage from Salerno, nicknamed "Rocket City" for the number of rocket attacks it endured.

tion ramjet to power the SR-72 from standstill to Mach 6. The SR-72 design leverages the company's work on the DARPA Falcon program that flight-tested the rocket-launched Hypersonic Technology Vehicle 2.

Building Better Generals

More than a decade of fighting two unconventional wars has "poorly" prepared today's general officer corps for future fights, according to a report from the Center for a New American Security.

"Twelve years at war in the unconventional conflicts of Iraq and Afghanistan have distorted the skills of the officer corps and much reduced the time that has been available for professional military education and broadening assignments," stated the report, issued in late October. As such, the United States must "redouble efforts to strengthen its current and future military leaders," it continued.

The report's authors suggested coding all two- and three-star billets either as "operational" or "enterprise" billets. This "would enable officers to optimize their development and education for the responsibilities of their assignment."

The report also suggested officers in the operational track attend a new "US higher command and staff course that emphasizes strategic and political-military skills." Those in

By the Numbers

2,500 the number of military working dogs on duty across DOD today.

430 the number of military dogs that leave the service each year.

90 the percentage of retired service dogs adopted by former handlers.

Source: 37th Training Wing Public Affairs Office, JBSA-Lackland, Tex.

USAF photo by SSgt. Kelly Goonan

Pull!: *Capt. Charles Trovarello fires an M203 during weapons training on Nov. 3. The M203 is a single-shot 40 mm grenade launcher that attaches to a rifle and uses the same rounds as the older, stand-alone M79 break-action grenade launcher.*

the enterprise track should attend business schools and corporate or executive leadership courses.

Teaming Up for Future Bomber

Boeing and Lockheed Martin will compete as a team to build the Air Force's Long-Range Strike Bomber, with Boeing as the team leader and Lockheed Martin as the follower.

The two companies "are bringing together the best of the two enterprises and the rest of industry" for the competition, said Dennis A. Muilenberg, Boeing Defense, Space, and Security president and CEO, in an Oct. 25 news release. The team will reduce risk on the program, he said, "by leveraging mature technologies and integrating existing systems."

The two companies teamed up to compete to supply the next generation bomber in 2008, but the arrangement went on hiatus after then-Defense Secretary Robert M. Gates in 2009 canceled the project.

A Boeing spokesman said on Oct. 25 the only item carried over from the earlier arrangement is the Boeing-Lockheed Martin leader-follower arrangement. The companies scrapped the rest and inked a new deal. The Air Force has forbidden the companies to say any more, such as the work share between them, said the Boeing spokesman.

Read more about the teaming arrangement on www.airforcemag.com. Search "Together Again: Why Now?"

UN Security Council Rejection

Saudi Arabia rejected a seat on the United Nations Se-

Inhofe Press Office @InhofePress
"For members of SASC, participating in the upcoming briefings & hearings is a critical 1st step. Some1 should take attendance." –@JJCarafano <https://twitter.com/JJCarafano>

CSBA @CSBA_
"Gen Dempsey: "We can't pay [our soldiers] enough. Having said that, we also have an institution to manage."
[excerpt from a *Wall Street Journal* article]

curity Council just hours after the UN General Assembly elected it, for the first time, to serve as one of the council's 10 nonpermanent members. In justifying the October decision, the Saudi foreign ministry said the Security Council was not capable of resolving global conflicts, such as the Syrian civil war, reported the Associated Press.

Saudi Arabia backs Syrian opposition forces in the two-and-a-half-year civil war and has criticized the international community for failing to stop the fighting that has claimed the lives of more than 100,000 people, according to UN figures. The Saudi snub to the Security Council came as a surprise to UN diplomats, since the Saudis had been lobbying for a seat right up until the General Assembly's vote, AP said.

"So Help Me God" Optional at Academy

The Air Force Academy will no longer require cadets to recite the final clause of the honor oath that mentions God, according to an academy release.

US Rep. Ike Skelton, 1931-2013

Isaac Newton Skelton IV, a 34-year congressman from the 4th congressional district of Missouri and former chairman of the House Armed Services Committee, died Oct. 28, 2013.

Skelton, an attorney, was elected to the Missouri Senate in 1970. In 1976 he won election to the US House of Representatives and was returned to his seat 17 times by comfortable margins. Recognized by fellow members for his authoritative knowledge of military history and defense issues, he served as chairman of the HASC from 2007 until 2010, when he lost his House seat to Vicky Hartzler (R).

Skelton was an early supporter of the B-2 bomber. He got fellow Democrats to back it, and it was bedded down at Whiteman AFB, Mo., largely due to his efforts. He was also instrumental in steering functions to Ft. Leonard Wood, Mo., quadrupling its manpower during his tenure.

A conservative Democrat, Skelton opposed gun control and abortion and voted against the Affordable Care Act, but was nonetheless ousted by the Tea Party-backed Hartzler. On leaving the House, he went to work for the national law firm of Husch Blackwell.

In 2012, Skelton received West Point's highest honor, the Thayer Award, for his public service and as "an outstanding citizen whose service and accomplishments in the national interests exemplify the Military Academy motto, 'Duty, Honor, Country.'" He was also a presidential appointee to the American Battle Monuments Commission and the World War I Centennial Commission.

—John A. Tirpak

Lockheed Martin photo

"We work to build a culture of dignity and respect, and that respect includes the ability of our cadets, airmen, and civilian airmen to freely practice and exercise their religious preference—or not," said Lt. Gen. Michelle D. Johnson, academy superintendent, in the Oct. 25 news release. "So in the spirit of respect, cadets may or may not choose to finish the honor oath with, 'So help me God.'"

The oath reads: "We will not lie, steal, or cheat, nor tolerate among us anyone who does. Furthermore, I resolve to do my duty and live honorably, so help me God." The academy's Class of 1959 adopted the first sentence of the oath, the cadet's honor code. In 1984, the Cadet Wing expanded the oath—after widespread allegations of cheating among some cadets—by adding the second sentence, stated the release.

Pilot Receives DFC With Valor

Capt. Charles C. Napier received the Distinguished Flying Cross with Valor Device for his heroic actions piloting an HH-60G helicopter during a rescue mission in Afghanistan in December 2012.

Col. Ginger L. Wallace, 517th Training Group commander at the Defense Language Institute in Monterey, Calif., pre-

Playing Hide the Bogey: *An F-35 over an off-coast military test range executes the aircraft type's first live-fire launch of a guided air-to-air missile on Oct. 30. The AIM-120 was fired from the USAF version of the Lightning, acquired the target, and successfully followed an intercept flight profile. With only moments left before the missile engaged the target, a self-destruct signal was sent to the AIM-120 so that the drone target could be preserved for further tests.*

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sented Napier with the medal during an Oct. 17 ceremony at the school, where Napier is now a student, according to an institute release.

Napier is credited with saving the lives of three critically wounded soldiers in an Afghan village west of Kandahar by skillfully maneuvering his HH-60 into firing position just 60 feet away from the enemy, shielding friendly forces from enemy fire, and allowing a second HH-60 to land pararescuemen to retrieve the wounded, stated the release.

"That is what we are trained to do. We help people who are in harm's way," said Napier.

Clapper on Surveillance Activities

James R. Clapper Jr., national intelligence director, defended US intelligence operations before the House Select Intelligence Committee, deeming them "lawful."

"The rigorous oversight we've operated under has been effective," said Clapper during the Oct. 29 oversight hearing. Committee members met to discuss potential amendments to the Foreign Intelligence Surveillance Act and changes to National Security Agency programs in response to public concern regarding government surveillance practices unveiled by former NSA contractor Edward Snowden.

Clapper said the "manner" that some have characterized these intelligence activities has been "incomplete, inaccurate, or misleading."

"What we do not do is spy unlawfully on Americans or … spy indiscriminately on the citizens of any country," he asserted. "We only spy for valid foreign intelligence purposes as authorized by law, with multiple layers of oversight to ensure we don't abuse our authorities."

The hearing took place on the same day that Senate Judiciary Committee Chairman Sen. Patrick Leahy (D-Vt.) and Rep. Jim Sensenbrenner (R-Wis.), chairman of the House Judiciary Committee's crime, terrorism, homeland security, and investigations panel, introduced the US Freedom Act. That legislation would end the government's "dragnet" collection of phone records and require greater oversight of domestic surveillance activities.

CAP's New Structure

The Civil Air Patrol, the Air Force's auxiliary, is restructuring its noncommissioned officer corps to mirror the Air Force's NCO corps. With this change, CAP will be able to develop and promote its NCOs through its ranks in a promotion system similar to the Air Force's, according to an Oct. 21 release.

"The NCO corps is the backbone of any organization and brings a wealth of information to the table," said Maj. Gen. Charles L. Carr Jr., CAP national commander. Daniel B. Ginsberg, the Air Force's assistant secretary for manpower and reserve affairs, added, "It is no small task to create a framework for a professional volunteer force, and I'm very proud of the way everyone came together to create a workable proposal."

CAP's previous NCO setup did not allow for upgrade training for promotion. ■

Cold War Relic

It wouldn't serve US nuclear deterrence—or nonproliferation—goals to modernize the B83 nuclear gravity bomb in place of the B61, senior Defense Department and Energy Department officials told lawmakers in late October.

The megaton-class B83 is a "relic of the Cold War," Madelyn R. Creedon, assistant secretary of defense for global strategic affairs, told the House Armed Services Committee's strategic forces panel on Oct. 29. "We need the '61" for maintaining a credible, forward deployed tactical nuclear weapon for NATO and also for extending the US nuclear umbrella to protect allies in Asia, she said.

"The B61 is the best of the choices to go forward," said Gen. C. Robert Kehler, head of US Strategic Command, at the same hearing.

Creedon and Kehler were responding to questioning from Rep. John Garamendi (D-Calif.), who argued it might make sense to invest in keeping the comparatively newer B83 viable instead of the B61, one of the oldest nuclear weapons in the US stockpile. Garamendi was concerned about the estimated cost—more than $10 billion—of the Obama Administration's planned B61-12 life extension program (LEP).

He also questioned the need for maintaining tactical nuclear weapons in Europe. "If the B83 is good with some repairs over the next decade or more, why do we need the B61?" he asked.

Kehler answered that the B61 is the only nuclear bomb "that can arm both the B-2 bomber and dual-capable fighter aircraft deployed by the US and NATO in Europe" as part of the Alliance's nuclear mission. Further, the B61 is the candidate nuclear weapon for the F-35 strike fighter and the future US bomber, he said.

The B83 could arm the B-2. However, "the B83 is not currently compatible with NATO aircraft, nor with [US] fighters," said Donald L. Cook, the National Nuclear Security Administration's deputy administrator for defense programs.

The B61-12 LEP would refresh components of the 1960s-vintage B61 and replace the different bomb variants with the single B61-12 configuration.

Completing the B61-12 LEP would enable the United States to retire the B83, the last megaton-class gravity bomb in the US inventory, said Cook. This would make the B61-12 the only nuclear gravity bomb in the US inventory. That's part of the Obama Administration's broader nuclear modernization strategy—reducing to fewer nuclear warheads, yet ones that are safer, more reliable, and more secure.

Cook said maintaining the B83 inventory over the long term, including tasks such as integrating the bomb on additional aircraft types in lieu of the updated B61, "would be considerably more expensive" than a B61 life extension.

—Michael C. Sirak

Read the full article at www.airforcemag.com. Search "Cold War Relic."

J. Robinson Risner, 1925-2013

James Robinson Risner, a Korean War ace who gained world attention as a Vietnam War combat pilot and leader of fellow prisoners of war in the infamous "Hanoi Hilton" during more than seven years of captivity, died Oct. 22 at the age of 88. He was the first living recipient of the Air Force Cross and one of only a handful of airmen to be awarded the medal twice.

Risner's gutsy airmanship led to noteworthy victories, but he also helped create a code of conduct for POWs that endures to this day.

Born in Mammoth Spring, Ark., in 1925, Risner grew up in Oklahoma, the son of a sharecropper. At 18, he enlisted as an aviation cadet in the Army, receiving his wings and commission in May 1944. Though he requested World War II combat duty, he was assigned to fly fighters in Panama.

Risner mustered out in 1946 and worked in several automotive jobs. He joined the Oklahoma Air National Guard, however, and became an active F-51 Mustang pilot. Recalled to Active Duty in 1951, he learned to fly the F-80 Shooting Star and requested duty in Korea.

Soon after arriving there in 1952, he finagled a transfer to the 4th Fighter Wing and was assigned to fly the F-86 Sabre. He bagged his first MiG on Aug. 15, 1952. A month later, while escorting a strike package of F-84 Thunderjets, Risner pursued a MiG 35 miles into China, ultimately shooting it down over a Chinese air base.

In September 1952, Risner shot down a fifth MiG and became an ace, ultimately receiving credit for eight air-to-air kills by the end of January 1953, having flown 108 missions in Korea.

Receiving a regular commission, Risner took on a number of assignments as an operations officer and squadron commander, both Stateside and in West Germany. Chosen to fly an F-100F to Paris for the 30th anniversary of Lindbergh's solo flight across the Atlantic, Risner set an unofficial domestic speed record, coast-to-coast, and then another record across the Atlantic. He made two air-to-air refuelings—then a novelty.

After the Air War College and Pacific Command staff duty, in 1964 he took command of the 67th Tactical Fighter Squadron at Kadena AB, Okinawa, and soon led a flight of seven F-105D Thunderchiefs to Da Nang AB, South Vietnam, on temporary combat assignment. From the beginning, he was an aggressive pilot, dropping two bridges on an early mission when he'd been ordered to destroy only one; he simultaneously got an Air Medal and a reprimand.

On another temporary deployment, this time to Korat AB, Thailand, Risner led the first strike of the Rolling Thunder air campaign, on March 2, 1965. Two weeks later, he took heavy damage on a mission and had to bail out over the Gulf of Tonkin, but was rescued.

On April 3 and 4, he led back-to-back missions against a railroad bridge—action that earned him his first Air Force Cross. Risner repeatedly pressed the attack, withstanding heavy enemy air and ground fire, directing the battle at low altitude, and flying on despite a damaged aircraft and smoke in the cockpit. Two weeks later, partly due to these heroics, Risner appeared on the cover of *Time* magazine. In continuing combat, Risner was hit repeatedly.

In September 1965, Risner was shot down a second time, while attacking a surface-to-air missile site in North Vietnam. This time, he was captured. Having seen the *Time* cover, the North Vietnamese knew they had a prize and treated Risner especially badly, trying to coerce information and propagandistic statements from him. During his seven years and four months in their hands, he endured prolonged solitary confinement, subsisted for months on bread and water, and was tortured—sometimes daily.

As senior officer among the POWs in the "Hanoi Hilton," he held isolated prisoners together with optimism and faith, many of them later said. Organizing a forbidden prayer service in 1971, Risner was dragged away for more torture. Fellow prisoner George E. Day stood up and led the other POWs in singing "The Star-Spangled Banner" to encourage him. Risner heard the singing and later said it made him feel "nine feet tall."

Ultimately, the torture became too much, and Risner was made to sign an "apology" for bombing North Korea. He instructed his fellow prisoners that they should resist but not endure torture beyond the point where "you lose your capability to think … [or] lose the permanent use of your limbs."

For his courage under torture and for establishing an honorable standard of resistance, he received a second Air Force Cross. The torture continued until 1973. He was among the first group of POWs released, on Feb. 12.

He emerged from captivity with few permanent physical injuries, and talked the Air Force into letting him fly again. He flew the F-4E Phantom and became commander off the 832nd Air Division. Promoted to brigadier general, his last uniformed job was as vice commander of the Fighter Weapons Center at Nellis AFB, Nev., where he ran early incarnations of the Red Flag series of exercises. He retired in 1976.

In retirement, Risner led Texas' war on drugs. He wrote a memoir, *The Passing of the Night,* about his POW experiences.

His friend, Ross Perot Sr., commissioned a statue of Risner that today stands at the Air Force Academy. Day, speaking at the dedication, called the statue—which is nine feet tall—"life size."

—John A. Tirpak

See www.airforcemag.com. Search "Nine Feet Tall."

chartpage@afa.org

The Kims' Little Shop of Horrors

When it comes to threats from North Korea, most attention focuses on nuclear arms. A recent RAND study, however, notes that the communist Kim dynasty—Kim Il Sung, Kim Jong Il, and Kim Jong Eun—has also pushed for a horrific array of biological weapons. The exact nature of this program is murky, but the table here gives a sense of its likely dimensions. The worries include malignant anthrax, cholera, bubonic plague, and even smallpox. If weaponized and employed, says the author, these agents would pose "a fearsome threat" to South Korea and even the United States.

Potential North Korean Biological Agents

BW Agent	Type of Agent	Untreated Lethality	Korean Cases		U.S. Cases 2011
			2010	2011	
Anthrax	Bacteria	High	0	0	1
Botulinum	Toxin	High	0	1	153
Brucellosis	Bacteria	<5%	31	19	79
Cholera	Bacteria	50+%	8	3	40
Dengue fever	Virus	1%	125	72	3
Diphtheria	Bacteria	5–10%	0	0	?
Dysentery	Bacteria	Low	?	?	?
E. coli	Bacteria	3-5%	56	71	2,575
Hemorrhagic fever (HFRS)	Virus	5–15%	473	370	23
Hepatitis	Virus	Low	?	7,247	4,301
Japan. Encep.	Virus	≤60%	26	3	?
Malaria	Parasite	Low	1,772	838	1,724
Pertussis	Bacteria	Low	27	97	18,719
Pnm. plague	Bacteria	High	0	0	3
Q Fever	Bacteria	Low	13	8	134
Smallpox	Virus	20–40%	0	0	0
Tuberculosis	Bacteria	High	36,305	39,557	10,528
Tularemia	Bacteria	Moderate	0	0	166
Typhoid fever	Bacteria	Moderate	133	148	390
Typhus	Rickettsia	Moderate	54	23	?
Yellow fever	Virus	Moderate	0	0	0

Listing of South Korean and US cases is for reference and comparison only and does not signify cases of actual North Korean employment of weapons.

Source: "The Challenge of North Korean Biological Weapons," by Bruce W. Bennett, testimony before the House Armed Services subcommittee on intelligence, emerging threats, and capabilities, Oct. 11, 2013; published by RAND Corp., Santa Monica, Calif., 2013. Based principally on data from the Korea Centers for Disease Control and Prevention; US Centers for Disease Control and Prevention; and US Forces Korea. Find the report on the RAND website at http://www.rand.org/pubs/testimonies/CT401.html.


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BOEING

Climb Time for

Costs and performance are improving, but 2014 will be a critical year.

Lockheed Martin photo by Matthew Short

The F-35 joint strike fighter program is on a roll. Production prices and operating cost estimates are coming down, flight test is accelerating, development issues are being cleared, pilot training is underway, and target dates for operational service have been announced.

There are still risks in the program, but the services and Pentagon leaders insist the F-35 is their top priority and have pledged to protect its funding no matter what happens with the rest of the defense budget.

In a September interview, Air Force Lt. Gen. Christopher C. Bogdan, the F-35 program executive officer, said, "We are really, really close to turning the corner" on the fighter. "I am confident," he said, that the Marine Corps, Air Force, and Navy will have everything they need to achieve their target initial operational capability dates in the second half of 2015, second half of 2016, and late 2018, respectively. Those dates were announced by the services in June.

After a program review summit last summer of Pentagon, contractor, and international F-35 partners, Undersecretary of Defense for Acquisition, Technology, and Logistics Frank Kendall declared the strike fighter was no longer "one of my problem programs." Kendall also forecast that he'd greenlight a significant hike in F-35 production rates following a program review this fall.

Production has been held to about 30 airplanes a year for the last three years, but Kendall said he saw no reason not to start ramping up to 44 airplanes in 2015 and 66 in 2016.

Following this fall's Oct. 21 review, Kendall said production rates could increase—"consistent with budget priorities"—so long as progress continues, particularly in software, reliability and sustainability, and test.

"This is not the program of 2010," Kendall told reporters at a press conference after the June summit. While he said it was too soon to "declare success," he was impressed by the program's progress and forecast significantly lower cost reports in the months to come.

The coming year will be telling, however. Bogdan said his optimism is tempered by the prospect of "hard stuff" the program will have to achieve in the next 12 months.

"The two things we need to … really turn the corner, is to watch the production ramp rate go up because we really haven't seen that yet," he said. The second accomplishment needs to be demonstrating success with major software milestones.

One aspect of that software verification work is live, guided weapon launches. These began in October. While many types

the F-35

By **John A. Tirpak,** Executive Editor

Left: AF-1, piloted by Maj. Matthew Phillips, completes the first aerial weapons release of an AIM-120 AMRAAM over a test range in China Lake, Calif. Below: Maj. Jay Spohn, the first Air National Guard pilot to be qualified in the F-35 and an instructor pilot at Eglin AFB, Fla., runs a preflight check on an F-35 in 2012.

Photo by Jim Haseltine

Lt. Col. Matt Kelly pilots an F-35 during aerial refueling testing June 19. It was the first time an F-35B tanked from a KC-10.

of munitions have been released from the fighter to demonstrate they can come away from the airplane safely, "in the next year, we're actually going to try to … hit something," Bogdan said. The first tests included laser guided bombs and air-to-air missiles.

The ramp rate is a big challenge because it "stresses the supply chain pretty good when you're doubling your production over the next three years," he noted. For now, though, "engine and aircraft [production] are stable."

However, once it's clear the production increase and the software and weapon tests are going well, then "I would tell you … the program's turned the corner," he said.

Two key developments over the summer highlighted the program's progress. The government and Lockheed Martin struck a deal on production Lots 6 and 7 dropping the price four percent with each lot. Also, Bogdan sent a revised life cycle cost estimate to the Senate forecasting the US military fleet of 2,443 F-35s will cost $857 billion to buy, own, and operate for the next 53 years. That projection was 22 percent lower than the previous estimate, created by the Pentagon's Cost Assessment and Program Evaluation shop, which famously pegged it at $1.1 trillion.

While skeptics may be suspicious that these positive developments are coming at a time when defense programs are getting intense scrutiny, all this good news out of the project "is not spin. It's just fact," Bogdan said.

Now in its 12th year, the F-35 program has had a turbulent development. Three years ago, the project had to be restructured as deadlines slipped, flight testing lagged, technical problems abounded, and costs rose.

Vice Adm. David J. Venlet, then the F-35's PEO, asked for—and got—extensions of time and money to get the program back on track. About $6 billion was added to the program, along with 30 more months of development time, to resolve problems of concurrency. Concurrency is performing development, flight testing, production, training of operational pilots and maintainers, establishment of depots, and stand-up of operational bases all at the same time.

"I'm not sure that both the good and the bad got equal time" in public discussions about the F-35 until recently, Bogdan said. "Sometimes, not enough of the bad" was publicized, he said. Then, "people got surprised when things went off the rails"—and the bad news became a major story.

Since taking over the program in the summer of 2012, Bogdan's mantra has been "no more time and no more money." He won't request any more of either from Congress and said if any of the three services, eight international partners, or two foreign military sales customers involved in the program want to make changes to it, those changes must be thoroughly justified and paid for by deleting something else. He's established a team within the project whose sole job is to minimize changes, which drive costs up.

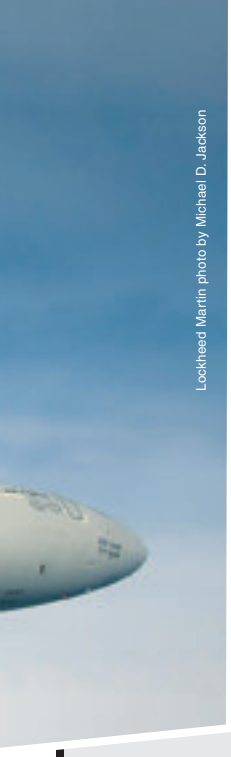
An Imbalance of Risk

The program left to him by Venlet is "pretty credible and pretty realistic," Bogdan said in a speech at the Air Force Association's Air & Space Conference in September.

He admitted throwing "a hand grenade into the crowd" in his speech the year before, by declaring the relationship between the government and its contractors on the F-35 was the worst he'd seen in his years as an acquisition officer.

"That was intentional," Bogdan said of those harsh comments, and they had the desired effect of getting the attention of contractors, the press, and Capitol Hill alike—making clear the urgency of changing the program's culture.

The old, dysfunctional relationship was not based on transparency and good communications, and it was also not fair, he said. There was an imbalance of risk, wherein the government was bearing too much and the contractors not enough.



Lockheed Martin photo by Michael D. Jackson

Now, though, "the balance of risk has changed," he said. While the relationship is not yet perfect, the Lots 6 and 7 results—achieved in only several months, after it took nearly 14 months to negotiate Lot 5 alone—demonstrate improved communication, he said. Bogdan pointed out that the government has "zero" liability if costs on Lots 6 and 7 are higher than those quoted by Lockheed Martin and engine-maker Pratt & Whitney; the companies will have to eat any overages. However, if costs are lower than expected, the government and the contractors share in the savings. Lot 8 comes up for negotiation next month.

Bogdan's speech at the 2012 AFA conference was "an impactful day," said Lorraine M. Martin, Lockheed Martin's F-35 vice president and general manager, in an interview. She and Bogdan resolved to make Lots 6 and 7 the "test case [for] how we can do business better together—communicating, coordinating, being responsive, ... which is what a good partnership is all about."

"[Through Lot 7], we've brought the price down 55 percent since the first time we negotiated for a production aircraft," Martin said. The price decrease was made possible by negotiating two lots at once, an improved learning curve, higher volume, and because of lessons learned on Lot 5, she said.

"We spent a lot of time in [Lot] 5 really understanding costs," she observed, chalking up most of the delay to the process of reaching agreement with the government on what those costs actually were.

"The next round of efficiencies," however, will depend on increasing the volume produced, to obtain the economies of scale, she said. The US military services expect to buy more than 2,400 F-35s; export orders will involve at least 600 more.

The program office's new lower cost estimate is informed by thousands of hours of real-world experience in test and training flights and maintenance, while the previous CAPE estimate—now three years old—did not have those numbers to work with and is "stale," Bogdan said.

In his 2013 Air Force Association Air & Space Conference speech, Bogdan forecast that "by 2019, you're going to see an airplane, in my opinion, that is comparable in cost" to fourth generation fighters. It will be somewhat more expensive "because you would expect that a fifth generation aircraft would cost somewhat more," but he said he's got contractor commitment to aim for price equivalency with fourth gen fighters. For the Air Force, the price is ultimately expected to come in at about $85 million a copy, flyaway cost.

Because affordability is the top management priority, Bogdan said he's copied a tactic used by the Navy on its Virginia-class submarine program and by European governments and contractors for the Typhoon fighter. He's established a "cost war room," populated by government and contractor experts whose sole job is to scrutinize operating costs and look for more efficient ways to do things. The contractors have provided office space and efficiency experts "with their own nickel," Bogdan said.

The war room was a good idea in any case, but it was mostly in response to the reliability and maintainability experience so far on the F-35, which "is one of my biggest worries, long term," he said.

The R&M cost curves "we're seeing right now are not where we need them to be, not where the services need them to be," Bogdan said. One headache is parts shortages: It's taking too long to fix parts and some were not designed properly in the first place.

Tires on the F-35B short takeoff and vertical landing model, for example, are being changed out too often. As it turns out, he said, the qualities that make a tire work well for a vertical landing on the F-35B are "on the opposite end of the spectrum" from the qualities that make a tire last a long time in conventional use. Lockheed Martin and tire manufacturer Dunlop have gone back to the drawing board, but the tire redesign "isn't costing me one penny," Bogdan said.

This is just one sign the program now demands accountability from contractors and customers alike to live up to their promises. When the tire is redesigned, Bogdan said he will expect the companies to "stand behind" their product with a warranty.

The spares situation, Martin said, came about for several reasons.

"The sparing inventory wasn't funded the way the program office would have hoped at the beginning," she said. "It's being fixed, going forward, … but in some cases, we don't have the spares we'd be looking for." Complicating the problem is the rapid stand-up of multiple F-35 operating locations; something not "originally planned for" in the spares plan. "We ... have six operational bases right now," she said, and there have to be spares available in all locations.

The stand-up of the USAF and USMC depots should help the spares shortfall by creating more places where parts can be fixed, freeing the parts manufacturers to concentrate on production rather than rework of parts.

Bogdan said he's taken a "whack-a-mole" approach to reliability issues. "We have a good list of all those bad actors," he said. "So we are systematically going through and applying engineering discipline, money, and work to ... bring that list down"—20 items at a time—"until we get the reliability and maintainability on this airplane to what the users need."

USAF photo by Andy Moratayа

Lt. Gen. Christopher Bogdan leads a discussion about F-35 requirements at the Air Force Association's Air & Space Conference and Technology Exposition Sept. 17, 2013.

A Marine Corps short takeoff and vertical landing version of the F-35 takes off from USS* Wasp *during developmental testing on Aug. 12, 2013. Tire fatigue is an issue for the STOVL version of the Lightning II, but the fix isn't costing DOD.

Testing Takes Off

By the end of this calendar year, the F-35 program will be "50 percent done" with the test flight program, versus one-third done at the end of last year, Bogdan reported. Test flying is accelerating because more test aircraft were added, and the flights themselves are being run "more efficiently." Departure testing and engine airborne restart testing are finished, and "we're very happy to have come through that cleanly," said Bogdan, himself a former test pilot.

All versions of the F-35 have performed aerial refueling with all US tanker types, and the short takeoff and vertical landing F-35B has made runs on the small carrier *Wasp* for vertical landing tests. Testing of the Multifunction Advanced Data Link, or MADL, system also is underway.

"That's a big deal for us," Bogdan said, "because this airplane is so darn smart, if you can't talk to other people, we will lose huge capability in the future."

He said the Air Force and Marine Corps versions have completed one "lifetime" of durability testing and have started a second lifetime; the Navy model has nearly finished its first durability lifetime.

The program will deliver 36 aircraft this calendar year, Bogdan said. He said "the biggest thing" that has changed on the program since last year is the number of sites where F-35s are flying. Each service has several operating locations now; Air Force and Marine Corps depots have been stood up; and the Navy has started flying its new F-35Cs at Eglin AFB, Fla. Italy's Final Assembly and Check-Out (FACO) facility recently began assembling its first fuselage.

"So in just one year, we've added five or six different sites, … and over the next four years, we'll add another 11 sites," Bogdan said. From 2011 through 2017, "we'll have 17 more places where we'll be operating the F-35. That is a big, big increase."

Eglin, the all-service F-35 schoolhouse, has trained some 67 operational pilots, and there are more than 100 F-35 pilots in all. More than 100 F-35s are flying.

Most long-term issues with the F-35 are also largely resolved, to varying degrees, Bogdan reported.

The F-35 helmet—on which pilots depend for 360-degree situational awareness, night vision, targeting, and aircraft status data—had a number of problems with nighttime acuity, latency of the image as pilots moved their heads, and a jittery presentation.

Martin said the helmet concerns have been generally corrected after "a good six months" of testing fixes. Some were with software, and the night vision problem is being remedied by substituting a new, more advanced camera than the existing 2005-vintage model. It will be cut into production starting with Lot 7.

"But we can go to war with the helmet we have," she said, and in fact, the existing helmet "has been deemed suitable for Marine Corps IOC." The helmet has "9,000 flying hours on it," and pilots "love it," she said. Bogdan agreed that the helmet matter seems to be resolved. He canceled an alternative helmet development; its existence had offered contractors a stiff incentive to fix the original equipment. Progress in resolving the helmet issues made the alternative unnecessary, he announced in October.

The original F-35C arrestor hook has been redesigned and tested, and the new hook will soon be integrated into production.

Regarding issues with fuel dumps, "we're stuck with the design," Bogdan said in the AFA speech. Underwing pressure was keeping dumped fuel against the airframe, getting into areas where it shouldn't go. Tweaks of affected areas on the wing will mitigate the problem and render the situation acceptable to the Navy and Marine Corps. USAF tends not to dump fuel, he said.

Critics joked that the F-35 Lightning II can't survive an encounter with lightning, since it doesn't fly in thunderstorms.

"The truth of it is, you usually don't get clearance to fly an airplane in lightning until near the end of the development program," Bogdan said, and the F-35 is only halfway through flight test. Still, the program will accelerate lightning qualification to satisfy critics; it should be in place by 2015.

The Marine Corps will declare the F-35 operational with what is called the 2B software. It will have all the basic weapons, sensors, software, electronic warfare, and other capabilities expected for initial operations and, at that minimum level, will still be better than those on any current Marine Corps fighter.

The 3I software, considered interim software as is the 2B, is the same suite of programs but on a more powerful processor, Martin explained. The 3F software—which will

equip the Air Force's first war-ready aircraft—"is the final … development capability as committed to on the F-35," she said.

The 3F software "has some more data fusion in it [and] has about 300,000 extra lines of code to be coded that we haven't finished yet, out of 8.6 million [lines in the fighter]," Martin explained. That's "nontrivial, but we do have the time, and we have a plan that we feel comfortable can be executed," she said.

The 2B software has had "three main drops, and they have all been on time, with the capability we had promised." There's also clear agreement with the program office about just what has to be in each software drop, she said, so "there's no question between us and [Bogdan] at any time where we are."

Breaking the Code

Martin asserted that, as of September, 95 percent of the F-35 software has been coded and "86 percent is flying."

Bogdan agreed that "the interim capabilities" of the software as it stands now "are pretty secure." However, "I am less confident on the back end … [in] the 2016 to 2017 time frame, with our final capability."

The F-35 has "10 million lines of code on the airplane [and] 10 million lines of code on offboard systems. That is just an awful lot of software." The pacing is critical, he said in the AFA speech.

"The labs, the airplanes, the software engineers" now working on the 2B and 3I will have to shift to the 3F at some point. If that shift happens in "a timely way," he will be confident in the software effort going forward, he said. But "if I have to leave people and resources on 2B and 3I longer, you can bet that affects our final capability."

Stakeholders should keep an eye on the 2B and 3I software progress; "that will give you a very good indication of what's going to happen in 2017," Bogdan suggested.

Air Force Chief of Staff Gen. Mark A. Welsh III rarely misses a chance to advocate for the F-35 as crucial to the service's future combat ability. Last spring, he also said the F-35 will have to bear a much greater part of the air superiority mission than it was ever intended to, because of the small number of F-22s.

"I believe the Chief is probably right," Bogdan said in the interview. As a replacement for the F-16, the F-35 will inherit the Viper's air-to-air role.

To give it more dogfighting capability, Bogdan said the F-35 program has a science and technology funding line that looks at future capabilities and growth potential for the fighter. "We are specifically targeting sensors and weapons that enhance our ability in the air-to-air realm," he reported. "We … will make this airplane even better than it is today in an air-to-air role."

There are block upgrade plans "already in place for the aircraft," Martin said. There are "significant roadmaps" for electronic warfare, communications, weapons, and sensors, "not only to support the US but our partners as well." The summit-level steering committee is "now in the process of looking at Block 4A and 4B for added capabilities," she said.

The power plant is a likely improvement area. Bogdan said there could be modular enhancements to the F135 engine, or "a whole new engine 20 years from now." The entire S&T community, he said, "continues to advance engine technology, and … the F-35 is going to use some of that someday. We have to."

Moreover, the F-35's stealth can be improved, he said.

"It's not just coatings, … shape, [or] … countermeasures kind of stuff. There's a whole host of things you can do" without affecting the aircraft's shape or "mold line." The program "would like to tap into that," he said.

Bogdan acknowledged that Lockheed Martin offered stealthy external weapons or fuel pods on the stillborn FB-22 proposal, and something similar could extend the F-35's range, even as the services are putting a premium on longer-range systems to defeat anti-access, area-denial threats.

However, combat commanders "have to decide in some form of trade if they're willing to pay the penalty of maybe a little less stealth, a little less payload for increased range," Bogdan said. "I've not heard that demand signal yet."

The recent news of positive developments coming from the program office shouldn't be construed as advocacy, Bogdan maintained.

"I have to run the program to the best of my ability and let the chips fall where they may," he insisted. Program advocacy is best left to Lockheed Martin, the services, and the international partners. To be an F-35 advocate would mean "I lose my credibility," he said.

Even so, Bogdan is confident "it's going to come out good."

Having made countless visits to Capitol Hill since taking over the F-35, Bogdan said he believes there is a "sea change" in the way the fighter is perceived there.

"I think the Hill appreciates our candor and the transparency we're providing them on the program," he asserted, hastening to add that he's only one of many messengers from the Defense Department explaining how things are going on the F-35. Service Chiefs and the "whole senior leadership" of the Defense Department are telling Congress "what is and what isn't." It's appreciated, he said. Members of Congress "don't like to make decisions in a vacuum; they want information to make good decisions," and a diet of news skewed good or bad doesn't help.

Ten years from now, Bogdan concluded, "people will look back and they'll go, 'What was all the fuss about? This is a darn good airplane.'" ■

Lockheed Martin photo by Neal Chapman

Lockheed Martin employees work on assembling the 100th F-35 in January at the company's facility in Fort Worth, Tex. The aircraft will be known as AF-41.

USAF photo by Capt. Tristan Hinderliter

Life Flight

By Amy McCullough, News Editor

Capt. Adriana Valadez had no idea the life of an Air Force hero was in her hands.

Valadez, 35, a Reservist assigned to the 433rd Aeromedical Evacuation Squadron at JBSA-Lackland, Tex., was serving as medical crew director on a routine aeromedical evacuation flight in Afghanistan when the C-130J—call sign Bandage 33—was suddenly diverted to Mazar-e-Sharif to pick up an additional patient—a high-priority one.

Although the call was urgent, details were sparse and the crew really didn't know what to expect.

"We just knew it was a gunshot wound. We didn't know where or what. We didn't have any of the details," said Valadez, who was on her first deployment.

Mazar-e-Sharif is a German-controlled forward operating base in the northern province of Balkh near the Uzbekistan-Tajikistan border. The medical attendant who escorted the patient out to the aircraft in an armored ambulance was German and didn't speak any English, making it nearly impossible for the aircrew to get the information it needed.

Valadez and her team, which included one other flight nurse and three medical technicians, had no idea how extensive the USAF combat controller's wounds were or what his medical history was. The paratrooper who initially rescued him from the battlefield about four hours earlier tried to fill in the gaps as best he could, but communication would continue to be a challenge throughout the mission.

The bullet had entered the airman's right femur and exited out his right buttock, said Valadez. He had undergone surgery at Mazar-e-Sharif to clean his wounds, but the doctors there knew he needed more advanced care if he was going to keep his leg and his life.

The combat controller was listed in urgent but stable condition, "but he didn't look good," said Valadez.

As the team rushed to get the patient settled so they could take off, some crew members tried to connect with command and control through satellite telephones. They wanted permission to go straight to Bagram to drop off the patients and then continue on with their mission, but the phones were not working that day.

Because they were a basic aeromedical evacuation five-man crew, they didn't have any doctors or other medical specialists onboard. They also had minimal drugs in their kit and they didn't carry blood.

Communications Down

Afghanistan is a dynamic environment where situations can rapidly change—as they did that day—but Bandage 33 was typically called in to pick up patients in stable condition, said Valadez. In fact, there were four such patients already onboard the aircraft at that time.

The crew is able to provide oxygen and fluids to keep patients stable and comfortable in flight, but any additional medical procedures must first be approved by a flight surgeon. However, it quickly became clear that any conventional method of communication was not going to work and the clock was still ticking.

"We can't be a practicing physician. We have to call for everything. That's why

The aeromedical evacuation mission started off normally, but Bandage 33's patient was far from ordinary.

Far left: (l-r) MSgt. John Kley, Capt. Adriana Valadez, SSgt. Julian Williams, Lt. Col. Kathleen Sprague, and SrA. Amanda Pena, the crew of Bandage 33. Above: A C-17 loaded with patients and a critical care air transport team leaves Bagram Airfield, Afghanistan, in March. C-17s and C-130s are among several aircraft types tasked with this mission.

communication was so important, and we didn't have any that day," said Valadez.

Thankfully, the C-130J was equipped with a sophisticated new communications technology known as Dynamic Retasking Capability, or DRC.

Maj. Ryan Thornton, one of Bandage 33's pilots, was a captain at the time and assigned to the 772nd Expeditionary Airlift Squadron at Kandahar Airfield. He said the DRC allows pilots to send messages to command and control similar to a text message. The front of the DRC is a moving map display. When you push up on the map a keyboard appears.

"We had just trained on it before we deployed. ... It really proved to be a good tool," said Thornton. He was on his first C-130 deployment, though he had deployed before as a KC-10 pilot. The DRC is only available in the C-130 and the C-17.

It was the "only way to let command and control know that we had to proceed to Bagram," added Thornton, who is currently assigned to the 41st Airlift Squadron at Little Rock AFB, Ark.

Thornton was able to get through to command and control using the DRC, but communication continued to be a problem. Their request to fly directly to Bagram was initially denied because the paperwork said the patient was listed in stable condition.

However, as the aircraft ascended, the combat controller's condition began to rapidly deteriorate. The second flight nurse, Lt. Col. Kathleen Sprague, called Valadez back to the rear of the aircraft. The patient's blood pressure was dropping. His face was pale and his breathing was fast.

On seeing his condition, Valadez went back to the pilot and said, "We need to go to Bagram. We can't wait. Do what you need to do. Put the call out. Whatever you need to do. We need to declare an inflight emergency because the patient is not doing well."

Several months later, during the Air Force Association's September Air & Space Conference, Chief of Staff Gen. Mark A. Welsh III highlighted this mission in his speech. As Welsh praised all the airmen involved for their quick thinking and hard work, he joked that Thornton was "scared to death of Adriana. He just calls her the 'bad ass.'"

During an October interview with *Air Force Magazine,* Thornton laughed as he recalled the quote. But he didn't contradict it. Thornton said Valadez's professionalism and overall "bad ass" nature made it easy for the pilots to do their job that day.

"She does nursing outside of the Air Force and it was very evident. ... She was a very impressive human being. I was very fortunate to work with her to help another airman," Thornton said.

The airevac crew worked with the pilots so they could portray the significance of the patient's injuries, and Bandage 33 was given the green light to reroute.

"We were going max blast all the way there," copilot Capt. Eric Jones said in an April Kandahar release. "That's the closest thing I think we'll ever get to driving an ambulance. You call, 'Urgent medevac' over the radio and they part the Red Sea for you. All the traffic gets out of your way."

The flight from Mazar-e-Sharif to Bagram typically takes about an hour and 20 minutes. Bandage 33 made it in 42 minutes.

As the airplane sped toward Bagram, Valadez went back to the patient to try to figure out why his blood pressure had dropped and why he looked so pale. When she pulled up his blanket to assess the wound, she realized the dressing and litter were soaked with blood.

"Once we reach altitude there can be adverse affects," said Valadez. "He was fresh from post-op when we got him on the plane. He had a fresh wound. Then just being at altitude" all played a role in his deterioration.

His leg also started to swell and he was losing feeling, said Valadez.

"I began to hold pressure because I wasn't sure if it was arterial or venous or from the surgery. You just can't tell up there. It's dark and you don't have the best resources," she said.

The second flight nurse, Sprague, and the three medical technicians—MSgt.

USAF photo by Michael J. Pausic

Above: Military personnel offload a patient from a C-130J at Bagram in the same procedure that was performed when Bandage 33 brought in their patient. Left: Valadez is thanked by Air Force Chief of Staff Gen. Mark Welsh at the Air Force Association's Air & Space Conference in September. To her left is Outstanding Airman of the Year MSgt. Andre Davis.

John Kley, SSgt. Julian Williams, and SrA. Amanda Pena—were giving him IV fluids and changing his oxygen in an effort to stabilize him once again. As Valadez held pressure on his thigh, she noticed even more blood coming up from his back. That's when she knew he was bleeding from both the entrance and the exit wound.

Compromising Positions

She kept the patient talking to keep him conscious, joking about the absurdity of making small talk while her hands were "in some very compromising positions."

USAF photo by Capt. Tristan Hinderliter

USAF photos by SrA. Scott Saldukas

Above and below: Contingency aeromedical staging facility personnel and other airmen hoist a patient from the transport bus, transferring the wounded troop to a waiting C-130J at Kandahar Airfield, Afghanistan.

Despite the "comical moments," Valadez said both were concerned the airman might lose his leg.

"I was more worried about any kind of long-term damage to his leg because we just didn't know where the bleeding was coming from—if it was bone, if it was arterial, if it was venous. So we were definitely worried about getting him to a higher level of care so he would have the use of his leg," she said.

It wasn't just the patient's vital signs that were shaky. Bagram is known as the "Bagram Bowl" because the airfield is surrounded by jagged mountains. Since the C-130J was coming from Mazar-e-Sharif at max speed, Thornton and Jones were forced to descend rapidly and steeply.

"They don't want to slow down. It's a little rugged inside the back of the airplane, so they're bouncing around a little bit," said Welsh in September. "Adriana's having trouble now keeping pressure on the bleeding, which she's now doing with her hands because that was the best way to try and do it. So she straps herself in the litter with the patient and hangs on as they go down this bumpy ride."

Forty-two minutes after taking off at Mazar-e-Sharif, Bandage 33 landed safely at Bagram. Despite the communication struggles throughout the mission, everything was in place by the time they landed. A flight surgeon was on call, the emergency room was ready, blood was on hand, and nurses were ready to transfer the patient from the aircraft to the ER.

The airman's blood pressure had gone back up, and the bleeding appeared to be under control. However, his leg remained severely swollen and the AE crew was having a hard time finding a pulse in his foot. Valadez didn't want to ease the pres-

USAF photo

Air Force Cross recipient TSgt. Zachary Rhyner was grievously wounded during a firefight in Afghanistan. Bandage 33 picked him up and brought him to the hospital.

sure on the wound, so she walked with him to the ER where she handed him off to Bagram-based medical professionals.

Then she climbed back in the aircraft and went back to work, spending another six hours in the air.

"It's great to see what a difference our aeromedical evacuation mission makes for folks who are wounded on the battlefield," said Lt. Col. Sean Barden, 772nd EAS director of operations, in the April release. "It's rewarding to know that our teamwork and use of technology made such a big difference for one of our fellow airmen."

After the mission, Valadez tried to keep track of the patient's recovery. She was able to piece together snippets here and there. She learned he had made it to Germany, he was stabilized, and his leg was going to be OK, but she never did learn his name.

It wasn't until Welsh told their story at the AFA conference that she learned she had helped save the life of TSgt. Zachary J. Rhyner—one of three combat controllers to receive an Air Force Cross, the award second only to the Medal of Honor for heroism in combat.

In 2008, Rhyner was "directly responsible" for saving his 10-man special operations team in a "brutal ambush" deep in the mountains of Afghanistan. The mission—designated "Commando Wrath"—was to capture or kill a group of insurgents gathered in a remote region near the Pakistan border.

Rhyner was wounded in that battle as well, but he pushed on—spending three hours calling in close air support.

He "walked away from that with the respect of some very, very capable warriors and the nomination for the Air Force Cross, which he richly deserved," said Welsh in September.

As images of Rhyner and Valadez were displayed on a movie theater-sized screen at the conference, Welsh stopped addressing the larger audience and spoke directly to Valadez, who had been flown in for the event.

"Adriana, let me introduce him to you. He's an Air Force hero," said Welsh. "He couldn't be here today, but he asked me to say thank you. I'll give you his email. Thanks for saving our guy."

Tears streamed down Valadez's face as Welsh called her to the stage. She told *Air Force Magazine* after the speech that the entire event seemed surreal.

In the months since, Valadez and Rhyner have connected via text message. Rhyner says he doesn't remember much of that flight and he can't talk about the mission in which he was most recently wounded because it is classified.

Back in the Saddle

"I wasn't even aware of how serious the injury was and how bad off I was on that flight until I heard what she had done for me," Rhyner told *Air Force Magazine* in October. "I'd definitely thank her and the team for what they had done for me."

Rhyner is assigned to the 24th Special Operations Wing at Hurlburt Field, Fla., but he presently spends most of his time doing physical therapy and recuperating. When the bullet struck his hip, it transacted his sciatic nerve and broke his femoral neck—the piece of bone that connects the femur to the ball of the hip.

As of mid-October, Rhyner had had three surgeries to fix the related problems and was to undergo one final surgery—a bone graft, which he hopes will allow him to be more mobile. Rhyner said he's also waiting on a brace that will allow him to "get back to running around."

Although there is going to be some lasting nerve damage, he's hoping to stay on Active Duty.

"It all depends on how the bone in my hip heals. ... If my bone doesn't heal, I'll have to get a fake hip and there is not a lot of great hip technology out there right now, so I'll be pretty limited," said Rhyner. "The plan is to get healed up. Get this brace, and find out exactly what the limitations are and get back to work." ■

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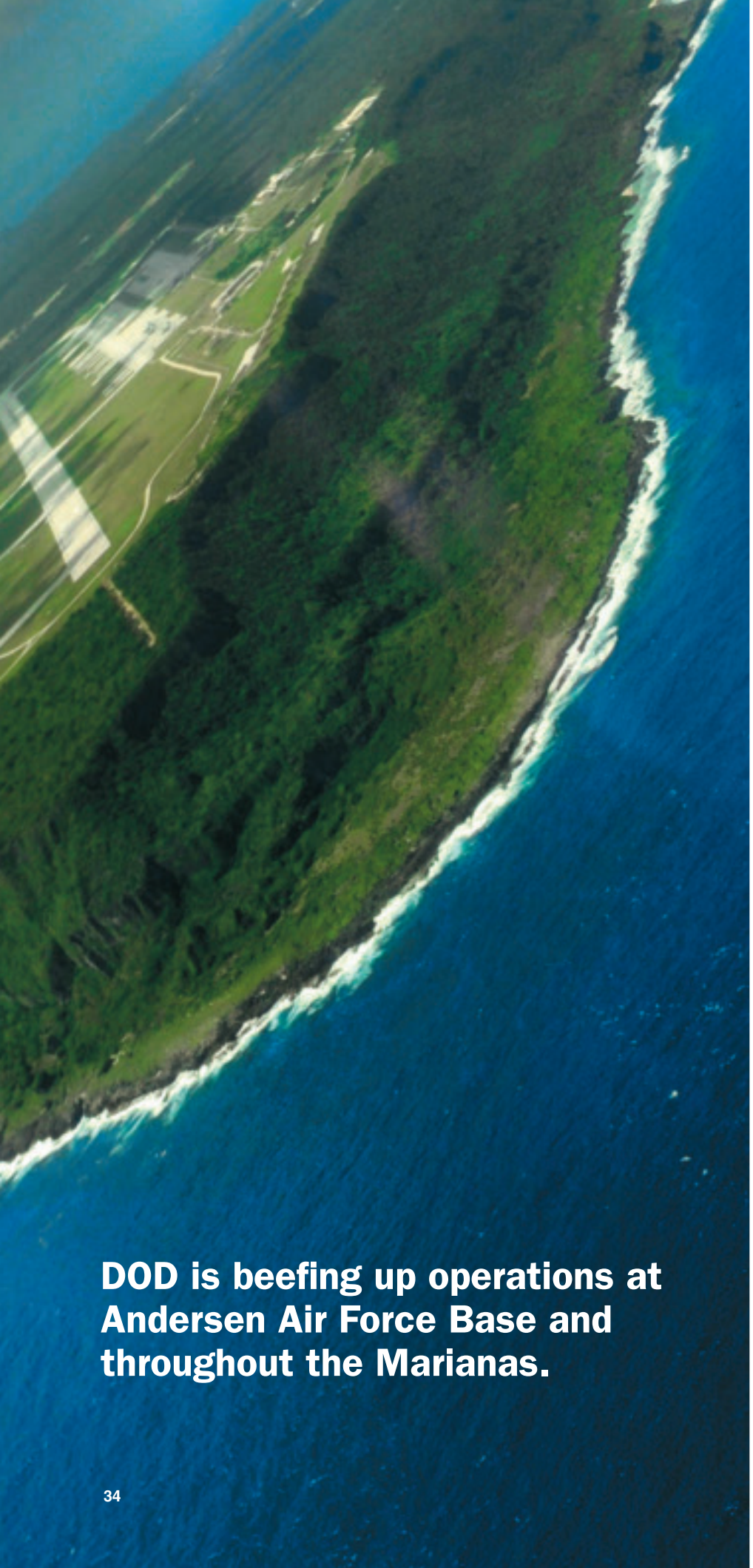


DOD is beefing up operations at Andersen Air Force Base and throughout the Marianas.

ACCESS is the name of the game for security in the Pacific. For airmen, this access hinges on Guam.

Guam is an American possession—US soil. While there are many other desirable basing locations in the western Pacific, Guam—nearly 220 square miles of sovereign American territory about 3,900 miles west of Hawaii—is the only one where basing rights will never be an issue.

Andersen Air Force Base, at the northern tip of the island, is a historic installation. The main runway is famous for its dip in the center, an ocean cliff at the end, and its white color—radiating from crushed coral mixed in the concrete. Andersen hosted US combat aircraft in World War II and throughout the Vietnam War and the Cold War.

For the last 10 years, USAF has been increasing its presence on Guam. So has the Navy, which homeports submarines there, and plans call for some Marine Corps aviation and ground units from Okinawa to move to a new home on the island. The strategic importance of Guam extends to other territories in the Marianas island chain such as Tinian and Saipan.

President Obama's Asia-Pacific rebalance leans heavily on Guam for access, transient staging, and presence.

"What many people do not realize is that it sits at the tip of the spear for the defense of our nation and is woven into the strategic fabric of the Pacific theater," noted Rep. Solomon Ortiz (D-Tex.) in 2009.

The Guam Hub

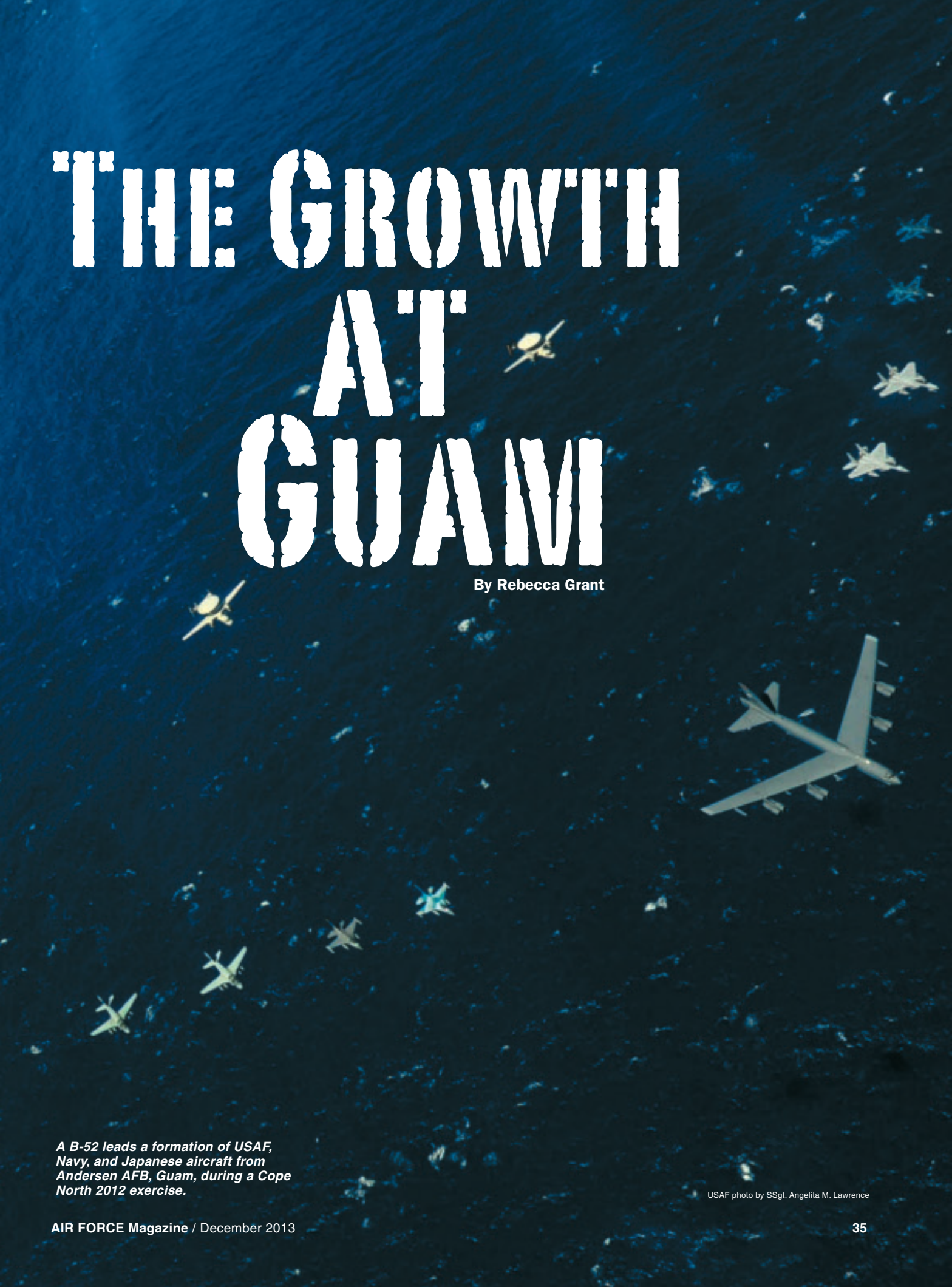
Before airpower, the Northern Marianas were the site of Spanish imperial stopovers and Japanese occupation. A small contingent of marines built the first strip there at Orote Peninsula and kept it in use from 1921 to 1931, when the naval air station was abandoned to cut costs.

Guam was seized by imperial Japan on Dec. 13, 1941. Later in the war, Guam, Tinian, and Saipan were the scenes of ferocious battles. US success on the lava and limestone island led to huge air bases, as Navy Seabees and US Army construction battalions built airfields for the B-29 Superfortresses of Twentieth Air Force.

After V-J Day, Tinian, Saipan, and what is now Guam's Northwest Field closed. Operations on the main field at Guam continued, providing air interceptors and famously hosting B-52s during the Vietnam War. But the other white, crushed coral airstrips disappeared beneath tropical foliage.

The Growth at Guam

By Rebecca Grant



A B-52 leads a formation of USAF, Navy, and Japanese aircraft from Andersen AFB, Guam, during a Cope North 2012 exercise.

USAF photo by SSgt. Angelita M. Lawrence

Nearly 70 years later, the battle for access and influence in the Pacific has led the Air Force and joint partners back to the long-quiet strips. They now resonate with the sounds of RED HORSE bulldozers, C-130J propellers, and fighter jets. Guam's Northwest Field is in limited use again, and expeditionary operations are focusing on Tinian and Saipan, too.

One of the first to predict a new role for Guam was James H. Webb. Back in 1974, the future Navy Secretary and senator wrote a study of the region speculating, "It is quite conceivable that in 10 to 20 years the entire US Pacific presence will be centered on a Guam-Tinian axis."

Webb's prediction was premature, but not by much. China's expanding military presence and ongoing tensions with North Korea have made Guam essential to America's Pacific air and sea power projection.

"The US military faces a major basing disadvantage in the western Pacific," wrote Jan van Tol in his 2010 study of AirSea Battle for the Center for Strategic and Budgetary Assessments. According to van Tol, "Bases and facilities on US territory in the western Pacific comprise a small number of very large and effectively undefended sites located on a handful of isolated islands, all within range of PLA [China's People's Liberation Army] weapons systems."

Guam falls within what China calls the second island chain, a notional line running from the Kurile Islands in the north through Japan, the Bonins, the Marianas, the Carolines, and down to Indonesia.

RAND Corp. analyst Roger Cliff explained that, for China, denying an adversary access to the region "implies attacking the adversary's transportation, bases, and other facilities and systems besides its main combat forces." By this thinking, "preventing the adversary from deploying its combat forces into the region will in turn enable China to avoid a direct confrontation with the adversary's forces." Holding Guam at risk would be a major coup.

Up the Ante

USAF has been steadily increasing its missions out of Guam for more than a decade, and the 36th Wing at Andersen is structured to host forces arriving in a hurry. The 36th has no permanently assigned aircraft. The whole function of the wing is to support detachments from the many aircraft units that deploy to the Pacific.

Best known of these is the continuous bomber presence. Short-term rotations of bombers to Guam began officially in 2004 during a period of tension with North Korea.

"The ability to project force from Guam is very valuable to us," commented Gen. William J. Begert, who was commander, Pacific Air Forces, at the time. Bombers have since flown sorties to all points of the compass to reinforce partnerships with allies and show resolve throughout the theater. In recent years, B-52s and B-2s have taken turns deploying to the island.

In 2010, a trio of Global Hawk Block 30s joined the mix. F-15Cs, F-22s, and other fighters also rotate through Guam as part of formal theater security presence operations. Guam's 36th Wing also has the ability to stage a contingency response group in support of expeditionary deployments.

Although the air operations center on Guam consolidated to Hawaii, Guam remains very much a forward perch for theater command and control.

"I was there when the President and Secretary of Defense walked in and said, 'We're pivoting to the Pacific; this is our new focus,'" said Gen. Herbert J. Carlisle, head of Pacific Air Forces, who was serving in the Pentagon at the time.

The rotational bomber presence through Guam will continue. PACAF is also considering a rebalancing of its own with more permanent change of station slots taking over for some of the temporary duty rotations. That option might give airmen "a little bit more of an opportunity" to "spend a couple of years" on Guam, according to Carlisle.

Guam's rotational role is set to expand along with other bases in theater.

Carlisle explained, "We're not going to build any more bases in the Pacific." Instead, planned unit rotations will resemble the Checkered Flag exercises in Europe during the Cold War days. "Every 18 months or two years, every unit would go and work out of a collateral operating base," Carlisle explained. Looking ahead, "the most capable platforms will be rotated into the Pacific."

As for intelligence, surveillance, and reconnaissance capability, the Global Hawks will stay at Andersen. "The best capability will go to the Pacific as it's developed and brought on line," Carlisle said.

A Target, Too

As a major power projection asset, Guam is also a likely target, according to rhetoric from adversaries in the region. In theory, China's ballistic missiles are capable of reaching Guam. China could

National Archives photo

USAF photo by A1C Marianique Santos

USAF photo by SSgt. Nathan Allen

The US military plants the US flag on Guam on July 20, 1944. The island was occupied by Japanese forces for two-and-a-half years during World War II.

also hit Andersen with cruise missiles launched from its H-6 bombers.

In 2009, Army Lt. Gen. Walter L. Sharp, then commander of US Forces Korea, told Congress, "North Korea is now fielding a new intermediate-range ballistic missile capable of striking Okinawa, Guam, and Alaska."

North Korea directly threatened Guam during the spring 2013 crisis. "The moment of explosion is approaching fast," the North Korea news agency ranted early this year.

Reports from South Korea stated that North Korea appeared to have moved an intermediate- or mid-range Musudan missile to a coastal site. The Musudan missile has a reported range of more than 1,800 miles, putting Guam potentially within reach.

That was enough for DOD. In a swift response, the Defense Secretary reconfirmed Guam's important military role. "As they have ratcheted up [their] bellicose, dangerous rhetoric, ... some of the actions they've taken over the last few weeks present a real and clear danger," Secretary of Defense Chuck Hagel said,

SSgt. Ryan Vogt marshals a B-52 on the flight line at Andersen. The B-52 was there as part of the continuous bomber presence mission.

singling out threats by North Korea against "our base in Guam."

Hagel's next move was to order the first-ever operational deployment of an Army Terminal High-Altitude Area Defense (THAAD) unit to Guam. The system reached the island in April. "THAAD is deployed to the region as a precautionary measure to strengthen our regional defense, including Guam," Pacific Command spokesman Army Col. Michael Donnelly told Pacific News Center.

"This deployment will strengthen defense capabilities for American citizens in the US territory of Guam and US forces stationed there," according to an official Pentagon statement.

Guam residents welcomed the new defense layer although they expressed concern.

A boat tethered to a parachute flies out the back of a C-17 over the ocean near Guam during a joint service and international operability mission.

"While we were fortunate to welcome the nation's newest land-based missile defense system, I believe we must continue working with our nation's leaders to permanently secure missile interceptor systems on Guam to effectively protect our island, its people, our neighbors, and regional allies," stated Frank B. Aguon Jr., a Guam state senator.

Tinian Again

Guam's growing role has also enhanced the strategic value of its neighbors in the Northern Marianas. Two tiny islands, Tinian and Saipan, have come out of the historical mists to take up serious new missions in the Pacific rebalance.

Tinian is about 100 miles north of Guam. Spain, the US, and Germany all controlled the 39-square-mile island prior to the international mandate after World War I ceding it to Japan. Although its strategic importance dated back centuries, World War II put Tinian in the spotlight.

The US took Tinian from Japanese forces on Aug. 1, 1944. Massive construction began almost immediately. "A great coral ridge was half-leveled to fill a rough plain and to build six runways, each an excellent 10-lane highway, each almost two miles long," recalled Philip Morrison, who helped assemble the first bomb, in Richard Rhodes' 1986 history *The Making of the Atomic Bomb*. The result was a busy bomber base laid out to resemble lower Manhattan.

At its peak Tinian hosted 269 B-29 bombers. Crews faced daunting missions. The distance to targets in Japan averaged 1,500 miles, one-way. As a result, Tinian also became a massive fuel dump.

Tinian today shows little sign of the bomber fleets, and most surviving military buildings are of Japanese origin. They date back to the early 1940s, when Japan used the island as a regional air command center and transit point for forces deploying south.

During World War II, runways covered 11 miles on the northern end of the island. From Tinian, Twentieth Air Force launched the most fearsome military operation of all time when the specially modified B-29 *Enola Gay* took off to deliver the first atomic bomb on Aug. 6, 1945.

The two devices—"Fat Man" and "Little Boy"—were differently shaped, but each was too bulky for standard bomb loading. Pits were dug to hold the bombs. The B-29s were then backed over the pits with doors open to receive them.

The pits remain on Tinian and are now glassed over, a striking memorial.

USAF photo by SSgt. Andy M. Kin

An F-16 aggressor from Eielson AFB, Alaska, takes off from the runway at Andersen during a Cope North exercise.

"It's just two pits now under glass enclosures, somewhat like the entrance to the Louvre," noted Alex Wellerstein, who visited Tinian in 2012 and wrote about it on his Nuclear Secrecy blog.

For now, Tinian is technically just a "divert" base. However, detachments of Marine Corps fighters, helicopters, and C-130Js landed there in 2012 during two expeditionary warfare training exercises.

First came Exercise Geiger Fury.

"We are setting up a [forward operating base] in order to better control and coordinate Exercise Geiger Fury," said Capt. Mark Schouten of the Marine Wing Support Squadron 171. The units home-based at Iwakuni in Japan deployed to test out the feasibility of bare base operations on Tinian and to "conduct repairs to the island's northern airfield built during World War II," said Schouten, according to a USMC press release.

Next, Exercise Forager Fury saw the marines offload 87,000 gallons of aviation fuel from KC-130Js to F/A-18D Hornets, MV-22 Ospreys, and CH-46 helicopters.

According to a report from the Pacific Islands Development Program of the East-West Center in Hawaii, the Commonwealth of the Northern Mariana Islands (CNMI) government has "long been pitching to the US Department of Defense to make further use of their leased lands on Tinian for additional training needs." DOD's leased holdings on Tinian total 15,353 acres.

The Air Force brought Exercise Cope North to Tinian in February 2013. Building on experience from Cope North 2012, this year's exercise saw Australian, Japanese, and US forces practicing rapid setup of humanitarian relief operations.

"The [goals] of the exercise on Guam and Tinian are similar—to demonstrate the capability to rapidly execute establishing an operating airfield at a location in the event of a real-world HA/DR [humanitarian assistance, disaster relief] operation," said USAF 36th Wing spokesman Capt. Chris M. Hoyler.

Running a portion of Cope North on Tinian tested a training environment, with Guam as the hub and Tinian as the spoke.

"Practicing the hub and spoke training objective increases multilateral interoperability to deploy and rapidly deliver supplies in austere conditions," spokeswoman Capt. Kim T. Bender told a local newspaper after the exercise. The Air Force is planning to operate from Tinian again in 2014.

Tinian could also provide additional facilities that won't fit on Guam. One example, suggested in a 2010 feasibility study, is a training range for marines.

Then there is Saipan. USAF may favor the island as a future divert and deployment airfield site. The idea behind another site is to make notional targeting of Guam's airfields a more difficult tactical problem. Practical reasons favor a divert site, too. In 2012, an Air Force F-16 made a forced landing on Saipan after an in-flight mechanical emergency.

The Air Force completed a full study of environmental impact and options in the Northern Marianas in 2012. At 44 square miles, Saipan is also the most developed of the CNMI chain. But USAF may have to purchase additional acreage on Saipan to construct an adequate divert field.

Another big advantage favoring Saipan lies in access for ships bringing fuel, according to the study. To augment Guam's fuel capacity, Saipan could in theory assist with additional reception of fuel from ships. Guam hosts one of the largest fuel farms in USAF. However, contingency requirements for strike and transient aircraft could draw down fuel fast.

Meanwhile, the Marines are going forward with more plans for exercises on Tinian. Either way, additional USAF presence in the Northern Marianas is seen as a win-win by local leaders.

"Whether it's built on Tinian or Saipan, the revenues generated from those expenditures will go to the general fund. It is of benefit to the CNMI," Don Farrell of the Tinian mayor's office told *Pacific Islands Report* in August 2013.

Into the Future

Guam has its own World War II relic at Northwest Field.

Operations there stopped in 1949. Over time, tropical vegetation advanced up to the taxiway, and winds eroded the berms between parking hardstands. The airfield was all but invisible to those driving along the road.

Northwest Field got back in action during the Cope North exercises. USAF, the Royal Australian Air Force, and Japan Air Self-Defense Force personnel used it to practice humanitarian relief operations. This included setting up a command center, perimeter security, and receiving C-130 flights and airdrops.

Guam is due for further expansion. The US Navy's Joint Guam Program Office plans envision a USMC aviation area for the 1st Marine Aircraft Wing on a section of the main field at Andersen.

Northwest Field could well open up as a contingency or transient site. The waterfront at Apra, Guam, could receive more submarines, destroyers, cruisers, and amphibious ships if a new deep water pier is completed there.

The total cost of relocating upward of 5,000 marines to Guam could run $8 billion, and Congress has most of the plan on hold, pending fiscal and environmental reviews. Some Navy work on upgrades for Marine Corps aviation units is continuing. Other potential concepts could even include a missile defense task force for the Army and facilities for a transient nuclear aircraft carrier for the Navy. Yet to be resolved are questions about where to locate auxiliary training such as live-fire ranges.

However, the priority of Guam as an aviation hub is beyond dispute. It remains the sovereign option as US airmen reinforce their Pacific posture. ■

Rebecca Grant is president of IRIS Independent Research. Her most recent article for Air Force Magazine *was "Spaatz's Quest for Air Superiority," in the October issue.*

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By Robert S. Dudney

Speaking of Surrealism

"We need help in planning for the future. We can adjust to any reality once we have a reality."***—Gen. Mark A. Welsh III, USAF Chief of Staff,*** **Colorado Springs Gazette,** ***Nov. 4.***

A Vanilla Gorilla?

"We are trying to stick to a [development] plan, for once. Adding things means risk—risk of increasing costs, risk the plane won't be built. ... [Using] technology that has been fielded is the only answer. If it hasn't already been tested, we aren't interested. ... This plane is not going to be all things to all people."***—USAF Col. Chad Stevenson, Long-Range Strike Bomber program officer, quoted in the*** **Wall Street Journal,** ***Nov. 3.***

When Trumps Are Gone

"The US military remains virtually the sole employer of large-scale precision strike efforts, especially over long ranges. ... Eventually, however, precision strike will proliferate into the hands of prospective American adversaries both large and small. ... The eventual spread of precision strike raises the possibility that countries such as China and Iran will one day manage to exploit precision strike to create 'no-go' zones into which it would be too difficult and too costly for the United States to project military power using today's overseas bases and expeditionary forces. ... Either new ways of projecting power around the globe from long ranges would have to be developed or else America's ability to protect its global interests, intervene around the globe militarily, and reassure allies would shrink. How soon US leaders may have to face this choice is anyone's guess. ... Nonetheless it is one possible result of a mature precision-strike regime in which the US military no longer holds most of the trump cards."***—Barry D. Watts, former USAF fighter pilot and DOD official, now senior fellow at the Center for Strategic and Budgetary Assessments,*** **The National Interest,** ***Nov. 2.***

Knowledge Is Power

"This command, this commander, and the 26,000 airmen he leads are [entrusted] with two-thirds of our nation's nuclear triad. What you do is provide our nation with the ability to hold any target at risk, anywhere in the world, at any time. You know that, the rest of the world knows it, and that's why strategic deterrence works."***—Gen. Mark A. Welsh III, USAF Chief of Staff, remarks at Global Strike Command, Barksdale AFB, La., Oct. 23.***

The Inman Flush

"My advice [to today's embattled NSA leaders] would be to take everything you think Snowden has and get it out yourself. It would certainly be a shock to the agency, but bad news doesn't get better with age. The sooner they get it out and put it behind them, the faster they can begin to rebuild."***—Retired Adm. Bobby R. Inman, former NSA director,*** **New York Times,** ***Nov. 2.***

Trading Places

"[A] revelation that has emerged from US post-Cold War combat experiences has been that when it comes to major conventional warfare against modern mechanized opponents like the former Iraqi army or North Korea today, the classic roles of airpower and land power have changed places. In this role reversal, ground forces have now come to do most of the shaping and fixing of enemy forces, with airpower now doing most of the actual killing of those forces. ... This changed phenomenon of joint warfare in the past two decades is not simply a matter of the notional 'hammer' of friendly airpower smashing enemy forces against the 'anvil' of friendly ground power. Rather, as one former Army colonel explained, it more entails 'a case of ground power flushing the enemy, allowing airpower to maul his forces, with ground power finishing the fight against the remnants and controlling the ground dimension in the aftermath of combat."***—Benjamin S. Lambeth, senior fellow at the Center for Strategic and Budgetary Assessments, writing in the fall 2013 issue of*** **Strategic Studies Quarterly.**

Chinese Cheese

"We need to look at it [China's anti-access defense] not as an iron dome but as a block of Swiss cheese that gets more dense as you get closer to the center. ... The way you deal with it is you find the holes in the Swiss cheese and widen them. Those holes in the Swiss cheese ... that's where our ... money ought to go. You've got to buy the things that increase our asymmetric advantage, and we have many, many, many of them. [Everything else], let it go, because we're just throwing money into places that aren't going to make a difference."***—Adm. Samuel J. Locklear III, commander, US Pacific Command, remarks to a recent National Defense Industrial Association conference, as reported in breakingdefense.com, Nov. 4.***

The Killing Fields

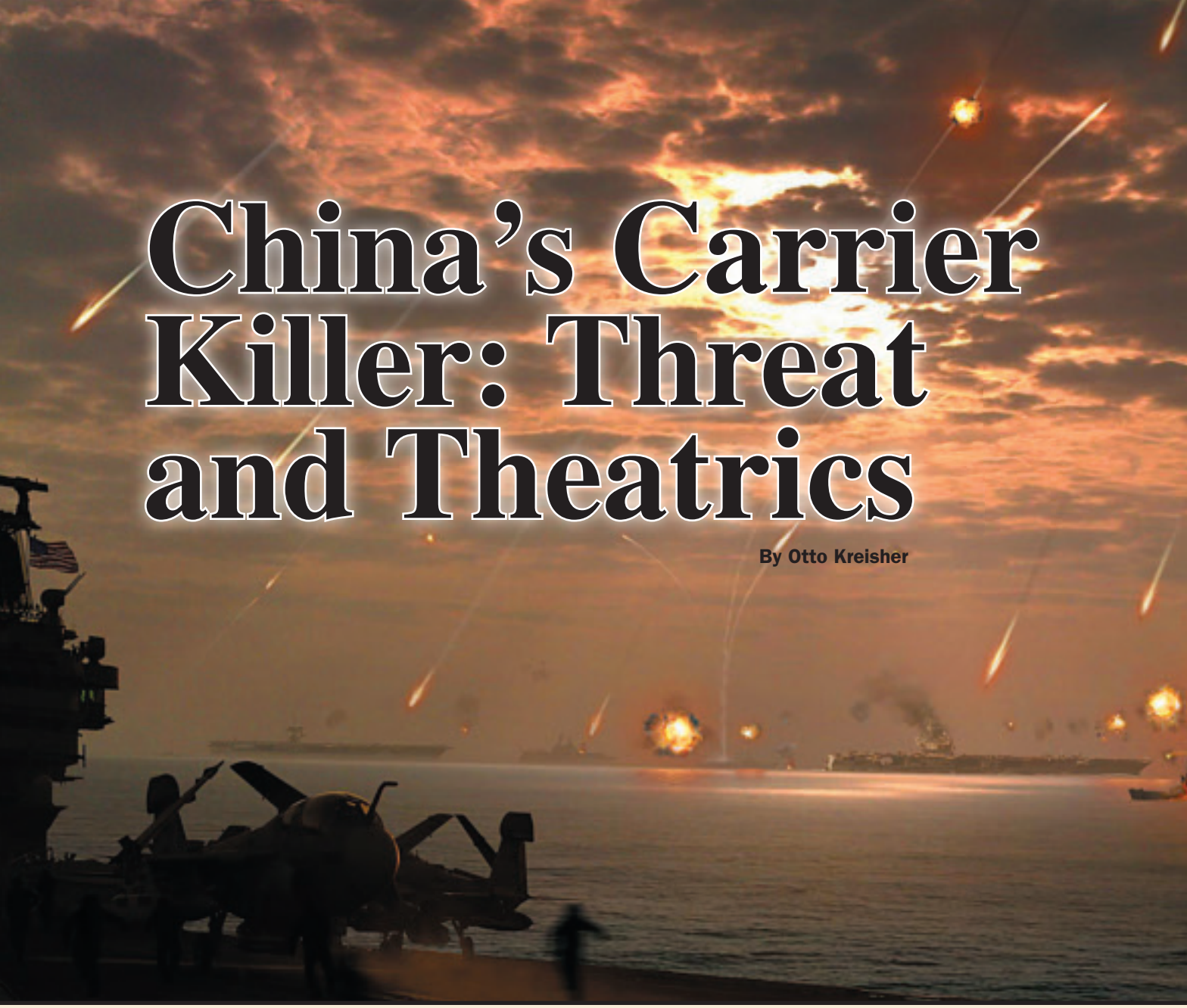
"Because the Midwest states of the US are sparsely populated, in order to increase the lethality, [our] nuclear attacks should mainly target the key cities on the West Coast of the United States, such as Seattle, Los Angeles, San Francisco, and San Diego. The 12 JL-2 nuclear warheads carried by one single Type 094 SSBN can kill and wound five million to 12 million Americans. If we launch our DF 31A ICBMs over the North Pole, we can easily destroy a whole list of metropolises on the East Coast and the New England region of the US, including Annapolis, Philadelphia, New York, Boston, Portland, Baltimore, and Norfolk, whose population accounts for about one-eighth of America's total residents."***—Statement in Chinese state-run Global Times, reported in the*** **Washington Times,** ***Oct. 31.***

First (and Only) Use Doctrine

"The ultimate objective of the nuclear deterrent is to make sure that the weapons are never used. And yet, we use them every day to do that. It's almost counterintuitive from people who aren't informed, but we use those weapons every single day."***—USAF Gen. C. Robert Kehler, then commander, US Strategic Command, House Armed Services strategic forces subcommittee, Oct. 29.***

Process, Process, Process

"Time is money. We really need to look at how we get things to market faster and more efficiently. How we test, how we learn, and how we make improvements has become overtaken by a slavish adherence to an ever-increasing process."***—Retired Adm. Gary Roughead, former Chief of Naval Operations, on the need to streamline testing of the new F-35 fighter, interview with Reuters, Oct. 30.***



China's Carrier Killer: Threat and Theatrics

By Otto Kreisher

In the history of warfare, there have been numerous weapons described as "game changers" that promised to nullify the dominant weapons of the day. Stone castles fell prey to gunpowder. Integrated air defenses were overcome by stealth.

Sometimes new weapons brought tremendous advantages, but they have often proved short-lived, as countermeasures—in the form of defensive weapons or tactics—have always arisen to blunt the effect of the new technology.

Today, some are predicting the demise of the aircraft carrier—a potent tool of American power projection for more than 90 years—at the hands of China's DF-21D anti-ship ballistic missile (ASBM), widely labeled the "carrier killer." This medium-range, high-speed missile with a terminal homing warhead is touted by many analysts as reducing nuclear-powered carriers, with their complement of 70-odd aircraft each, to sitting ducks.

Longtime critics of the Navy's multibillion-dollar carriers have cited the DF-21D as justification to sharply reduce the flattop fleet, declaring them hopelessly obsolete.

Naturally, not all see it that way. Senior defense officials—including top Navy and Air Force officers—suggest reports of the carrier's demise, to paraphrase Mark Twain, are premature.

The DF-21D missile is a legitimate threat to carrier-based airpower, but at times the concern has bordered on hysteria.

The DF-21D—NATO designation CSS-5 Mod 4—is part of the family of Dong Feng ("East Wind") ballistic missiles. China has hundreds, in a number of variants.

Based on Chinese defense documents, what sets the -21D apart from the others is that it has a maneuverable re-entry vehicle with synthetic aperture radar (SAR) and optical sensors, which could enable it to hit a moving target.

The two-stage, solid-fuel missile has an operational range variously estimated at 1,035 to 1,726 miles and a conventional warhead considered powerful enough to inflict at least a "mission kill"—meaning that a direct hit could cause enough damage to

Photo via Chinese website

China's A2/AD defense includes hundreds of short- to long-range ballistic missiles that would attempt to neutralize Air Force, Navy, and Marine Corps strike aircraft based on mainland Japan, Okinawa, South Korea, and as far away as Guam.

It is the reported capabilities of the DF-21D, however, that seem to have stirred the most excitement among defense analysts.

Patrick M. Cronin, senior director of the Asia-Pacific Security Program at the Center for a New American Security, wrote in 2010, "The emerging Chinese anti-ship missile capability, and in particular the DF-21D, represents the first post-Cold War capability that is both potentially capable of stopping our naval power projection and deliberately designed for that purpose."

Toshi Yoshihara, a professor at the Naval War College, in 2010 wrote, "China can reach out and hit the US well before the US can get close enough to the mainland to hit back. ... It underscores more broadly that the US Navy no longer rules the waves as it has since the end of World War II."

Even then-Defense Secretary Robert M. Gates, speaking at the Air Force Association's 2010 Air & Space Conference, said China's investments in cyber and anti-satellite warfare and anti-air and anti-ship weaponry, including ballistic missiles, "could threaten America's pri-

make a US carrier unable to conduct flight operations. Chinese defense literature describes a salvo of DF-21Ds first crippling the carrier and then sinking it with later hits.

Such a range could threaten a carrier well outside the combat radius of carrier aircraft without in-flight refueling. That makes the DF-21 a key element in China's strategy of developing an anti-access, area-denial (A2/AD) capability. The missile could potentially prevent the Navy from intervening in a conflict with Taiwan or with one of its neighbors over disputed islands in the South and East China seas.

China's apparent fixation with keeping US carriers at bay may stem from a 1996 incident, in which two American carrier strike groups moved into the Taiwan Strait while China was saber-rattling in the area in an attempt to sway Taiwan elections. The presence of the carriers compelled China to stop missile shots and military maneuvers aimed at coercing what it considers its "breakaway province."

Above: A computer-generated image found on a Chinese website of DF-21D missiles hitting a US Navy carrier group. Right: Artist Tom Freeman's concept of carrier-killer missiles hitting USS* Enterprise *made the cover of the US Naval Institute's publication* Proceedings *in May 2009.

mary way to project power" through its forward air bases and carrier strike groups.

And in May 2009, the US Naval Institute's *Proceedings* magazine featured a cover story with art of an American carrier exploding and in flames beneath the headline, "Chinese Carrier Killer?"

Threat or Hyperbole?

Is the actual threat posed by the DF-21 as bad as all that?

Top US commanders seem to believe the DF-21 is deployed. Chinese publications say deployment of the DF-21D began in 2010, and Adm. Robert F. Willard, then chief of US Pacific Command, told reporters that same year that the missile apparently had reached initial operational capability (IOC).

Adm. Samuel J. Locklear III, current PACOM chief, referred in congressional testimony this spring to the "initial deployment of a new anti-ship missile that we believe is designed to target US aircraft carriers."

That was echoed in another hearing when Army Lt. Gen. Michael T. Flynn, Defense Intelligence Agency director, said in the unclassified annual Chinese threat assessment that China's array of 1,200 ballistic missiles includes "a limited but growing number of conventionally armed, medium-range ballistic missiles, including the DF-21D."

Several defense analysts point out, however, that deployment doesn't necessarily equate to a combat-ready weapon. After that, the next question would involve actual effectiveness.

For a ballistic missile to hit a target at 1,000 miles or more, it has to know where that target is located, with a high degree of accuracy. That's complicated when the target—such as a carrier strike group—is moving at up to 34 miles per hour. For the weapon to be effective, such a geographic fix must be updated constantly.

To locate a carrier initially, China could use its over-the-horizon radars, which can search out more than a thousand miles. But the geographic accuracy of OTH radars at long range can be off by scores of miles.

China is known to have at least three reconnaissance satellites in orbit over the Pacific—with SAR or optical sensors—that could be used to more accurately fix a carrier's position.

Long-range Chinese reconnaissance aircraft or attack submarines could also pinpoint a carrier, if they were operating in the right area. But in a time of conflict, a patrol airplane or submarine attempting to get close to a carrier—shielded by its E-2C early warning airplanes, F/A-18 interceptors, and an anti-submarine screen of subs and destroyers—might not succeed.

If the Chinese could get an accurate fix on the carrier, the data would have to be processed, and the missile prepared, programmed, and launched—a complicated command and control procedure that has to be routinely tested and practiced to ensure it works. The missile, its homing sensors, and guidance system would also have to function properly to reach and hit the moving carrier.

Those integrated steps—to find, fix, target, and hit—are crucial links in what the military calls the "kill chain" of a successful weapons system.

The complexity of that kill chain led Jan van Tol, a retired Navy captain and senior fellow on strategic planning at the Center for Strategic and Budgetary Assessment, to wonder, "Has it really reached IOC as that term is normally understood?"

Acknowledging that he can use only unclassified information, van Tol said in an interview, "I have seen no stories of any kind that China has successfully tested the system, first, against any mobile targets; … secondly, mobile targets at sea; and thirdly, mobile targets at sea amid clutter," meaning the various support ships in a carrier battle group.

Such a demonstration "is what's really important to show that the weapon had actually reached operational capability," and these are "very difficult things." Van Tol was the principal author of a 2010 CSBA study on China's A2/AD threats.

The only indication that the DF-21D has been tested at all was a report in the Taiwan-based *Want China Times*. That article said satellite photos showed a 650-foot-long white form painted in the Gobi Desert with two large craters, possibly created by unarmed warheads from the missile. Even if this did represent a DF-21 test, however, van Tol notes that this was not a mobile target.

DOD's annual report on China states: "It is not clear whether China has the capability to collect accurate targeting information and pass it to launch platforms in time for successful strikes in sea areas beyond the first island chain," the imaginary line, prominent in Chinese defense literature, that runs from Japan to the Philippines.

This conclusion was echoed by another CSBA analyst, Barry D. Watts, a former Air Force fighter pilot and planner, in a study released in August titled, "The Evolution of Precision Strike."

Discussing the DF-21D, Watts wrote, "Perhaps the most salient observation regarding this system is that the Chinese have yet to conduct an end-to-end test of it against a moving target at sea." He cited a July 2011 article from China's Xinhua News Agency in which Gen. Chen Bingde of the People's Liberation Army General Staff said the DF-21D was "still in the research stage" and had not yet achieved operational status.

Disrupting the Kill Chain

The DF-21D is likely a developing component of China's larger anti-access strategies, and "it seems reasonable to assume that the US Navy is already working on countermeasures to further complicate the already difficult task of hitting a maneuvering warship at sea at long ranges," Watts wrote.

Moreover, the US military as a whole, and not just the Navy, is working on ways to counter the DF-21D and China's other A2/AD efforts under the evolving AirSea Battle concept.

Adm. Jonathan W. Greenert, the Chief of Naval Operations, and other military leaders shy away from even mentioning China or the DF-21, to avoid an admission that the US considers China an adversary.

A Greenert spokesman said the CNO would not sit for an interview specifically on the DF-21D. But he made available a number of documents in which the Navy leader described, in generic terms, how the military could counter such weapons.

One of those was a May 16 article in *Foreign Policy* co-authored by Greenert and Air Force Chief of Staff Gen. Mark A. Welsh III. In it, they discussed joint efforts within the AirSea Battle concept to counter A2/AD capabilities, again without naming China or the DF-21D.

AirSea Battle "is not focused on one specific adversary, since the anti-access capabilities it is intended to defeat are proliferating and, with automation, becoming easier to use," the two leaders wrote. "US forces need a credible means to assure access when needed to help deter aggression by a range of potential adversaries, to assure allies, and to provide escalation control and crisis stability."

Photo via Chinese website

A DF-21 missile is launched. The midrange missile is a key element in China's developing anti-access, area-denial capability.

A key part of the counter-A2/AD approach, Greenert and Welsh said, is to disrupt the enemy's kill chain.

"AirSea Battle defeats threats to access by, first, disrupting an adversary's command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) systems; second, destroying adversary weapons launchers (including aircraft, ships, and missile sites); and finally, defeating the weapons an adversary launches," they wrote.

They further noted that to succeed in attacking US forces, an enemy "must complete a sequence of actions, commonly referred to as a 'kill chain.'" The enemy's surveillance systems must locate US forces, its communications networks must relay targeting information to weapons launchers, weapons must be launched, and then they must home in on US forces.

"Each of these steps is vulnerable to interdiction or disruption, and because each step must work, our forces can focus on the weakest links in the chain, not each and every one," the two service Chiefs pointed out.

A Sept. 30, 2011, press report quoted then-Lt. Gen. Herbert J. Carlisle, who was the Air Force deputy chief of staff for operations, plans, and requirements, as saying the Air Force has "taken [China's] kill chains apart to the nth degree." Carlisle is now commander of Pacific Air Forces.

Welsh and Greenert said they would not need to use "strikes against installations deep inland," an apparent reference to attacking long-range missiles at the launch site.

This view may recognize that most of China's ballistic missiles are either on mobile launchers—like the DF-21D is—or are hidden in tunnels or reinforced bunkers.

US forces were not successful in finding the Iraqi mobile launchers firing Scud missiles at Israel and at American forces in Saudi Arabia during 1991's Operation Desert Storm, despite the use of large numbers of strike and recon aircraft and special operations forces. More than two decades have passed since this frustration, however, and electronic warfare and ISR capabilities have come a long way.

Instead, Greenert and Welsh said they could defeat missiles with EW and disrupt surveillance systems with electromagnetic or cyber attacks.

Greenert elaborated on that point in his CNO's blog on April 23, when he said a good example of breaking the adversary's kill chain at a vulnerable point is "using electronic warfare and jamming to prevent an adversary's radar from seeing us. That disrupts the first link in the enemy's kill chain: Find the target. Once that link is broken, the enemy has trouble completing the rest of the chain and attacking us."

Airborne or surface-based jammers could prevent over-the-horizon radars from finding a carrier strike group. Electronics, lasers, cyber, or kinetic weapons could be employed to blind the satellites China would need to pinpoint a moving target.

Failing that, the Navy could employ its EA-18G Growler electronic warfare jets or its shipboard EW systems to defeat the DF-21D's radar. In addition to the active jammers, destroyers escorting the carrier could deploy off-board radar-reflective decoys that could deceive the missile into aiming at a balloon floating over empty ocean.

The missile could also be defeated with a kinetic kill.

In a 2012 meeting with reporters, Greenert noted that US forces could attempt to shoot down a DF-21D at various spots along its trajectory. For example, Army Terminal High-Altitude Area Defense missile systems on Okinawa—or US and Japanese destroyers with the Aegis combat systems and SM-3 ballistic missile interceptors sailing in the East China Sea—could try for an early kill.

In the terminal stage, Navy destroyers could employ the Aegis-SM-3 ballistic missile defense system to protect the carrier. As of Sept. 18, the Navy BMD system had scored kills in 27 of 33 test shots against short- and medium-range ballistic missiles, including four straight hits with the latest anti-missile software. Even better software and more capable missiles are in development.

The Navy also is deploying to the Persian Gulf for operational trials on a solid-state laser weapon that in tests has shot down cruise missiles. If proven, it would be a speed-of-light weapon against threatening missiles.

The chances of successfully intercepting an in-bound ballistic missile are enhanced by the Cooperative Engagement Capability system that allows surface ships and the E-2C early warning airplanes to instantly share targeting data to create the most accurate shot.

As a last resort, the carrier could use its own self-defense weapon, the Evolved Seasparrow Missile, to kill a DF-21D close-in.

"Although China's projected ASBM, as a new type of weapon, might be considered a 'game changer,' that does not mean it cannot be countered," concluded Ronald O'Rourke, naval analyst at the Congressional Research Service in a July report. "There are several potential approaches for countering an ASBM that can be imagined, and these approaches could be used in combination." ■

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A USAF F-15E and an Indian Air Force Su-30MKI perform a familiarization flight over Idaho during Red Flag preparation in 2008. India participated in Red Flag that year for the first time—if all goes as planned, the IAF will be back for Red Flag 2014.

FRIENDS or ALLIES?

By Richard Halloran

FOR two years, the Obama Administration has sought to forge robust security relations with India as a vital element in the "rebalance" toward the Pacific-Asian region. Progress has been uneven, however, as India has been hampered by a zealous defense of sovereignty.

Slowed by the continued influence of its nonaligned policy during the Cold War, India has also been hobbled by internal political and bureaucratic infighting.

A report produced in early 2013 by the nonpartisan Congressional Research Service was pointed: "Frustrations among many ... in the United States have arisen from the sense that India's enthusiasm for further deepening bilateral security cooperation is limited and that New Delhi's reciprocity has been insufficient." A CRS analysis in 2011 said: "Indian leaders continue to demonstrate an aversion to assuming the kinds of new security-related postures and activities the United States seeks for India."

Lt. Col. Douglas Woodard, the Pacific Air Forces officer charged with planning contacts with India's air service, offered a diplomatic assessment: "It is a PACAF priority to develop a routine and reliable Air Force-to-Air Force relationship with India, but we recognize that we have to

The US and India have many common goals, but are slow to expand their military relationsip.

Photo by Sagar Pathak

be patient and move at a pace with which India is comfortable."

Woodard is secretary of the PACAF Executive Steering Group, co-chaired at the three-star level at both PACAF and in the Indian Air Staff. The Navy's Pacific Fleet and US Army Pacific, other components of Pacific Command, have similar steering groups to plan training and exchanges with Indian counterparts. At the political level, a Defense Policy Group is co-chaired by the undersecretary of defense for policy in Washington and by the Indian Defense Secretary in New Delhi.

Despite the obstacles, if all goes as planned, aircraft and pilots from the Indian Air Force (IAF) will make their second visit to Nellis AFB, Nev., next summer, to join USAF air and ground crews in a demanding Red Flag combat exercise.

The IAF crews and aircraft were set to fly in a Red Flag this past July, but the exercise was canceled at the last minute because of the US budget sequester.

The first IAF visit to Red Flag was five years ago, in 2008, when some 250 IAF airmen flew to Nellis with eight Sukhoi Su-30 fighters, one Il-76 airlifter, and two Il-78 tankers. Anecdotally, USAF airmen were impressed by the flying skills displayed by the IAF.

Drilling Together

In India, PACAF pilots flew in four Cope India exercises between 2004 and 2009. During the 2009 iteration, PACAF and IAF crews flew day and night parachute drops, airdrops of light vehicles, assault landings, and medical evacuation missions. Joint planning sessions gave both sides an education. In other venues, PACAF and IAF have exchanged instructor pilots, safety specialists, and security personnel. The Indians and Americans have also occasionally met at multilateral drills elsewhere in Asia, such as Cobra Gold in Thailand.

Other joint exercises include:

- Malabar: The US Navy has joined with the Indian Navy for more than a dozen annual Malabar exercises, usually in Indian waters. The premier Malabar is a bilateral drill in tactics, techniques, and procedures during one year and a multilateral event the following year, with warships from Australia, Japan, and Singapore invited to join. For the US, the 10-day training often centers on an aircraft carrier strike force.
- Habu Nag is a drill highlighting amphibious operations.
- Spitting Cobra focuses on destruction of explosive ordnance.
- Salvex is a diving and salvage exercise.
- The Indian Navy has been invited to send ships to the 2014 Rim of the Pacific (RIMPAC) exercise organized by the US Pacific Fleet in Hawaiian waters.

The US Army has also been training alongside Indian Army formations since 2005:

- Yudh Abhyas features battalion field drills and brigade command post exercises. These have included armored Stryker combat vehicles from Schofield Barracks in Hawaii to show what they can do in India.
- In a May 2013 exercise, Indian Army units were flown into Fort Bragg, N.C., to train with paratroopers in the 82nd Airborne Division.

India does not have a Marine Corps equivalent, but US marines train in amphibious operations with the Indian Army in a drill called Shatrujeet. Special

USAF photo by SSgt. Nichelle Anderson

Indian Prime Minister Manmohan Singh speaks to reporters at JB Andrews, Md., during a two-day visit to the United States in September. Indian and US officials were closed-mouthed about the discussions held.

operations forces are often included in those Army, Navy, and Air Force exercises.

US arms sales to India have totaled some $8 billion since 2001, a relatively small amount when measured against India's $100 billion military modernization plan. A Pentagon report to Congress noted that arms sales "enable new training and exchange opportunities between our militaries." But the CRS said those sales were "complicated by myriad legal, political, strategic, historical, and bureaucratic obstacles."

One obstacle is a chasm between civilian officials in India's Ministry of Defense who hold decisive power on what is procured and military officers who evidently have little to say on such decisions. Recent sales reported by the CRS have included 12 C-130J Hercules airlifters worth nearly $2 billion and 10 C-17 airlifters for $4.1 billion. The US has sold the former Navy cruiser USS *Trenton* to the Indian Navy for $48 million. However, the US lost out in 2011 to European aircraft makers in a competition to sell fighters to India. The US candidates were the F-16 and F/A-18; India chose France's Rafale.

The Administrations of Presidents Bill Clinton and George W. Bush looked for improved relations with India before the announced rebalance to Asia in November 2011. Hillary R. Clinton, President Obama's first Secretary of State, said then that the Asia-Pacific region "has become a key driver of global politics," and she noted "emerging powers like China, India, and Indonesia" as part of the calculus.

Then-Secretary of Defense Leon E. Panetta, during a visit to New Delhi in June 2012, said: "I believe our relationship is, can, and should become more strategic, more practical, and more collaborative." He told an Indian audience he had asked his deputy, Ashton B. Carter, "to lead an effort at the Pentagon to engage with Indian leaders on a new initiative."

In July 2012, Carter made a major trip to New Delhi for a meeting with the Defense Council of the Confederation of Indian Industry. The director general, Chandrajit Banerjee, estimated that India would procure $80 billion to $100 billion worth of defense equipment within the next five years. But, Banerjee said, "India will no longer be satisfied with a buyer/seller or patron/client type of arrangement."

Future acquisitions would emphasize technology transfer and joint research and development, he said. The chairman of the council, V. Sumantran, added: "If we can have co-development and co-manufacturing with other nations, including Russia, why not have a similar and an even more promising relationship with the US?"

In response, Carter turned to practical steps: "We want to develop a joint vision of US-India defense cooperation," he said. "We need to define where we want to go and then make it possible to get there."

Carter asserted a necessity for a common strategic view, for knocking down bureaucratic barriers, and for aligning economic and business interests.

"You have to have all three of them to have a successful project," he said.

This past June, Secretary of State John F. Kerry, accompanied by US Pacific Command chief Adm. Samuel J. Locklear, traveled to New Delhi to take part in a strategic dialogue that focused mostly on economics and climate change control. But long-range anti-submarine warfare, intelligence, and maritime security came into the conversation.

Vice President Joe Biden became the most senior American to visit India recently, flying there in July to contend that India and the US have made progress in defense cooperation now that they have put the Cold War behind them.

Biden addressed the issue of sovereignty, often referred to by Indians as a "strategic autonomy."

Photo by Sagar Pathak

An F-15C taxis by an Indian Air Force Il-78MKI tanker at Mountain Home AFB, Idaho, during Red Flag training in 2008. USAF pilots were impressed with the flying skills of the Indian pilots.

"Let me state it plainly," Biden said. "There is no contradiction between strategic autonomy and a strategic partnership." He argued that "global powers are capable of both."

Reasons for Partnership

Carter was back in India in September, saying the US and India "are destined to be security partners on the world stage." He told reporters that, in meetings with Indian leaders, he had tried "to clarify a lot of old misperceptions about US willingness to share high-level technology." The US, he insisted, would give priority funding to American researchers who find Indian partners for collaboration in technology.

"That's something we've only ever done before with the United Kingdom and Australia," Carter said. He cited the procurement and use of the C-130J cargo airplane as a "great example" of what India can accomplish.

Carter visited Hindon Air Force Station, where he met an IAF pilot who had flown a C-130J into and out of a landing field in the Himalayas above 16,000 feet, calling it "quite an accomplishment."

In contrast to the parade of senior Americans through New Delhi, the visit of Prime Minister Manmohan Singh to Washington in late September was distinctly subdued. After he and President Obama met in the White House, the two leaders offered platitudes to members of the press, taking no questions and offering no background briefing on what was discussed.

Both Indians and Americans affirm that there are clear reasons for partnership between the two countries.

- India is the world's most populous democracy, and promotion of democracy worldwide has been a stated goal of every US administration.
- India's economy is expanding swiftly—perhaps the ninth largest in the world.
- Geographically, India dominates South Asia on land and the Indian Ocean's vital sea transit lanes.
- India's military forces are being modernized; India in August launched its first indigenous aircraft carrier; put its first defense satellite into space; and is close to completing the purchase of the new Boeing C-17 airlifters. (India's chief air marshal, Norman A. K. Browne, piloted one from San Diego to Washington in July.)

Both Indians and Americans acknowledge privately that the emergence of China gives New Delhi and Washington

Photos by Sagar Pathak

Above: A Su-30MKI (bottom) flies a mission with an Air Force F-15C during training for Red Flag. Below: Indian Air Force maintainers install flare countermeasure devices on a Flanker-H at Mountain Home.

Photo by Sagar Pathak

Indian civilian technicians and IAF personnel troubleshoot a Su-30MKI forward facing advanced radar at Mountain Home.

an impetus to stand together. But they are diffident about making common cause in public to avoid arousing the wrath of Beijing.

J. Mohan Malik, a scholar at the Asia-Pacific Center for Security Studies, a government-funded research and training center in Honolulu, has written extensively about India and China. In his book, *China and India: Great Power Rivals,* he wrote: "Relations between the two Asian giants have been marked by conflict, containment, mutual suspicion, distrust, and rivalry."

Malik points to "a fundamental clash of interests between China and India that is rooted in their strategic cultures, history, geo-economics, and geopolitics." The consequence, Malik concludes, is that "both countries aspire to the same things at the same time on the same continental landmass and its adjoining waters."

Even so, not all Indian leaders distrust China. Minister of Defense A. K. Antony, considered by Indian political analysts to be an ideological left-winger, flew to Beijing to meet with the Chinese Minister of Defense, General Chang Wanquan, and Premier Li Keqiang, two weeks before Biden visited in India.

The Chinese official news agency, Xinhua, reported that the Indian and Chinese leaders agreed that service commanders, military region commanders, and field commanders would meet regularly (not mentioning their frequent border clashes). Dialogue would be promoted, ship visits would be increased, and air force exchanges on flight safety, aviation medicine, and training would be expanded.

India has also maintained working relations with Russia, built on New Delhi's collaboration with Moscow during the days of the Soviet Union. An Indian briefing paper published a year ago by its Foreign Ministry read, "Bilateral ties with Russia are a key pillar of India's foreign policy. India sees Russia as a longstanding and time-tested friend that has played a significant role in its economic development and security."

Nonalignment 2.0

The paper's authors wrote that "cooperation in the military technical ... sphere has evolved from a simple buyer-seller framework to one involving joint research and development, joint production, and marketing of advanced defense technologies and systems." The brief noted the two countries are working on joint development of a fifth generation fighter and a multirole transport. The licensed production in India of Su-30 aircraft and T-90 tanks are other examples of this cooperation.

US relations with Pakistan, India's archrival, have frayed in recent years due to differences over Afghanistan, and consequently US decisions concerning India seem less influenced by what Islamabad might think. Until recently, Pakistan's reaction was a key consideration in any cooperation with New Delhi.

As in most Asian nations, the legacy of colonialism and the struggle for independence still generates a wary attitude in India toward the West, including the US. India shook off British colonial rule in 1947. Thus, a fierce compulsion to protect national sovereignty drives many decisions in India.

When speculative press reports suggested PACAF might propose that US aircraft fly into Indian air bases on rotation, both the Indian Defense Ministry and PACAF stomped on the notion. While USAF rotates aircraft to Guam, Okinawa, and South Korea, and has plans to do so in Australia and possibly the Philippines, there are no such arrangements eyed for India. Neither the Army nor the Navy envision such a scenario in the foreseeable future, either.

In New Delhi, a new form of strategic autonomy called Nonalignment 2.0 has gained credence. It is based on the strategy of nonalignment that governed India's international relations throughout the Cold War and that was seen by some as favoring the Soviet Union.

Eight prominent scholars published "Nonalignment 2.0: A Foreign and Strategic Policy for India in the 21st Century," which generated widespread coverage in the Indian press—and some dissent from pundits who thought it reflected Cold War thinking. The scholars met frequently for two years to produce the proposal, which they contended would preserve India's strategic autonomy. "The core objective of a strategic approach," they wrote, "should be to give India maximum options in its relations with the outside world—that is, to enhance India's strategic space and capacity for independent agency." They claimed their concept was a "reworking for present times of the fundamental principle that has defined India's international engagements since independence."

Nonalignment, they said, was to ensure that India did not define its national interest by ideologies and goals that had been set elsewhere and that "India retained maximum strategic autonomy."

India, they argued, must seek "to achieve a situation where no other state is in a position to exercise undue influence on us—or make us act against our better judgment and will."

The authors of Nonalignment 2.0, skeptical of getting too close to the US, concluded, "Both India and the US may be better served by being friends rather than allies." ■

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DOCTRINE NEXT

Air Force doctrine takes a great leap into the digital age.

By John T. Correll

BY the time this appears in print, the long-standing structure of Air Force doctrine—paper documents, often years out of date and sometimes contradicting each other—will be gone. In its place will be a streamlined digital library, easy to access from a computer, smartphone, or tablet.

The website, *https://doctrine.af.mil,* was scheduled to go online in November. The new format will be instantly familiar to anyone accustomed to using the internet, search engines, and hyperlinks.

Instead of the 30 stand-alone doctrine documents of the past, the material is now modular, arrayed into five basic volumes and 29 annexes, constructed from 893 building blocks called "Doctrine Topic Modules," each of which can be called up individually. The breakout into individual DTMs enables revision in detail without broader disruption, so keeping doctrine current is no longer the forbidding chore it used to be.

The overall word count has been reduced by about 30 percent. Background material—such as definitions and explanation of recurring concepts—previously repeated in document after document is now broken out and stashed elsewhere. The product is consistent throughout.

For the first time ever, terms and concepts are defined the same way

PREVIOUSLY, dispute over a lone issue could hold up doctrine revisions for years.

wherever they appear in doctrine. With no lag in updates, there are no internal contradictions.

Just as doctrine evolves to reflect changing theory, technology, and use of airpower, "so must the means of delivering doctrine to airmen evolve to leverage the increased capability, speed, and flexibility of digital media," said Maj. Gen. Walter D. Givhan, commander of the Curtis E. LeMay Center for Doctrine Development and Education at Maxwell AFB, Ala.

The conversion to digital doctrine was accomplished in a massive project called "Doctrine Next," which took more than a year to complete. It gained the support of senior Air Force leaders and approval by the Chief of Staff at a doctrine summit held at the Air Force Academy in October 2012.

There was considerably more to Doctrine Next than a change in format. It was paired up with a general review and revision of major doctrine documents, already in progress, so the body of material that went online in November is fresh from top to bottom.

Those who have not looked at doctrine for a while may be surprised to discover—among other things—that the way the Air Force refers to its "Airmen" (with a capital A) is now used to refer to both military and civilian members of the Air Force.

The construct of "air and space power," officially endorsed for the past decade, has been dropped in favor of a return to the traditional term, "airpower."

The Leverage of Doctrine

The Air Force did not publish its own doctrine for its first seven years as a separate service. When USAF Basic Doctrine appeared in April 1953, it measured only four by six-and-a-half inches and was just 17 pages long. The 1955 revision was even smaller, cut to 10 pages.

In those days, Air Force doctrine put overwhelming emphasis on strategic nuclear operations to the exclusion of everything else. The 1959 version of Basic Doctrine said that "the best preparation for limited war is proper preparation for general war." That perspective was moderated somewhat after Vietnam but did not fade away completely until the end of the Cold War.

It was a simplistic approach that pushed strategic analysis to the side and contributed to a lack of interest in doctrine within the Air Force, which has traditionally put less emphasis on it than the other services did. That has enabled the others, notably the Army, to use doctrine as a venue to imprint joint operations with their own concepts and theories.

In the 1980s, the AirLand Battle construct advanced by the Army's Training and Doctrine Command (TRADOC) established the primacy of the ground forces, relegating airpower to a secondary and supporting role. It went without doctrinal challenge by the Air Force and persisted until the Gulf War demonstrated the error of it.

More recently, retired Army Gen. David A. Petraeus, former commander of US and coalition forces in Afghanistan, and his followers made TRADOC's Combined Arms Center at Fort Leavenworth—home base for Army doctrine—their springboard for launching counterinsurgency of the boots-on-the-ground variety as the centerpiece of joint operations.

Responsibility for doctrine in the Air Force moved around from place to place until the LeMay center was established at Maxwell in 1997 and given the job. The center is now the Air Force's executive agent for doctrine.

"Doctrine reflects and embodies our core beliefs about the nature of airpower and unifies us as airmen while articulating our capabilities to our joint and international partners," Givhan said.

"In doctrine, words are vital," said Col. Todd Westhauser, director of doctrine development at the LeMay center. "Specific terms have far-reaching effects if not used accurately and consistently. While some revisions appear to be focused on minor 'happy to glad' changes, those changes often have an impact on operational missions. Also, precision becomes important when introducing concepts across service lines we strive to reduce ambiguity."

What may look like an obsession with terms and definitions, in fact, sets the assumptions with which the force would go to war. Words can also have a fundamental effect on strategy.

In 2008, Marine Corps Gen. James N. Mattis and his subordinates at US Joint Forces Command used word definition as a means to purge "Effects-Based Operations" from joint lexicon and then from joint doctrine.

EBO, which held that the purpose of a military operation was to achieve a chosen strategic effect, originated in the Air Force and had gained joint and international recognition. However, critics saw it as diminishing the role of the ground forces.

Mattis announced that JFCOM no longer recognized EBO or related concepts and called for a "return to time-honored principles and terminology." Practically overnight, EBO disappeared from joint operational thinking.

Problems With the Old System

Doctrine Next was kick-started in 2011. A revision to Air Force basic

THE other services put more emphasis on doctrine and have used it as a means for imprinting joint concepts and practices.

doctrine—the first since 2003—was nearing completion at the LeMay center, but the new commander, Maj. Gen. Thomas K. Andersen, wondered why it had taken so long. "One of my first questions was how we make doctrine more relevant by making it current and shorter," Andersen said.

The arteries of doctrine had been hardened by a combination of bureaucratic practices and pre-internet technology limitations.

"We have historically been constrained by bureaucratic publication limitations that forced us to an 'all or nothing' approach," said LeMay center senior analyst Robert Christensen. "Even minor administrative changes required full coordination of a full publication. Under this approach, a single office could hold up a document almost indefinitely, often over a single issue."

A lone issue was sufficient to clog up the works. "The definition of 'Airman' was delayed four years due to disagreements among Air Staff organizations as to whether Department of the Air Force civilians should be included in the definition," said Westhauser. "Since the word was key to AFDD 1-1, Leadership and Force Development, the whole document was held up until that single item was resolved. With Doctrine Next, only the individual DTM containing the Air Force definition and discussion will be opened for debate while the rest of the volume will remain untouched and usable by the service."

"As another example," Westhauser said, "a revision of the 2003 edition of Basic Doctrine was delayed for several years when senior leaders in 2008 failed to resolve the combining of certain 'operational functions' of airpower (creating intelligence, surveillance, and reconnaissance, or ISR). Resolution of these descriptions finally happened in 2010, and publication occurred in 2011."

Because of the sheer difficulty of moving the iceberg, Air Force doctrine routinely lagged the evolution of concepts and the terminology used by operational planners. Thus destruction of enemy air defenses (DEAD) remained in USAF doctrine after the joint definition of suppression of enemy air defenses (SEAD) was changed to incorporate both suppression and destruction.

> USAF has completed the circle: from "airpower" to "aerospace power" to "air and space" and back to "airpower."

A similar change happened in the case of the air expeditionary task force (AETF). "Its description has evolved as we have experienced different command arrangements over the years," said senior analyst Robert Poynor. "Much was driven by the Air Force's move to a single air operations center per theater. Since, as a matter of policy, the Air Force was no longer attaching a separate Air Force component to subordinate joint task forces, we experimented with different ways to provide those JTFs with on-hand airpower expertise. We've found some solutions work better than others; Doctrine Next will allow us to get that word out promptly."

"With our new process, we can selectively target those DTMs that need revision based on feedback from the field or from our research," Christensen continued. "We can now post the material that's agreed upon, while resolving the outstanding issue separately."

"One caution," said Andersen, who is now retired. "We have to resist the temptation to change doctrine at a whim just because we can. We still need debate and deliberate thought—albeit shorter."

Tool Kit

The Air Force now has the best tool kit in the doctrine business. None of the other services have anything like the digital library produced by Doctrine Next, and neither does the J-7 doctrine shop on the Joint Staff.

Over the past year, the LeMay center liaison office in the Pentagon has been showing a demonstration version of the website to assorted Air Staff agencies. Col. Frank Link, who heads the office, says the reaction has been universally positive.

The opening screen of the website presents six main choices. The user can choose one of five volumes (Basic Doctrine, Leadership, Command, Operations, or Support) or click on annexes, which leads to a drop-down menu with 29 options. On the opening screen, the user can also select "recent changes to doctrine," go to "frequently asked questions," call up a doctrine search engine, or consult the ultimate sources with "contact us."

"All the doctrinal material in Volumes and Annexes is constructed from Doctrine Topic Modules, the building blocks that contain the key discussion points for any given subject area of doctrine," Christensen explained. "DTMs come together to build Annexes, which

are the supporting material for the key complications called volumes." A DTM may be as short as a single paragraph or as long as five pages.

The new configuration eliminates repetitive scene-setting and boilerplate. "When our doctrine was in individual stand-alone books, each one had to have a separate foreword, a separate introduction, a separate glossary, etc.," said Poynor.

"Since Doctrine Next contains doctrinal material unencumbered by traditional book structure, these repeated boilerplate pieces are no longer necessary. Separate glossaries are now replaced with an easily updated single glossary that all volumes and annexes link to for their definitions."

THERE are Airmen (capital A) and then there are airmen (lowercase).

Adjusting the Perspective

Much of the content in the new doctrine library will be familiar but there are some changes, many of them reflecting the radical change in perspective since the Sept. 11, 2001, terrorist attacks and subsequent operations in Iraq and Afghanistan.

In times gone by, irregular warfare was regarded as "a lesser included form of traditional warfare." It is now recognized as a kind of conflict that can exist on its own or escalate into something bigger. Irregular warfare is a regular part of the range of military operations, not an offshoot.

"The character of contemporary and immediately foreseeable conflict has been driven by a significant shift in the US approach to warfighting," the Basic Doctrine volume says. "The large-scale, complex, force-on-force scenarios that drove much of Cold War planning, which were seen during Operation Desert Storm and in the early stages of Operation Iraqi Freedom, are now viewed as the exception, replaced by the complex and unpredictable pace of irregular war against nontraditional enemies."

A DTM on "Culture in War" adds a new element in Basic Doctrine.

"In a number of non-Western societies around the globe, the cultural motivation for war is more deeply felt, causing them to fight in ways and for reasons that may seem strange to Americans," it says. "Some adhere to a warrior ethos, in which the act of waging war provides its own important psychological reinforcements. Some do not separate church, state, and popular culture in the Western manner, but see religion, politics, warfare, and even trade as a seamless whole. Thus, the wars they wage may take on the single-mindedness and ferocity of religious or civil wars. ... The causes of conflict will likely vary from rational political calculation to uncontrolled passion."

Current Air Force doctrine recognizes the same nine Principles of War—unity of command, objective, offensive, mass, maneuver, economy of force, security, surprise, and simplicity—espoused by Napoleon more than 200 years ago—with one exception. In 1997, the Air Force moved unity of command to the top of the list, ahead of objective.

All the Way Back to Airpower

The latest revision of Basic Doctrine may have finally resolved half a century of anguish over the terms airpower, aerospace power, and air and space power. In the early days, it was airpower, no question about it. Then in 1959, Air Force doctrine switched to aerospace power, defining aerospace as "the total expanse beyond the earth's surface."

However, "aerospace" did not gain full acceptance until 1998, when the Air Force declared it unequivocally to be the preferred term. That did not last long. In 2003, Basic Doctrine threw out aerospace in favor of "air and space."

Current doctrine, recognizing cyberspace as yet another regime, completes the full circle and goes all the way back to "airpower" as what it calls the "unitary construct," using "concepts and language that bind airmen together instead of presenting the Air Force as a collection of tribes broken out in technological stovepipes according to the domains of air, space, and cyberspace."

"Doctrine is about warfighting, not physics," it says. "Air, space, and cyberspace are separate domains requiring different sets of physical laws to operate in, but are linked by the effects they can produce together."

In recent years, the Air Force had toned down its advocacy of airpower in a gesture toward joint service harmony. Now, in the face of undiminished promotion of ground force hegemony, Air Force doctrine takes a strong position on airpower:

"Airpower has a degree of versatility not found in any other force. Many aircraft can be employed in a variety of roles and shift rapidly from the defense to the offense. Aircraft may conduct a close air support mission on one sortie, then be rearmed and subsequently used to suppress enemy surface-to-surface missile attacks or to interdict enemy supply routes on the next.

"Historically, armies, navies, and air forces massed large numbers of troops, ships, or aircraft to create significant impact on the enemy. Today, the technological impact of precision guided munitions enables a relatively small number of aircraft to directly achieve national as well as military strategy objectives."

"Within the broad sweep of history, the benefits of this instrument of military power are relatively new. Up until the latter part or the 20th century, naval

forces provided the primary symbol of American military power and resolve; powerful warships making port calls throughout the world were visible symbols of the strength and capability of the US. Today, airpower plays a very similar role—and not just in those nations with major seaports."

At the same time, there is a warning against excessive parochialism. "A study of airpower should also distinguish between doctrine and public relations-like pronouncements concerning the Air Force's role," Basic Doctrine says. "There have been many of the latter since the Air Force's inception."

WITH one exception, USAF espouses the same Principles of War that Napoleon did 200 years ago.

The Capital Letter

There are Airmen and then there are airmen. "The term Airman has historically been associated with uniformed members of the US Air Force (officer or enlisted; Regular, Reserve, or Guard) regardless of rank, component, or specialty," the doctrine explains. "Today, Department of the Air Force (DAF) civilians are incorporated within the broader meaning of the term when there is a need to communicate to a larger audience within the service, either for force development purposes or for clarity and inclusiveness by senior leaders when addressing a larger body of personnel.

"The broader meaning does not, however, mean or imply that anyone other than uniformed members of the US Air Force are members of the armed services in other contexts." The rights and obligations imposed by law of armed conflict regulations "are not uniformly applied to both Service members and civilians."

As for airmen, "The Airman's perspective may be shared by members of the other services and other nations who apply airpower. To differentiate US Air Force Airmen from these like-minded individuals, the term *Airman* [capitalized] is reserved for US Air Force personnel, while *airman* [not capitalized] is used as a general term for those from various services and nations."

This leaves out a certain amount of background. Several years ago, disgruntled by the unilateral capitalization of *Marines* by the news media and others, the Army and the Air Force directed their official publications to spell *Soldier* and *Airman* with capital letters. In 2004, the Air Force asked the Associated Press to make a similar change, but AP declined to do so.

The 2013 edition of *The Associated Press Stylebook,* used by most newspapers and magazines, still prescribes lower case for airman and soldier, but capitalization for Marine. For reasons of consistency, *Air Force Magazine* also dropped the capital letter from "marines."

It's Effects That Count

When Mattis and JFCOM banished "Effects-Based Operations" in 2008, the Joint Staff went along meekly, saying that the bulk of the EBO "construct" had never been officially adopted in joint doctrine. There was no objection or public response from USAF, which was still reeling from the "decapitation" in July 2008 when Secretary of Defense Robert M. Gates fired both the Air Force Secretary and Chief of Staff for reasons widely understood to be related to their advocacy of airpower.

The new Air Force doctrine replants the flag for EBO, now rephrased as the Effects-Based Approach to Operations. According to EBAO, the purpose of a military operation is to achieve a desired strategic effect, such as neutralizing the enemy or holding him in check but does not in every instance require destruction of the enemy force at the expense of high casualties on both sides.

It adds up to a ringing endorsement for the concept, declaring that "the purpose of military strategy is not just to 'win' or conquer, it is to resolve the conflict" and, it adds, "the attainment of military aims, even at the strategic level, should be subordinate to the attainment of a set of conditions that needs to be achieved to resolve the situation or conflict on satisfactory terms and gain continuing advantage. ... Victory in battle does not equal victory in war."

EBAO, it says, is "not a planning methodology; it is a way of thinking about operations. ... Operations are driven by desired ends (objectives and end states) and should be expressed in terms of desired effects, not defined by what available forces or capabilities can do. ... EBAO is comprehensive—it cuts across all domains, dimensions, levels, and IOPs [instruments of power]."

It remains to be seen whether the improved product and ease of use introduced by Doctrine Next will stimulate a greater interest in doctrine on the part of Air Force members at large.

"We're excited about Doctrine Next," said Westhauser. "While it's far from a dramatic change in how information is presented in general, it is a new way of thinking for presenting approved service doctrine. We believe this flexibility will allow us to lead turn emerging issues in joint doctrine by more quickly attaining a service consensus. When we make this work, we anticipate being able to support allowing this process to proliferate, making coordination and updating more kinds of documentation easier and more accessible across the service."

"Doctrine is a living, evolving part of us that reflects who we are," Givhan said. "Doctrine Next will enable us to keep it fresh, relevant, and connected to our experience as airmen in a digital age." ■

THE new doctrine replants the flag for Effects-Based Operations.

John T. Correll was editor in chief of Air Force Magazine *for 18 years and is now a contributor. His most recent article, "Glenn Miller's Air Force Odyssey," appeared in the November issue.*

Going Postal

Ovington at the start of flight to Mineola, N.Y.

Stamp, issued in 1971, with a B-2-like image.

The US Postal Service's first official airmail flight came on Sept. 23, 1911, over Long Island. Here, the first "aeroplane mail carrier," pilot Earle Ovington, receives the first bag of airmail. Others pictured are (l-r) New York City Postmaster Edward Morgan and US Postmaster General Frank Hitchcock. Ovington took off (inset) from Garden City and rounded Mineola, two miles away. Ovington (once an assistant to Thomas Edison) brought his Bleriot XI down to 500 feet and tossed the bag. It burst on impact, but letters and postcards were retrieved and delivered. Airmail survived as a distinct service until 1975, when it became part of first-class mail.

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Ralph Parr is the only airman ever to earn both a Distinguished Service Cross and an Air Force Cross.

Capt. Ralph Parr (l) describes his final "kill"—the destruction of an enemy transport—to Col. Thomas DeJarnette and other members of the 4th Fighter-Interceptor Wing in July 1953.

By John Lowery

The Jet-Age Gladiator

Having just landed from a combat mission, four pilots from the 334th Fighter-Interceptor Squadron walked casually from the squadron's sandbagged revetments at Kimpo AB, South Korea, toward the operations building for the usual intelligence debriefing. The deafening engine whine of another returning flight of F-86 Sabres went up. At the time, all fighter-interceptor pilots instinctively checked the gunports of returning flights for the dark gray soot indicating their guns had been fired. This would imply contact with MiGs. Sure enough, the .50-caliber blast shields of the No. 4 aircraft showed the unmistakable signs. But something else looked odd: The ship's entire fuselage was badly scorched from nose to tail—as if it had been burned with a giant blowtorch.

It was June 7, 1953, and the fighter's pilot was Capt. Ralph S. Parr, returning from his sixth combat sortie in the Sabre. His flight's mission had been a "fighter sweep"—to intercept and destroy any enemy aircraft found over North Korea. The fouled gunports and scorched airplane provided visual confirmation of what turned out to be the first two of Parr's 10 aerial victories.

Born on July 1, 1924, in Portsmouth, Va., the son a Navy pilot, Parr began his military career on Nov. 4, 1942, when he enlisted at age 18 in the Army Reserve. On Feb. 2, 1943, he began flight training as an aviation cadet, earning his wings and commission as a second lieutenant on Feb. 8, 1944.

His first taste of combat was very late in World War II, as a P-38 pilot based in the Philippines. He had no significant engagements. He did, however, witness the smoke still rising from the aftermath of the atomic bomb dropped on Hiroshima.

When the Korean War began, he immediately volunteered to fly combat. He was sent to the F-80-equipped 49th Fighter-Bomber Group. Following 165 interdiction missions, he returned to an F-86-equipped fighter wing at George AFB, Calif. The next year he spent perfecting tactics for use against the MiG-15.

With the war winding down, he wrangled an assignment to the F-86-equipped 4th Fighter-Interceptor Wing. In the remaining 11 weeks of hostilities he shot down 10 enemy aircraft in just 47 missions.

Through three wars, Parr received more than 60 decorations. The Distinguished Service Cross, predecessor medal to the Air Force Cross, is second only to the Medal of Honor for heroism in combat. Parr is the only airman ever to receive both a DSC and an AFC.

The day of his first two kills of the Korean War, Parr was flying as Shark Four, wingman to element leader 2nd Lt. Al B. Cox, Shark Three. Normally a wingman was forbidden to fire his guns without specific permission from his element leader. But Cox knew of Parr's extensive jet fighter background. He said to Parr while walking to their jets, "You have more Sabre experience than I've got total flying time. If you should see something, call it out. If I can't see it, I'll clear you to take the bounce and cover you."

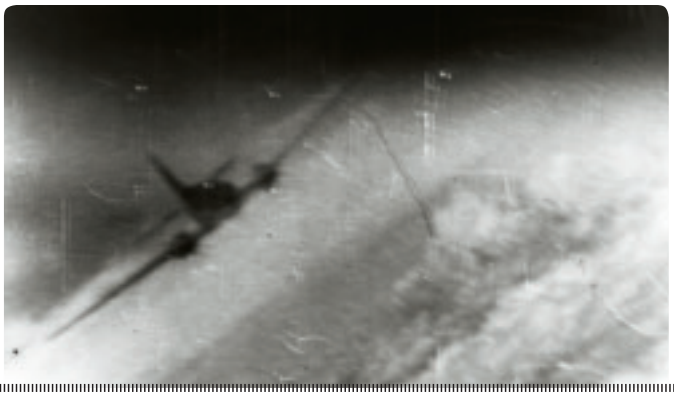
As they cruised along "MiG Alley," Parr recalled, the weather was beautiful, with unlimited visibility. "With the two elements almost line abreast, I was looking north into China. Suddenly I saw a flight of four MiGs perpendicular to our flight path with a dive angle of about 15 degrees and firing at us," he said. Parr and Cox broke hard left into the attackers, but the lead element broke right, thus separating the flight. With the attack thwarted and because flight integrity was required, the two Sabres turned west, toward the confluence of the Yalu River and Yellow Sea, before having to turn south toward home base.

"After that encounter I was trying my best to look in 16 different directions at once, to keep us from getting bounced again. Then I looked down very low and saw something flicker across some light-colored sandbars along the Yalu River shoreline and called them out," Parr remembered.

A Busy June

Cox said he didn't have it and urged Parr to take on the enemy, so Parr rolled a split-S and went straight down, pulling nine Gs to level off at 300 feet going very fast.

Parr spotted two MiGs a ways ahead, but when he got closer, he realized there were more—first four, then eight in all. Parr looked to his left and saw eight more and immediately decided to put a "big notch" in the MiG leader directly ahead.



Parr's gun camera caught this image of the Russian transport just before he shot it down in the last aerial combat action of the Korean War.

As Parr closed in on the leader, the eight in front went into a break. Parr stuck with the leader and fired as close to a "tracking shot" as he could get, but with a deflection angle of 70 degrees, he had to use 9.5Gs to do it. "There was no way I could stay with him without making a square corner," Parr said of the encounter.

The MiG and Parr continued with an old-fashioned dogfight, after Parr's gunsight malfunctioned, nearly rolling canopy to canopy 300 feet above the ground.

"What happened next I don't know, but I detected a faint movement that put him just slightly ahead. I thought to myself, 'Damn you. That's going to cost you, friend.' Then I got a little more spacing and slid in behind him," Parr recalled. They were so close Parr was afraid the nose of his aircraft would take off the MiG's stabilizer.

Parr's wing entered the MiG's jet wash, which pushed him back a few feet. He was now only 10 feet behind his foe. He leaned the guns against the MiG and pulled the trigger, not needing a gunsight.

"About the fourth or fifth time I hit him, it was like a bucket of water sloshed over my windshield," Parr said. It was fuel from his enemy's wing caps. Staying close, Parr worked back into firing position, firing again, and the MiG burst into flames. The gunfire caused Parr's jet to stall and he dropped low, with flames from the other aircraft barely missing his intake and going over the canopy and the top half of his aircraft. The MiG hit the ground and exploded. Pulling up rapidly, recovering from the stall, Parr saw five MiGs lined up against him. The first opened fire, with tracers from the cannons arcing toward his jet. Parr worked to avoid the fire, and the MiGs overshot him one by one.

One MiG looked like it was about to break off from the attacking element, and Parr eased up on his turn a bit—encouraging

him to come closer. Parr maneuvered when the MiG pulled close enough and rolled over on top and behind him, pulling the trigger. After two or three quick shots the MiG went down. Soon after, Parr headed back to base, the soot from his guns still apparent when he landed at Kimpo.

On June 10, three days later, Parr downed a third MiG.

On June 18, 1953, Parr achieved the magic five victories to become a jet ace, after earning another double kill. In the postflight debriefing, Parr said he was halfway home before he realized he was an ace. "You get pretty focused when in enemy territory, because in this game, losing can be permanent," he said of the day.

On June 30, Parr was flying a mission with Cox as his wingman when 10 MiGs attacked. Parr shot down two and was maneuvering for a third kill when a distress call came from his wing commander, Col. James K, Johnson, whose F-86 had flamed out after ingesting debris from a MiG he had shot down. Johnson was now under attack himself. Low on fuel, Parr found Johnson, drove off the attackers, and gave Johnson time to restart his engine and get back to base. For his actions that day, Parr was awarded the DSC.

With the armistice only a little more than two weeks away, on July 12 Parr scored his ninth kill. He carved off a MiG from a four-ship formation cruising toward their home base at around 16,000 feet near the Chinese border.

As Parr dived to engage, the flight saw him and broke in all directions. He latched on to the No. 4 MiG, which turned hard right. Parr called to his wingman, Lt. Col. Robert J. Dixon, telling him he was locked on.

The MiG pulled up vertically and began rolling. Parr got astern and rolled in unison, firing three short bursts, each of which hit. The MiG steadily ran out of airspeed and exploded.

USAF photo

Then-Vice President Richard Nixon sits in the cockpit of an F-86 Sabre on a visit to Korea in 1953, as Parr points out and explains the controls.

Double Ace

On the afternoon of July 27, 1953, just hours before the scheduled armistice, Parr downed a Soviet Il-12 transport. It would become one of the most politically contentious encounters of the Korean War.

On this mission Parr led one of three flights of F-86Fs, escorting a Marine Corps photoreconnaissance aircraft for a run over a dirt airfield in the bed of the Yalu River, the border between China and North Korea. But North Korea was covered by an undercast that stopped abruptly at the river.

"I looked down and saw an aircraft flying close to the river on the Manchurian side," Parr recalled. Meanwhile US radars had reported enemy aircraft just slightly west of the flight.

Parr had been observing the aircraft for a while when it slowly crossed the Yalu River into North Korea.

As Parr's flight approached the target area, he asked the marine pilot if he could get his photographs of the target. The answer was no, the target was socked in with cloud cover.

The mission commander gave permission to check out the "bogey," and Parr and his wingman descended to about 500 feet above the aircraft to check it out.

"It had the same markings as the MiGs, a big red star, but no civilian markings," Parr said. This was verified by his wingman, 1st Lt. Edwin J. Scarff.

Parr made two more passes to confirm the identity of the transport, checked his map to make sure he was south of the Yalu, then opened fire and shot the aircraft down.

The Soviets were outraged and immediately claimed the transport was a civilian airliner with the negotiation team aboard—and that it was 200 miles north in Manchuria. An investigation showed a straight line from the aircraft's departure point of Port Arthur, China, to its destination, Vladivostok, Siberia, took it across the Yalu River exactly where Parr saw it enter North Korea.

The shootdown would turn out to be the final aerial action of the Korean War, as the armistice went into effect at 10:01 p.m. that day.

Heroism Over Khe Sanh

Parr remained in the Air Force and went on to fly combat missions in Vietnam—his third war. He earned the Air Force Cross for actions during the deadly siege of the US garrison at Khe Sanh, South Vietnam.

On March 16, 1968, the determined North Vietnamese Tet Offensive was beginning to bog down. The North Vietnamese were attempting to repeat the success-via-siege used in the 1954 victory against the French at Dien Bien Phu, but the communists failed to take American airpower into account.

With the base under mortar attack, an F-4C dived into the battle. The Marine Corps forward air controller (FAC), Fingerprint 54, shouted at it: "Sharkbait Two, you're receiving unbelievably heavy fire. Pull out! Pull out!" The man behind the F-4's controls was then-Colonel Parr.

Capt. Thomas McManus was the weapon systems officer in the back of Parr's Phantom. "We flew down into the low, hazy visibility of the ravines—below the hilltops on both sides," McManus recalled. He was looking for mortars that were hitting the marines at Khe Sanh, when suddenly a mass of enemy troops appeared on top of the hill to the left of the Phantom—and they were shooting at it.

McManus and Parr had flown into an entrenchment of heavy anti-aircraft and machine guns. Enemy troops had set up at the

Parr receives the Air Force Cross from Maj. Gen. Robert Dixon, then USAF assistant deputy chief of staff for personnel, in a ceremony at Randolph AFB, Tex. Parr received the medal for his heroic actions over Khe Sanh, Vietnam, in 1968.

dead center approach to Khe Sanh's only runway, to ambush approaching transports.

The USMC commander came on the radio to tell Parr and McManus their F-4 was hit, then canceled the mission saying they couldn't survive any more passes. McManus asked Parr if he could feel the aircraft get hit, to which Parr reportedly said, "Don't know. I've never been hit."

One of the mortars below had been taken out with a well-placed delivery of napalm, but Parr told his WSO they had to do something about the guns below; transports would be sitting ducks, and they had been looking for the gun emplacements for too long to give up and go back.

Parr radioed the FAC, refusing cancelation, telling him to alert the Marine Corps commander to keep the troops under cover when he was cleared to go back in.

Unless they destroyed the guns, the supply aircraft would fall like flies, he told the FAC. Reluctant approval came back, and on the second pass the F-4 did another "sloppy maneuver"—and McManus said he knew the jet was hit yet again—but all gauges were still checking out. The FAC told them not to come back, but Parr persisted, returning to attack, destroying more guns with every pass.

Ammunition depleted and napalm expended, dangerously low on fuel, Parr stayed close by the site of the guns to direct his wingman against targets in the area, attempting to take out as many guns as possible, to assure fewer threats against incoming C-130s. The FAC was finally able to fly down the landing approach to Khe Sanh without drawing fire. He radioed back his estimate of more than 100 enemy killed from the air.

The official tally from the Marines was two mortars destroyed, five heavy anti-aircraft guns destroyed and one disabled, with 96 enemy troops killed.

Parr and McManus' Phantom survived 27 hits. Parr was honored with the Air Force Cross for his actions on that day.

In large part thanks to airpower's aid, and efforts by Parr and many other airmen, the Joint Chiefs of Staff estimated the enemy sustained 10,000 casualties while attacking Khe Sanh. North Vietnam's participating divisions were decimated.

Farewell

In 1970, Parr returned to Vietnam for another tour, this time as commander of the 12th Tactical Fighter Wing. By the time his Vietnam engagement was over, Parr had flown 641 combat missions over three wars.

Parr was compelled to retire from the Air Force for medical reasons in 1976. Assigned to Eglin AFB, Fla., at the time, he seriously injured his back while inspecting hurricane damage to the roof of his home. "You'd think I could have picked a more graceful way to depart the military," he later told *Air Force Magazine.*

Following a long illness, Parr died peacefully on Dec. 7, 2012, in New Braunfels, Tex. He was 88. His commitment to his fellow troops and uncommon fierceness under fire classify him as a true jet-age gladiator. ■

John Lowery is a veteran Air Force fighter pilot and freelance writer. He is author of five books on aircraft performance and aviation safety. His most recent article for Air Force Magazine, *"Piotrowski," appeared in the September issue. This article is adapted from his book* Life in the Wild Blue Yonder.

Keeper File

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Sum of All Wisdom

In late 2001, USAF was riding high. The Afghan war had turned into a triumph of advanced air and space systems and operations. It was at this moment that Gen. John P. Jumper, the new Chief of Staff, laid out a vision for airpower. Afghanistan was just the beginning. He prescribed massive "horizontal integration" of the power of USAF's air and spacecraft, allowing them to exchange data, directly and immediately, to yield "the sum of the wisdom" for commanders. This, said Jumper, was "the essence of transformation."

"Toward Air and Space Integration"
Gen. John P. Jumper, USAF Chief of Staff
Air Force Association National Symposium
Los Angeles
Nov. 16, 2001

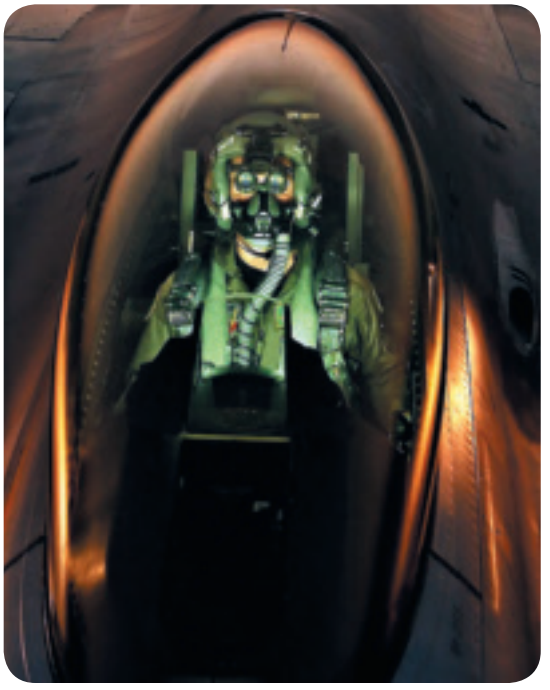
Find the full text on the *Air Force Magazine's* website www.airforcemag.com "Keeper File"

I came here today to talk about my two favorite subjects, and that is air and space [power] and how our airmen ... will combine their skills and their talents to bring the greatest asymmetrical advantage to those commanders whose job it is to win the war. ... This is what I think is the essence of transformation. ...

When air and space combine together in the right ways, we can target, we can be redundant, we can persist. We can find, fix, track, target, engage, and assess anything of significance on the face of the Earth. We can bring this to the joint fight in ways that no one else can. ...

It is our strength that we unlock the intellectual potential that resides in those who can think across the dimensions of air and space, of manned and unmanned. ...

Right now, I would argue, these are capabilities that exist in bits and pieces. It is our job to pull it all together, to be able to think in terms of integration. ...



Do you think that the guy on the ground, the special operator who is trying to put bombs on targets before they kill him, cares whether the coordinates arrive as a result of an air platform or a space platform? He does not. He wants the effect. And he is most grateful for those of us in uniform who can think across boundaries, who can think across capabilities, in a single word, who can integrate. ...

We are all wedded to our platforms and our programs. ... To an F-15 guy, every problem looks like a MiG-21. ... To a bomber guy, not many problems can't be solved with 105 Mk-82s. ... [Do] you know how many programs we have dedicated to integration in our Air Force? How much money is labeled against a program element that says integration? Do you know how much? Zero. Integration is left as a byproduct ... of the platform. ... What are we trying to do is to create an intellectual construct that will take us away from that. ...

One of them ... is what I call the horizontal integration of manned, unmanned, and space [capabilities]. Notice I didn't mention one platform or program. This horizontal integration of manned, unmanned, and space is designed to do one thing—I call it the "sum of the wisdom."

The sum of the wisdom of this horizontal integration will result in a cursor over the target. ... We won't have to go through tribal representatives that sit in front of tribal work stations to interpret their tribal hieroglyphics to the rest of us poor unwashed. We will do this with machine-to-machine digital interfaces. ...

The person sitting at the console doesn't know where the result came from. He or she doesn't care. Neither does that commander who is passing on that information to the warhead wherever it is, manned or unmanned, space-borne or airborne, that is going to destroy that target. ...

Today, if you are an F-15 driver, you are up there with the AWACS, and the AWACS says, "Eagle One, you've got a bandit, bull's eye, zero-four-zero for 40." You take your cursor in that F-15, you put it over that target, and you press the button. ...

[But with an integrated system] you don't have to run your mouths over the target and say, "Give me the air speed, give me the altitude," send a query out on the Internet, tell me what kind of airplane this is, watch the hourglass run down. You don't do that. The system understands the urgency. It says, "Altitude, heading, air speed, target, type." You put the dot in the middle of the circle, it flies you the perfect intercept. Without any prompting it has a conversation with Mr. AMRAAM missile down here on the missile rail and says "Mr. AMRAAM, you come off the rail, look right here, that is where the target is going to be." AMRAAM says, "Got it," and puts an envelope up on your head-up display: max range, min range, no escape range.

And for the fighter pilot who can't figure out any other way, there is a big flashing light right in the middle of the HUD that says, "Shoot! Shoot!" [audience laughter] That is for me.

Here is the question, gang: If we can do this in the tactical level of war, why can't we do it at the operational level of war?

The Aerodrome Fraud

By Peter Grier

Langley's aircraft broke apart into the Potomac nine days before the Wright brothers' successful flight. Glenn Curtiss later made sure it flew.

1

At 4:45 p.m. on Dec. 8, 1903, a tandem-winged flying machine named the "Great Aerodrome" raced down the rails of its catapult toward the gathering darkness over the Potomac River. With it went the dreams and reputation of designer Samuel P. Langley, secretary of the Smithsonian and one of the most renowned American scientists of the age.

It was a burden the fragile aircraft could not bear. At or near the end of its run down the launcher, mounted atop a houseboat, the craft bucked from the rails. Pilot Charles M. Manly testified he felt an "extreme swaying motion," followed by a tremendous jerk. A photo of that instant shows the machine nearly vertical, clawing at the air, its rear crushed and dangling.

It flipped on its back and collapsed into the water. Manly barely escaped with his life.

Langley had worked on problems of aerodynamics for 17 years. He had successfully flown large powered models and overseen development of a radial engine that generated more than 50 horsepower, astonishing for that time. The War Department had granted him $50,000 for Great Aerodrome development.

But his status—and the US government's money—appeared to have vanished beneath the Potomac's icy waters. Newspapers were brutal. One suggested that if he had launched the Great Aerodrome bottom-up, it would have flown instead of dived.

Nine days later the Wright brothers made the first heavier-than-air, powered, controlled human flight at Kitty Hawk, N. C. Langley's place in aviation history seemed to be as an also-ran. He died in 1906 without working on flight again.

The Wrights always said they appreciated Langley's contributions.

"When they were wrestling with whether or not to enter this problematic field, the fact that someone with Langley's reputation believed that human flight was possible and had flown models proved to them the thing could be done. They recognized Langley's value as inspiration in that sense," said Tom D. Crouch, senior curator at the Smithsonian's National Air and Space Museum and author of numerous books on aviation's early years.

That was not the end of the Langley story, however.

The Great Aerodrome was resurrected and rebuilt more than a decade later by the Wright brothers' rival Glenn H. Curtiss. It eventually flew, in a manner of speaking, and the Smithsonian chose to call its former secretary's aerodrome the first aircraft "capable of flight."

For decades, the Smithsonian displayed it but not the Wright Flyer. The controversy was not fully resolved until 1948.

Many Talents and Passions

Langley was a man of great contradictions. As an employer, he could be impatient, even domineering. At the Smithsonian, subordinates knew to follow a few steps in his wake as a tacit acknowledgment of their relative position. On the other hand, he inspired staunch loyalty in some key aides. Chief assistant (and pilot) Manly finished Langley's *Memoir on Mechanical Flight* following his death and remained a lifelong defender of Langley's contribution to aeronautics.

As a scientist, Langley was a keen and exacting observer of reality. His freehand drawings of sunspots were so accurate and beautiful they were reproduced in textbooks well into the 20th century. Yet he loved myths, legends, folklore,

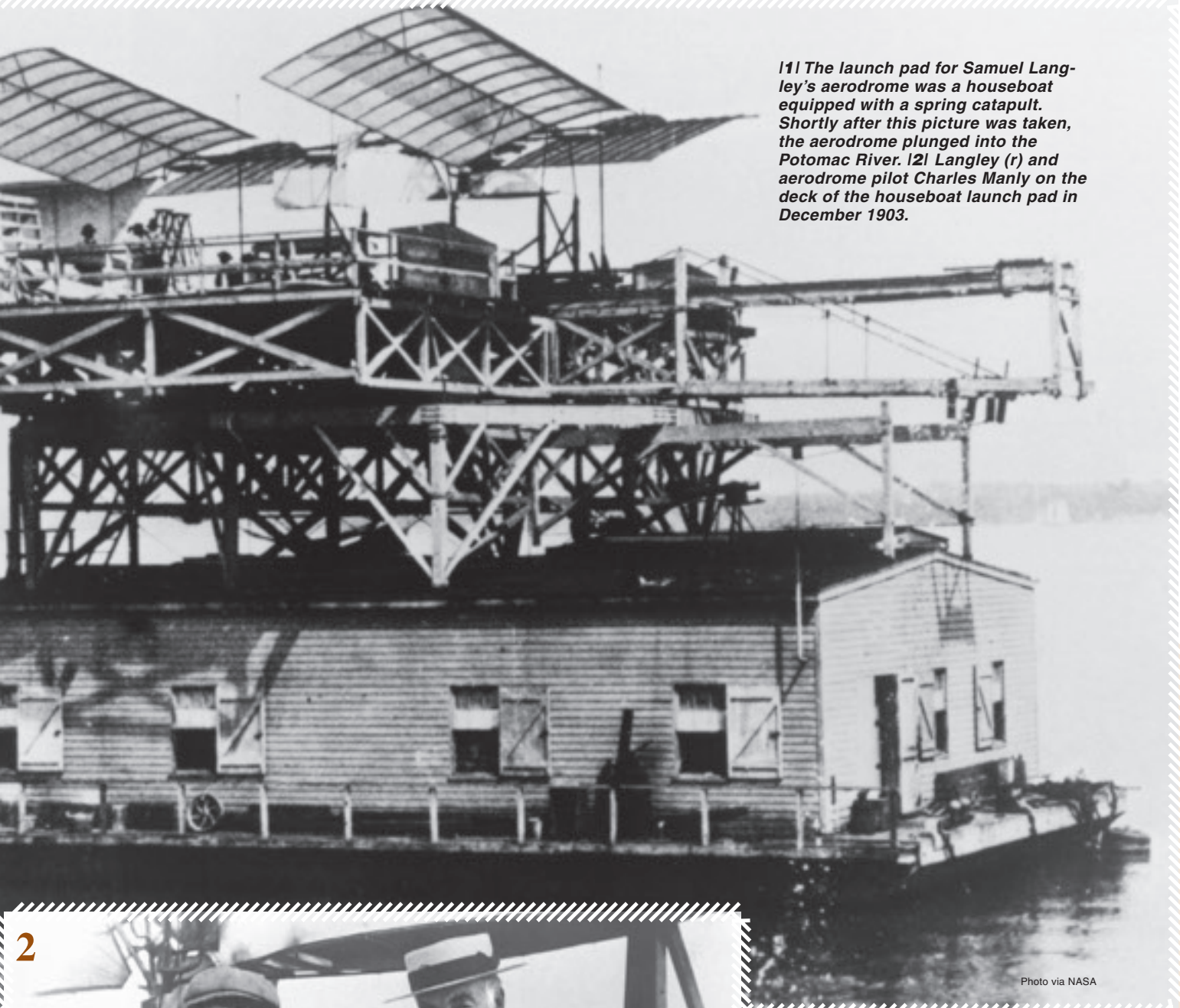


Photo via NASA

|1| The launch pad for Samuel Langley's aerodrome was a houseboat equipped with a spring catapult. Shortly after this picture was taken, the aerodrome plunged into the Potomac River. |2| Langley (r) and aerodrome pilot Charles Manly on the deck of the houseboat launch pad in December 1903.

National Archives photo

and stories of magic. One evening at a Washington dinner party a socialite tried and failed to engage Langley in scientific conversation. Exasperated, she asked the great man what did interest him.

"Children and fairy tales," he said.

The unmarried Langley was happy home alone, reading vast numbers of scientific and general books by gaslight. All the same, he craved the company of intellectual and famous men. He dined at the White House and traveled to Europe to meet with his scientific peers every summer. Inventor Alexander Graham Bell, an aeronautic enthusiast himself, considered Langley among his closest friends.

"He was not an easy man to work for or to get to know," said Crouch.

Langley was born in 1834 in Roxbury, Mass. His father was a wholesale mer-

1

National Archives photos

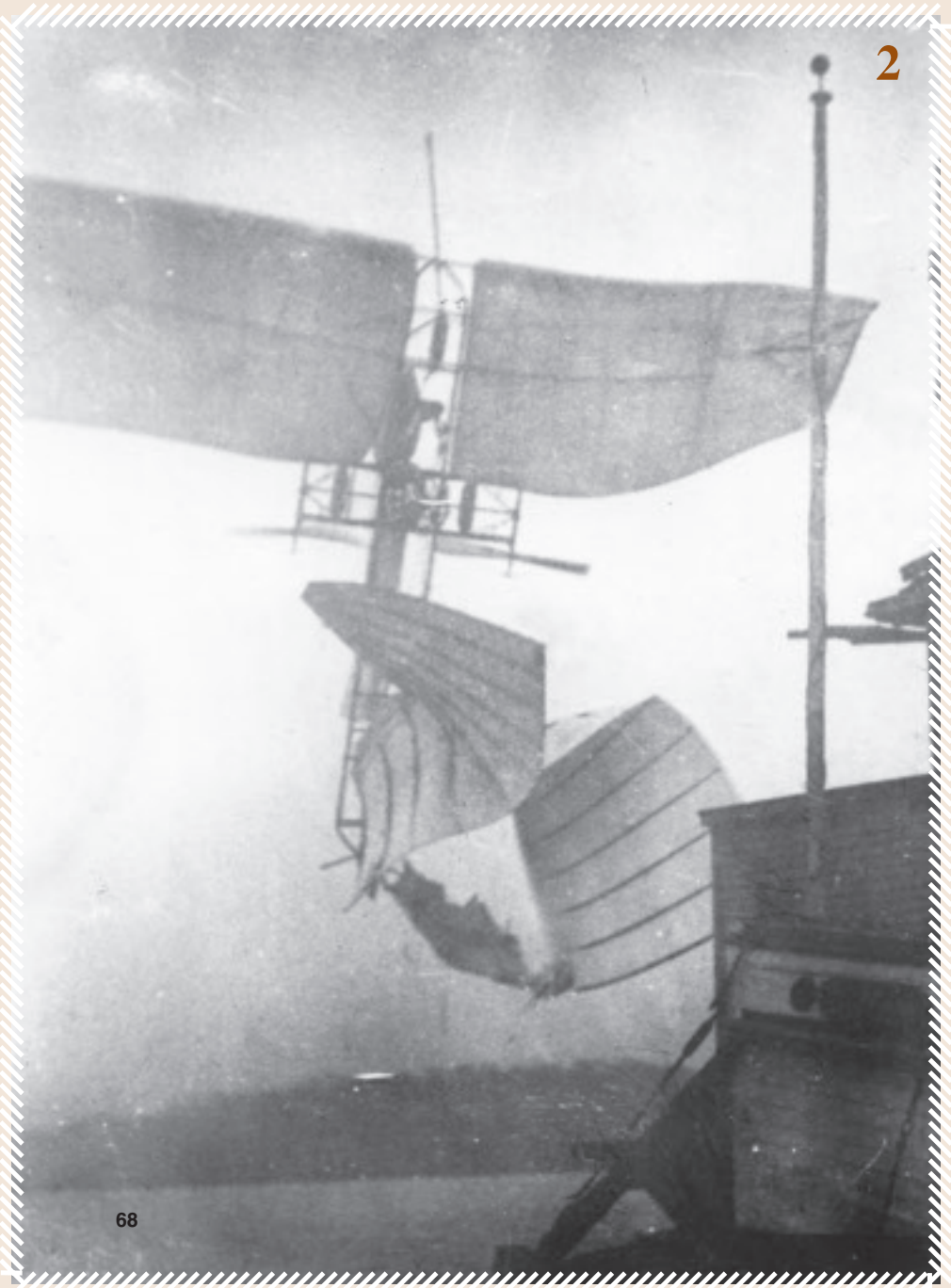
chant with deep New England roots. The young Langley attended Boston Latin School, training ground for children of the local elite. He showed promise of future scientific achievement at an early age: With his brother, John, he built instruments that enabled them to view such astronomical phenomena as the craters and seas of the moon, the phases of Venus, and the rings of Saturn.

After graduating from Boston High School Langley did not continue to Harvard, as did his brother and many of his peers. Instead, he traveled west to St. Louis and Chicago to be an architectural apprentice, learning valuable drawing and mechanical skills in the process.

Langley also learned architecture was not the profession for him. He moved back to New England, and after a grand tour of Europe with John, Langley obtained a position as assistant at the Harvard College Observatory. A year later he moved to the US Naval Academy in Annapolis, Md., to teach math and to restore the academy's small observatory.

In 1867 he received the break that was to make his career. He was appointed director of Pittsburgh's new Allegheny Observatory and chairman of astronomy and physics at Western University of Pennsylvania.

Pittsburgh was a backward town by Eastern standards. The university was small, the observatory but one



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telescope, a table, and a few chairs. Langley did not have an eminent education—indeed, he had little more formal schooling than did the Wright brothers, neither of whom received a high school diploma.

But he was ambitious and energetic. He would rise.

"From the beginning to end Langley was self-trained, both as an astronomer and as an engineer and builder," said Crouch.

Langley's first great success was both scientific and entrepreneurial. He recognized that an observatory, even one as humble as his own, possessed something valuable: the ability to determine the precise time. Fast-expanding railroads needed this type of knowledge to coordinate schedules. The era when towns could set local time by their own solar observations was dwindling away.

The Pennsylvania Railroad signed up as the Allegheny Observatory's client. Twice a day Langley sent the correct time via telegraph to the railroad's hundreds of stations. Other businesses soon signed up, providing money to improve the observatory equipment and free Langley for scholarly pursuits.

He focused on the sun. It fascinated him. He spent years observing sunspots, solar prominences, and the sun's corona and chromosphere. His descriptions of these phenomena became detailed classics of their time.

Langley's Law

Unsatisfied with existing instruments, he designed a kind of electrical thermometer he called a "bolometer" to measure changes in the temperature of various regions of the solar surface. He expanded his observations to determine the constancy and effects of solar radiation.

"The inventiveness of mind displayed by Mr. Langley in all his work was remarkable," wrote Charles D. Walcott, his successor at the Smithsonian, in a 1912 biographical memoir.

Langley later was showered with honorary doctorates and other honors. Scientific societies around the world were eager to hear him speak. But he increasingly felt isolated in Pittsburgh as steel and coke producers blackened the local skies. He accepted a job as an assistant secretary at the Smithsonian in 1886 and turned his attention to another scientific interest: flight.

Later in life, Langley would say he first became interested in flight as a boy while watching soaring hawks and buzzards in New England. But the spark that really lit his pursuit of powered flying machines occurred in August 1886 at the annual meeting of the American Association for the Advancement of Science in Buffalo, N.Y.

Langley attended a lecture where an amateur flight enthusiast named Israel Lancaster claimed to have produced small bird-like models able to stay aloft for upward of 15 minutes. The presentation was received poorly. The learned men present scoffed at Lancaster's claims, but Langley's reaction was different. Prevailing knowledge as to how birds fly was clearly lacking, he concluded. He decided to investigate the problem himself.

"He resolved, as a fundamental problem, to ascertain by scientific observation and experiment what mechanical power was required to sustain a weight in air and make it move at a given speed," wrote Walcott in 1912.

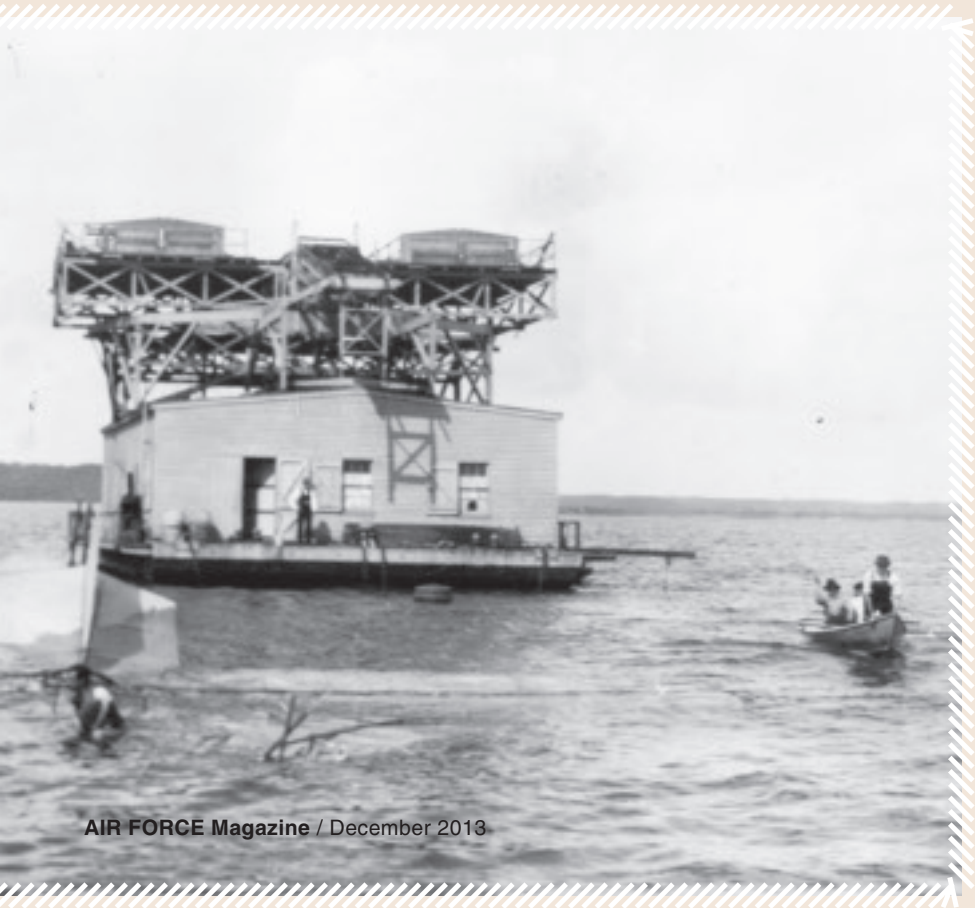
To provide basic data, Langley built a steam-powered whirling arm device. This allowed him to test the results of airflow over variously shaped metal plates. Using the arm, he discovered what he thought to be a basic principle of aerodynamics: The faster a plate "wing" moved through the air, the more its drag declined. The implication of this was that a wing would require less power to stay in the air—not more—the faster it flew.

Labeled "Langley's Law" by contemporaries, this assertion was in fact incorrect. It is true that drag due to lift decreases as speed increases, up to about 50 mph, but past 50 mph parasite drag, produced by the resistance of the air to the wing passing through it, becomes significant and steadily goes up.

"Langley, in short, had not conducted his experiments over a sufficiently broad speed range, and as a result his limited data led him to a fundamentally erroneous conclusion," wrote former Air Force historian Richard P. Hallion in his book *Taking Flight: Inventing the Aerial Age From Antiquity Through the First World War.*

Langley eventually moved to the construction of small gliders and rubber band-powered models. He built some 100 of these, many of them abstractly beautiful, jewel-like objects, but he could not get them to stay in the air more than a few seconds. Thinking more motive force might be the answer—as indicated by Langley's Law—he began to design models large enough to carry small engines.

By now he was secretary of the Smithsonian—a post he had acceded to



|1| The aerodrome leaves the catapult and falls into the Potomac on Oct. 7, 1903. |2| The aircraft breaks apart in midair immediately after being released by the catapult on another attempt, Dec. 8, 1903. |3| The wreckage of the aerodrome sinks into the Potomac River. Manly, the pilot, perches on a piece of debris waiting to be rescued.

Library of Congress photo

National Archives photo

|1| A mere nine days after Langley's unsuccessful flight in December 1903, Orville (at the controls) and Wilbur Wright (at right) flew the Wright Flyer at Kill Devil Hills, N.C., for 12 seconds. That flight is usually considered the first sustained, controlled, heavier-than-air, powered flight. |2| Wright brothers' rival Glenn Curtiss wanted to undermine their accomplishment by proving Langley's aerodrome could have, indeed, flown. Curtiss and two other pilots took to the air in 1914 in a similar—but heavily modified—aircraft. This began a feud between the Smithsonian museum and Orville Wright.

when the incumbent, naturalist Spencer F. Baird, died in 1887. He assembled a small team of expert carpenters, machinists, and other craftsmen in Smithsonian shops. Through trial and error Langley and his men eventually developed a basic plan: tandem wings, one behind the other, with a kite-like tail and twin pusher propellers powered by a one-cylinder steam engine.

He dubbed these models "aerodromes," mistakenly believing the word meant "air runners" in Greek.

"In fact, he had created a word that could only mean a place where aircraft could operate, i.e., an airfield—the first, unfortunately, of his many misapprehensions about flight," wrote Hallion.

With wingspans of up to 14 feet, Langley's model aerodromes were too large to operate from small fields in the nation's capital. They risked damage in hard landings due to lack of skids or wheels. Thus Langley decided to test them over water. Eventually he settled on a site at a wide spot in the Potomac, 33 miles downriver from Washington, near Chopawamsic Creek.

The aerodrome launch pad was a houseboat, which provided height to aid takeoff and could easily turn into the wind. A spring catapult provided speed.

Initial efforts were unsuccessful. The first aerodromes were too weak or underpowered to fly. Some became unmanageable in the slightest breeze. In 1895, aerodrome No. 5 provided a glimmer of hope by flying for a few seconds in several attempts. Then it, too, fell into the waters below.

On May 6, 1896, Langley and his crew prepared to try again. Langley's friend Bell, with camera, came along as a witness. A new aerodrome No. 6 was a quick casualty. A guy wire snagged on the catapult, breaking the left wing before the machine had even left the catapult track.

At 3:05 p.m., the crew readied for another try with aerodrome No. 5. Langley stood on shore watching. Bell floated in a small boat in the river. A mechanic tripped the launcher, the aerodrome ran down its track, and reaching the end, dipped toward the Potomac.

Then it recovered, lifted its nose, and flew.

Moving forward with an inclination of about 10 degrees, it moved north against a gentle wind, then turned to the right, passing almost over Bell, as it completed two circles. Reaching a height of 70 to 100 feet, its propellers ceased turning as the engine ran out of steam. It glided gracefully downward, landing about 140 yards south of the houseboat. It had stayed in the air about one minute and 30 seconds and traveled a total of about 3,300 feet.

Langley, Bell, and others present were stunned and exultant. After years of frustration, they had suddenly seen an epic moment in the quest for powered flight.

No. 5 duplicated this feat later in the day. No. 6, repaired, proved capable of similar flights in further tests that fall. If Langley had stopped at that point his image today might be far more heroic than it is.

"Those were the first significantly large, powered, heavier-than-air machines that had ever flown," said curator Crouch. "They had a 14-foot wingspan, very impressive."

Publicly, Langley said he had achieved all he had set out to do. Privately, he began looking for a means to fund an aircraft capable of carrying a man. The Smithsonian chief knew the federal government was his most likely source of support, and he enlisted Walcott, his well-connected friend, then head of the US Geological Survey, to lobby his case.

The timing was propitious. The Spanish-American War was looming and the US government was indeed interested in a machine that could scout enemy positions or even bomb them. Eventually, Langley won a $50,000 appropriation for the work from the Department of War.

From the first, the engine was perhaps his biggest problem. Langley did not know how much horsepower he would need to get his Great Aerodrome into the air, so he decided to simply develop as much horsepower as he could. He hired Stephen M. Balzer, a New York inventor, to produce an internal combustion engine producing at least 12 horsepower and weighing no more than 120 pounds.

Balzer proposed building a rotary engine with cylinders that would spin around a fixed crankshaft. This would eliminate the need for water cooling and a heavy flywheel. But he could never get the engine to do more than produce a few horsepower, despite years of effort and thousands of taxpayer dollars.

Eventually Langley's assistant, Manly, took over the engine himself, converting it to a radial with fixed cylinders. He refined it so well, it produced more than 50 horsepower. That was far more mechanical muscle than the Wright brothers had at their disposal.

But the Wright brothers knew an airplane was a complex machine in which lift, control, and propulsion all had to work together. Langley in essence was trying to shove something into the air with brute force.

"Langley undoubtedly had the world's best aeronautical engine in 1903, mounted in an airplane that was never going to fly," said Crouch.

The main reason for that was structural weakness. Langley envisioned his Great Aerodrome as a full-size version of his model aerodrome No. 5, but he did not take into account the problem of scale effect. Building a 50-foot wingspan version of a 14-foot wingspan machine produced something too fragile to fly.

"The main spar of that wing is about the size of a push broom handle," said Crouch. "If you're going to shoot it down a rail with streetcar springs, and you've got enough sail area to be a clipper ship, you can just imagine what's going to happen to the wings."

After years of work, the Great Aerodrome faced its first Potomac test on Oct. 7, 1903. With Manly at the controls, and the engine producing more than 50 horsepower, it sprang down the houseboat rails—and plunged nose first into the river. A reporter said it went down "like a handful of mortar." Langley and his crew felt the machine had snagged on the catapult. Photos show the forward wing collapsing at launch.

After repairing the damage, Langley and crew made their last-ditch try on Dec. 8, with winter weather closing in and Wilbur Wright at Kitty Hawk, awaiting Orville's return from Dayton, Ohio, with new propeller shafts.

The Great Aerodrome was heavily damaged on launch and by its fall into the Potomac. On the floor of the House, a member of Congress attacked him for building "castles in the air."

Langley took it hard. He was further battered when a trusted friend absconded with Smithsonian funds to Mexico. Langley died three years later, in Aiken, S.C., after a series of strokes.

A Fraud and a Feud

However, the Great Aerodrome did eventually fly—at least something that was physically similar to it did. The feat launched a controversy that lasted 30 years.

In 1914, the Wright brothers' rival, Glenn Curtiss, was looking for a way to get a Wright patent suit against him dismissed. He thought that if he could demonstrate the Great Aerodrome capable of taking to the air, it would undermine the Wrights' claims to first flight, defeating surviving brother Orville's patents as well.

Walcott, now secretary of the Smithsonian himself, lent Curtiss the old Langley wreckage. Curtiss essentially used this as the base for a whole new machine, adding many components, including pontoons for takeoff. He rerigged the bracing and ultimately put in a new engine as well.

"The final result bore only a vague visual similarity to the 1903 machine," wrote Hallion.

This Great Aerodrome did make skipping flights off Lake Keuka, N.Y., but they were not a great success. One ended with the rear wings collapsing. Still, Langley's remaining supporters hailed the results.

They showed that Langley "developed and built the first man-carrying aeroplane capable of free flight," wrote Albert F. Zahm, chief of the aeronautical division of the Library of Congress and an old friend of Langley, in a 1913 Smithsonian report.

Smithsonian officials unwisely took up this wording and promoted it on behalf of their former chief. They displayed the Great Aerodrome with a label reflecting Zahm's claim.

Orville Wright was infuriated. He sent the original Wright Flyer not to the Smithsonian, but to the Science Museum in London's South Kensington area.

The rift remained unhealed for years. It fell to Walcott's successor, Charles G. Abbott, to close it. He began with a 1928 Smithsonian report acknowledging Orville Wright's feeling "that the Smithsonian Institution has appeared to be engaged in propaganda with the object of exulting Langley at the expense of himself and his brother." While this report recognized that the museum's claims about Langley were not entirely correct, it did not disavow them completely.

Wright remained angry. Abbott enlisted famed flier Charles A. Lindbergh to lobby Wright for the return of the nation's greatest aeronautic artifact, but the trans-Atlantic aviator was not successful. Finally, in 1942, Abbott wrote another report acknowledging the injury done the Wrights and repudiating any claims to the Great Aerodrome's airworthiness.

Abbott ended by writing, "If the publication of this paper should clear the way for Dr. Wright to bring back to America the Kitty Hawk machine to which all the world awards first place, it will be a source of profound and enduring gratification to his countrymen everywhere."

Orville Wright never gave any indication that he had changed his mind, but on his death in 1948, executors discovered that in his will he had left the Wright Flyer to the Smithsonian.

Today the Wright Flyer is displayed at the center of an exhibit room at the Smithsonian Air and Space Museum on the National Mall. Langley's Great Aerodrome hangs from the roof of the Smithsonian's Steven F. Udvar-Hazy Center in Chantilly, Va., supported by wires, but airborne at last. ■

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, *is a longtime contributor to* Air Force Magazine. *His most recent article, "Crossing the Intersection of Death," appeared in the October issue.*

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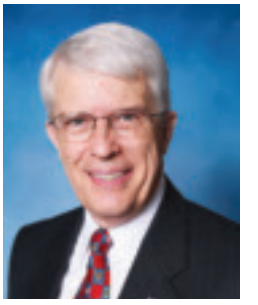

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For information on the Air Force Association, see www.afa.org

AFA National Report

natrep@afa.org

By Frances McKenney, Assistant Managing Editor

Emerging Leaders

The Air Force Association recently began an Emerging Leaders Program as an avenue to secure AFA's future.

Emerging Leaders volunteer for a year. With guidance from a mentor, they participate on a national-level council, attend national leader orientations, and serve as National Convention delegates. Emerging Leaders will be profiled here in the coming months. Here's the second one.

Juan E. Cruz

Home State: Puerto Rico.
Chapter: Robert H. Goddard (Calif.).
Joined AFA: 2010.
AFA Offices: Currently chapter president; previously treasurer.
AFA Awards: California Meritorious Service award 2011 and 2012.
Military Service: More than 24 years, mostly in space operations. Retired master sergeant.
Occupation: Space Based Infrared System program analyst, Vandenberg AFB, Calif.
Education: B.S., Everglades University; M.A., Embry-Riddle Aeronautical University.
Social Media: Find the Goddard Chapter on Facebook and Cruz on LinkedIn.

Q&A

What did you learn from the Region and State Presidents Meeting at AFA headquarters in October? It was informative to see how many programs AFA has, like Wounded Airman, [the Transition Program, now in a test phase], ... the Air Force Memorial.

What has taught you the most about leadership? The period when I was at the 533rd Training Squadron, when I had to fill four different positions. So I was the career development course author. I was the flight chief for the largest flight in the squadron. I was the additional-duty first sergeant. And I was the acting superintendent. All of those are full-time.

How can AFA increase membership? It's really just talking to people face-to-face and telling them the good things we are doing.

What gets them to join? The service that you're providing to members on base—and off base. The challenge of leadership appeals to them.

Photo by Brittany Gray, Chuck Fazio Photography

At the AFA National Convention (left), Cruz suggested improving the membership database to more easily identify and track Community Partners.

Wright Memorial Chapter honored Matt Longo (center) for helping a cadet at ROTC summer camp. At left is Eugene Longo, his father. Shiela Wallace (right), then chapter president, presented the cadet with a chapter coin.

The Heimlich Hero

At AFROTC field training camp in June, a cadet began coughing during dinner in the mess hall at Camp Shelby, Miss. It happened at a time when everyone was supposed to sit at attention, with no talking or unnecessary movement. As a result, the cadets hesitated to break the discipline of this regimen called a "tight meal." But Matthew Longo, a **Gen. Joseph W. Ralston Chapter** member, became alarmed at the cadet's prolonged coughing spell.

Longo said in a phone interview in October that the instructors didn't understand that the cadet was actually choking on food, but "once I turned around in my seat, it was obvious he was in trouble."

The instructors yelled at Longo for disobeying the tight meal rules. This didn't stop him from running over to the cadet and asking if he was choking. When he nodded, Longo performed an emergency technique he'd learned in high school health class: the Heimlich maneuver. He wrapped both of his arms around the cadet, from behind and above the waist, and jerked them hard to forcefully expel air—and thus dislodge a piece of Salisbury steak—from the cadet's windpipe.

The instructors didn't comment on the incident, so at the training camp's closing ceremony at Maxwell AFB, Ala., a week later, Longo was completely surprised when Lt. Gen. David S. Fadok, the Air University commander, called him up on stage and presented him with an AFROTC Silver Valor Award.

The recognition goes to cadets who have voluntarily acted with heroism.

Now a junior at the University of Cincinnati in Ohio, Longo returned to his hometown near Dayton for an October **Wright Memorial Chapter** meeting. His dad, chapter member Eugene Longo, introduced him to the audience, then turned the podium over to Matt.

"The chapter was very moved and excited to hear what he had done," then-Chapter President Shiela Wallace commented.

Photos by Tobia F. Terranova

Sal Capriglione Chapter President Joseph Capriglione (far right, second row) and Chapter VP Anthony Devino (far left, second row) presented Passaic High School's NJROTC team with a CyberPatriot V award. The students placed second, All-Service Division, in New Jersey. The presentation was at the New Jersey State Convention at JB McGuire-Dix-Lakehurst, N.J.

SMSgt. Joey Bailey of the Thomas B. McGuire Jr. Chapter spoke at the convention about his Afghanistan assignment. Here, he receives a state resolution presented by Col. Kevin Keehn, 108th Wing commander.

Photo via Leanne M. Babcock

"Who's in?" Charleston Chapter members asked at a CyberPatriot Meet 'n Greet at The Citadel in South Carolina. These "knobs" answered, "We are!" They volunteered to help start and mentor a nearby high school's CyberPatriot team.

New USAF, Civilian Scholarship for Graduate Studies

The family of the late retired Lt. Col. Loren J. Spencer and his wife, Lawona E. Spencer, have endowed an AFA scholarship for Air Force personnel and civilians who want to pursue graduate studies in management and administration.

Spencer had been an AFA national director emeritus until his death March 3 in Arlington, Va. He was 89. Lawona Spencer had preceded him in death three years ago.

AFA will post applications for the scholarship on its website next month. The association will award the scholarship based on academic standing and job performance and will announce the recipient in July.

How to Spotlight an Ace

Lt. Col. B. D. "Buzz" Wagner Chapter members in Pennsylvania completed a major initiative in October: designating a road in honor of their chapter's namesake, the first Army Air Forces ace of World War II.

The Lieutenant Colonel B. D. "Buzz" Wagner Memorial Highway—known to the post office as Airport Road—runs alongside the John Murtha Johnstown-Cambria County Airport in Johnstown.

"Chapter Treasurer Jim Kirkstadt and Chapter President Bill Burns took the lead with this project two years ago and worked tirelessly," wrote Pennsylvania State President Robert Rutledge, who also serves as chapter secretary.

Kirkstadt began the road-designation campaign with a letter to the local township supervisors. They liked the idea but said the state owned the road. Next step: The three chapter leaders paid office calls on state Rep. Bryan Barbin (D) and state Sen. John N. Wozniak (D).

Bills for the name designation passed both chambers, and the governor signed it on June 19. The state transportation department finished the new sign in September.

At the sign unveiling, on the right, are: State Sen. John Wozniak (D), Pennsylvania State President Bob Rutledge (center), and Wagner Chapter Treasurer Jim Kirkstadt (right).

Should another chapter take on a similar project to spotlight a hero, Kirkstadt says here's how:

- Decide on what to designate: a road? A bridge? An airport? Note that this was a designation for honorary or memorial purposes, not the renaming of a road—a more complicated process involving changing postal addresses, public meetings, and postal officials.
- Make personal contact. Kirkstadt also points out that chapter leaders already knew the politicians, having been their active supporters for several years.
- Don't hesitate to follow up. Although it took the Wagner Chapter a couple of years to nudge this initiative along, Burns says they always received "100 percent, complete approval" from everyone they approached.

Wagner was born in Emeigh, Pa., and flew P-40s from the Philippines, beginning in 1940. He became an ace on Dec. 16, 1941, and quickly reached eight kills before being reassigned Stateside to train other fighter pilots. Wagner died in 1942 when his airplane crashed on a flight from Eglin Field, Fla. He was 26.

Boyd W. Gilbert—Wagner's nephew and a chapter member—attended the road-designating ceremony, as did Wagner's cousin, Jan Bolha of Johnstown.

Spencer received a commission in December 1944 and flew with Thirteenth Air Force in the southwest Pacific. His post-World War II assignments included Air Training Command and a NATO stint in Paris. He flew some 100 kinds of aircraft, accumulating more than 7,000 flying hours, before retiring from the Air Force in 1966. He went on to a civilian career with the FAA and the Department of Transportation.

The Five-and-a-Half-Hour Luncheon

The **Iron Gate Chapter's** October luncheon began with a reception at 11:30 a.m. at New York City's famed 21 Club.

According to former Chapter President Frank T. Hayes, he and three chapter members, along with guest speaker Jonna Doolittle Hoppes, were "still in the lobby bidding good-bye" to the last of the audience at 5 p.m. "Nobody wanted to leave," he wrote in an email.

The lengthy chapter gathering began with "America the Beautiful," performed by opera singer Sarah Viola. Hoppes then spoke about her legendary grandfather, famed American aviation pioneer Gen. Jimmy Doolittle.

More musical entertainment followed: three USO Liberty Bells harmonizing on "Boogie Woogie Bugle Boy" and Broadway actor-vocalist Danny Siford singing the Air Force song.

Rema Webb, an actress from the "Lion King," brought a poster signed by the musical's cast members. Ronald Cohen, an official from the Mayor's Office, offered for a raffle two reviewing stand tickets for New York's Columbus Day parade.

New Jersey State Convention

The New Jersey State Convention in August featured wartime memories from "The Greatest Generation" and the newest when **Hangar One Chapter** VP James E. Young and SMSgt. Joey Bailey (see p. 76) delivered keynote addresses.

Photo by Anthony Cipriano

Jimmy Doolittle's granddaughter, Jonna Doolittle Hoppes, delivers a presentation to the Iron Gate Chapter in New York.

Gen. Edward A. Rice Jr., then head of Air Education and Training Command, chats with a new basic military training graduate and her mother (right) during Military City Family Night Out in San Antonio. The Alamo Chapter in Texas supports the event. It gives BMT grads an extra 2.5 hours on their town passes, to spend more time with their families.

Photo via Brent B. Boller

Young flew B-24s and later B-17s in World War II, while stationed in Massachusetts, Italy, and England. He later served in the Korean War and Vietnam War. After nearly 40 years of service on Active Duty and in the Air National Guard, he retired in 1980 as a brigadier general and as New Jersey's assistant adjutant general for air.

At the convention, he received a print of a painting by aviation artist Keith Ferris. The artwork by **Shooting Star Chapter** member Ferris is called "Circus Outbound" and depicts a B-24 on a World War II mission from England to Vegesack, Germany. ■

Dick Codling (l), then a VP, Paul Revere Chapter, Massachusetts, shows Chapter President Paul Zauner an award. The VA gave it to Codling for organizing the Vettes to Vets Program at its Bedford, Mass., facility. This year, some 420 Corvettes were displayed for the center's clients. The chapter fed more than 1,000 visitors at this event.

At the University of Florida, Red Tail Memorial Chapter President Michael Emig (right) and VP Ben Langer attended an area and regional conclave for Arnold Air Society and Silver Wings members in October. Here, with University of Florida cadets Jennie Seibert (left) and Lauren Mackiewicz, Emig goes over the conclave program before delivering his briefing on AFA.

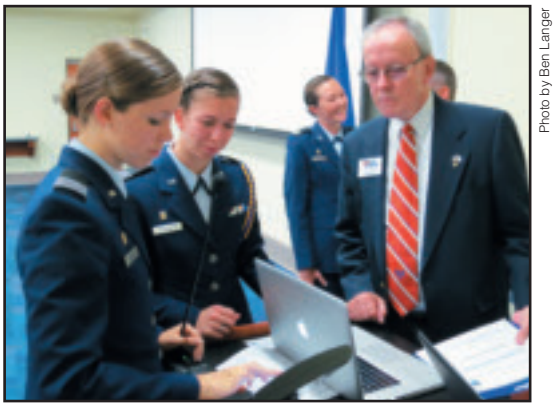


Photo by Ben Langer

Reunions

reunions@afa.org

91st Bomb Group. May 21-25, 2014, in San Francisco. **Contact:** Mick Hanou, (925-425-3220) (mhanou@comcast.net).

601st, 615th Aircraft Control & Warning Sq, Germany. April 28-May 2, 2014, at the Riverpark Inn in Tucson, AZ. **Contact:** Francis Gosselin (352-588-9295) (fgosselin@tampabay.rr.com).

Air Force Public Affairs Alumni Assn, including retirees and Active Duty military and civilians and broadcasting, band, and multimedia fields. April 10-13, 2014, at the La Quinta Inn & Suites, San Antonio Convention Center. **Contact:** John Terino (703-239-2704) (johnterino@afpaaa.org).

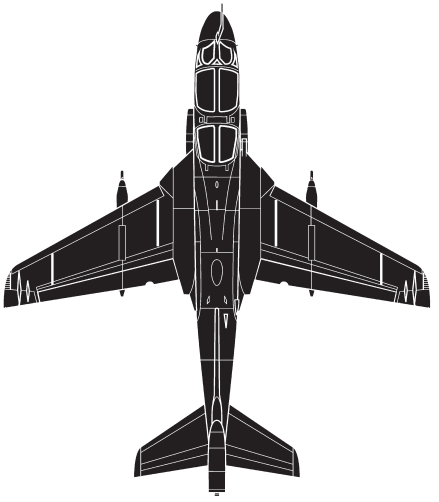
Aviation Cadet Pilot Tng Class 54-G. April 11-15, 2014, in Phoenix. **Contact:** John Schaefer (623-561-5000) (usafpilot@cox.net).

Blindbat C-130A Flareships. May 19-21, 2014, in Las Vegas. **Contact:** Dennis Miller (702-363-4231) (dmillerrr@embarqmail.com). ■

Email unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Unit Reunions," *Air Force Magazine,* 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

Artwork by Zaur Eylanbekov

EA-6B Prowler



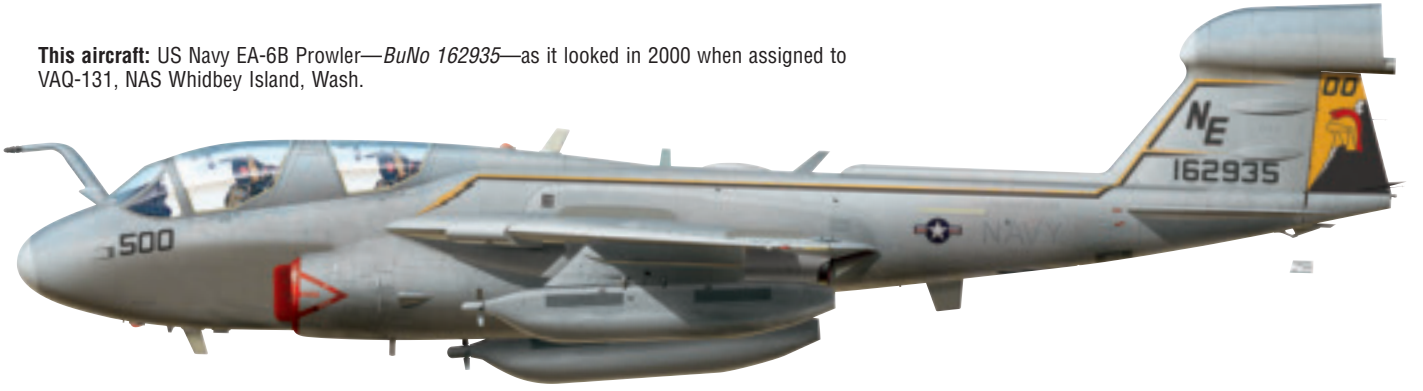
The EA-6B Prowler is a long-range, all-weather, electronic warfare aircraft with highly advanced electronic countermeasure capabilities for suppression of enemy air defenses. It entered service more than 40 years ago but is still operational in US Navy, Marine Corps, and joint Air Force-Navy squadrons. The Air Force, Navy, and USMC all provide crews. The aircraft offers an umbrella of protection for US forces by jamming enemy radar, electronic data links, and communications.

The Grumman-built Prowler was derived from the Navy's A-6 Intruder. The basic two-seat A-6B airframe was lengthened by 4.5 feet and strengthened to accommodate four crew members. The vertical stabilizer was fitted with a large pod to house surveillance receivers able to detect hostile radar at great distances. It was also equipped with massive electronic arrays capable of jamming radars and communications and AGM-88 anti-radiation missiles for kinetic attacks on such systems. Its electronics are continually upgraded to keep pace with new threats.

The Prowler has flown in combat many times—in Vietnam during Operation Linebacker II in 1972; in the 1980s as part of Navy strikes on targets in Iran, Lebanon, and Libya; in the Gulf War of 1991; and in later operations in the Balkans, Iraq, and Afghanistan. Even stealth aircraft such as the B-2 bomber require supplemental coverage from the EA-6B in certain environments. With the retirement of USAF's EF-111 EW aircraft in the mid-1990s, the Air Force began supplying pilots and electronic warfare officers for Prowler operations.

—*Walter J. Boyne*

This aircraft: US Navy EA-6B Prowler—*BuNo 162935*—as it looked in 2000 when assigned to VAQ-131, NAS Whidbey Island, Wash.



In Brief

Designed, built by Grumman ★ first flight May 25, 1968 ★ number built 170 ★ crew of four (pilot and three electronic countermeasures officers) ★ two Pratt & Whitney J52-P408 turbojet engines ★ electronic combat systems, ALQ-99 on-board receiver, ALQ-99 pod-mounted jammer, USQ-113 communications jammer ★ munitions load four AGM-88 High Speed Anti-Radiation Missiles ★ max speed 650 mph ★ cruise speed 480 mph ★ max range 2,100 mi ★ weight (loaded) 61,500 lb ★ span 53 ft ★ length 59 ft 10 in ★ height 16 ft 8 in.

Famous Fliers

J. D. Alexander, Ken Carlsen, Dave Cronk, John Cryer, Mark Darrah, J. R. Haley, Grady Jackson, Frank Kelly, Joe Kuzmick, Willie McCool, Dana McKinney, Dee Mewbourne, Royal Moore, Don Quinn, Russell Sanborn, David Suggs, David Woods.

Interesting Facts

Preceded by interim EA-6A "Electric Intruder," built in small numbers for USMC ★ features canopy embedded with gold, which blocks electromagnetic interference ★ suffered 55 losses in combat or training accidents ★ posted accident rate three times that of any other Navy or USMC aircraft in the 1980s ★ flies under stringent high-angle-of-attack restrictions ★ can sense location of buried improvised explosive devices and jam their detonation signals.

***An EA-6B Prowler launches from the flight deck of USS* Roosevelt.**