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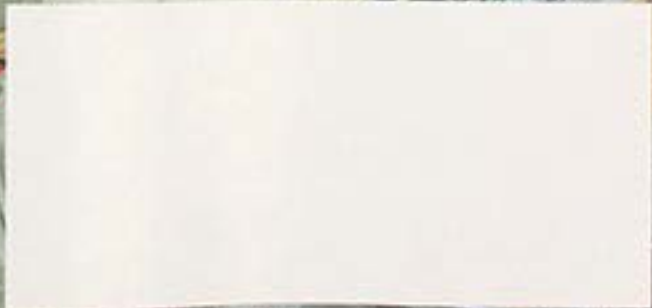
Journal of the Air Force Association

AIR FORCE

MAGAZINE

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Bombers

AFA's Global Warfare Symposium
Confronting Sexual Assault
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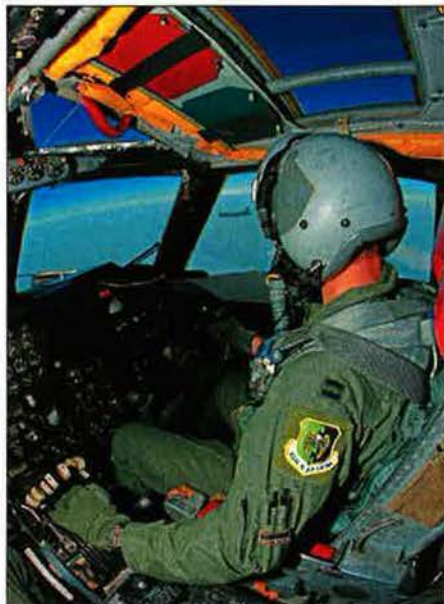
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About the cover: Capt. Brandon Wheeler aboard a B-52. See "Dual Capable," p. 32. Photo by Ted Carlson.

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

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

Advocate for aerospace power and STEM education.

Support the Total Air Force family and promote aerospace education.

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21 Years of Iraq War

WASHINGTON, D.C., DEC. 12, 2011

Two hundred fifty-seven months after USAF first arrived in the Middle East to defend Saudi Arabia and free Kuwait, the Iraq mission finally came to an end. Only a handful of US military forces are to remain in Iraq to defend diplomatic installations.

"The last days were like a ghost town," said Col. Brent Bigger, 332nd Mission Support Group commander, of the final days at JB Balad, Iraq. "It was surreal when we went down ... from 15,000 personnel to zero in 30 days."

This was a long time coming. When Saddam Hussein's Iraq invaded Kuwait Aug. 2, 1990, USAF airmen and aircraft were the first responders, touching down in Saudi Arabia just days later.

First on the scene in 1990, the Air Force was also last out of Iraq. USAF provided the reconnaissance, overhead protection, and airlift for a rapid and safe drawdown. Personnel recovery missions, aerial port operations, base management, and even Air Force-led convoy missions continued until every departing American was safely out.

Even now, most of USAF's airmen and aircraft have not come home. They have moved on to other Middle East bases, where they will continue to perform their full range of missions.

No one knew Iraq would dominate Air Force operations and planning for 21 years. Within two weeks of Iraq's invasion of Kuwait, a variety of Air Force fighters, mobility aircraft, and ISR and battle management aircraft had deployed to bases around the Persian Gulf. A massive buildup ensued. The US began with forces needed to defend Saudi Arabia and added those needed to free Kuwait.

Desert Storm began with F-117 strikes on Jan. 17, 1991. For the next five weeks, airpower pulverized Iraq's ground forces so effectively ground forces only needed 100 hours to defeat a demoralized Iraqi Army.

The war freed Kuwait but left Saddam in power. President George H. W. Bush noted how World War II had a definitive end, but "we have Saddam Hussein still there."

This would cause recurring problems.

Saddam would continually threaten his neighbors, terrorize his own populace, and violate the terms of the United

Nations cease-fire. That April, the Gulf War coalition was forced to defend Iraq's northern Kurdish minority.

Operation Provide Comfort, later renamed Northern Watch, launched the no-fly zones that defined the Iraq mission for the next dozen years. It protected and brought humanitarian aid to the Kurds.

Then, air attacks against the so-called "marsh Arabs" of southern Iraq brought on Operation Southern Watch. This no-fly zone barred Iraqi aircraft from flying in the nation's south. The two no-fly zones

Most airmen have never seen the Air Force not involved with Iraq.

left just a stripe across the center of the country where Iraq's aircraft could operate.

USAF had the bulk of the no-fly zone mission, and tedious enforcement was peppered by occasional flare-ups. December 1998 saw Iraq harass and then expel UN arms inspectors. Operation Desert Fox responded with four days of air attacks on military facilities and suspected weapons sites.

Iraq never recognized the legitimacy of the no-fly zones and fired more than a thousand missiles at patrolling aircraft. The US launched more than 500 air strikes in response. No blockade aircraft were shot down by the Iraqis, but the danger was always there.

The no-fly zone years were overshadowed by the huge wars that bookended them, but they transformed the Air Force. In 1991, USAF was a Cold War, garrison-based force. It fundamentally restructured into an expeditionary force, with deployments to the Middle East a way of life.

Repeated Iraqi provocations, Saddam's abominable actions, and American intelligence failures again brought the two nations to full-scale war. On March 19, 2003, a US-led coalition force launched a massive air attack on strategic targets while ground forces invaded Iraq from Saudi Arabia and Kuwait. Cruise missiles and F-117s led the way, as they had in 1991.

This time, however, US forces advanced all the way to Baghdad, with the stated goal of driving Saddam from

power once and for all. President George W. Bush declared major combat operations over on May 1, 2003.

Unfortunately, the war in Iraq was far from over. Terrorist and sectarian violence flared up, and early efforts to quell the fighting and establish a functioning Iraqi government failed.

The violence escalated and peaked in 2005 and 2006. Finally, the combination of a "surge" of forces, new counterinsurgency strategies, and Iraqi rejection of violence and terror brought about a relative calm.

USAF enabled all of this, providing intelligence and close air support to ground forces, airlifting vital supplies to keep trucks off of the deadly roads, and filling in in many areas so the Army could dedicate more troops to ground combat.

Iraqi Freedom became Operation New Dawn in September 2010 when US forces ended their active combat role. The mission shifted entirely to training and advising so Iraq could defend itself when the Americans departed. USAF helped rebuild and mentor Iraq's air force, which has progressed so far that it is now purchasing F-16s.

After follow-on negotiations with Iraq's democratically elected government failed to agree on a small, sustained American military presence (because Iraq refused to grant US troops immunity from local prosecution), the US began preparations for a total withdrawal.

In 2007, there were more than 170,000 US troops at 500 bases in Iraq. By mid-November 2011, the US was still operating six air bases in Iraq. At the end of the year, all of this was done.

Tens of thousands of airmen served in and around Iraq since 1990. Airmen retiring today, after serving full 20-year careers, never saw an Air Force not involved with Iraq. Some 4,500 Americans died in Iraq just since 2003, and thousands more suffered life-changing injuries.

Top US and Iraqi officials say the withdrawal is not a divorce but the next stage in a long-term relationship. Let's hope that is the case.

The Iraq mission changed dramatically and repeatedly, and USAF changed with it. The mission has changed once again. As always, the Air Force will be there when it is needed. ■



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Loss of Continuity?

I was surprised to see some of the comments in your article about NEADS in "Airmen on 9/11" in the September issue [p. 50]. According to the article, "[NEADS] had not trained for what unfolded on 9/11" and "the idea of turning an aircraft into a weapon had not yet infiltrated military doctrine." Col. Dawne Deskins, who had been a major at NEADS on 9/11, was quoted as saying, "The hijacked mindset back then would have been that they're going to land the plane [and] they're going to have some sort of demands. So it was really an escort-type role that we would be in."

I was assigned to NEADS as the chief of plans with additional duty as a fighter duty officer from 1992 to 1995. Our exercise scenarios of the time commonly included not only hijackings but also hijackers threatening to take civilian airliners into important military and civilian buildings. We would additionally exercise obtaining permission from higher authority to shoot down those airliners to minimize loss of life on the ground. I can assure you that our scenarios went far beyond just an "escort-type role."

If Colonel Deskins' information is correct, then it seems that a considerable loss of continuity occurred at NEADS sometime between 1995 and 2001. If NEADS did stop exercising those aircraft weapon/airliner shootdown scenarios, we should be asking why.

Col. Glenn Altschuld,
USAF (Ret.)
Hanover, Md.

"Are You Kidding Me?!"

It appears that the Air Force Association Air & Space Conference was a success once again, and I tip my hat to all the award winners and recipients ["Air Force Association National Awards 2011," November, p. 76]. But it pained me to see that of all the awards given at the conference, only two were "not awarded for 2011." Stealing a line from a current NFL pregame show: "Are you kidding me?!" The Air National Guard did not select an ANG unit for the Earl T. Ricks Award (unit airmanship) or select one outstanding civilian employer for the George W. Bush Award, Enlisted. How embarrassing! Air National Guardsmen the world over have flown, fought, sacrificed, and died in combat, and the Air National Guard doesn't take the time

or make the effort to highlight one unit or one civilian employer at a national conference?

Next year's selection committee must read "The Teeth of Bulldog Bite" [November, p. 40] by Mike Dunham. The exploits of my fellow Alaskan Air National Guardsmen made me swell with pride. Those men are heroes!

Col. J. R. Dallas,
USAF (Ret.)
Fort Smith, Ark.

Death on Call

As I read the article "Once More Unto the Breach" [October, p. 26], I couldn't help but reflect on all of the battlefield airmen who put their lives on the line each day in order to provide air strike capability to our Army brethren. I am a first sergeant for the 15th Air Support Operations Squadron, a tactical air control party (TACP) unit based at Fort Stewart, Ga. In short, TACPs provide precision terminal attack guidance of fixed- and rotary-wing close air support aircraft, artillery, and naval gunfire to ground forces.

I have had the benefit of witnessing the selfless heroism during my recent deployment with TACPs to Afghanistan in support of OEF.

I can tell you firsthand that American heroes like Staff Sergeant Gutierrez and TACP airmen are not seeking recognition or reward for their actions; rather they are merely doing the job that the Air Force trained them to do—and that is protecting their fellow airmen and soldiers with precision guided air strike capability, "Death on Call."

MSgt. Mike Hill
Fort Stewart, Ga.

The Bear Went Over the Mountain

No one writes better copy on historical and operationally difficult topics than John Correll. His article in the November *Air Force Magazine*, "The Bear Went Over the Mountain" [p. 54], was superb! I realize that a lot has transpired since the Soviets entered Afghanistan more than 30 years ago. The players on the ground have changed. Technology driving warfighting capabilities has changed. The political landscape has changed. However, I just can't help thinking about that old bromide: Those who don't learn from their history are doomed to repeat it. As we begin to draw down American

forces in Afghanistan, and ultimately pull them out, I can't help but wonder what we will have achieved. I realize that we won't know for several years after we leave. However, I am skeptical that we will have achieved many of our original hoped-for objectives. I am concerned that the price we paid in blood and treasure will not have been worth it. I truly hope that future events prove me wrong.

Col. Gene Townsend,
USAF (Ret.)
San Antonio

Let's Not Revise History

In a November letter, Michael Gallagher contends that the strategic bombing campaign in Europe was a failure ["Letters: Actually, It Was a Failure," p. 7]. Phillip Meilinger's October article on the USSBS clearly shows this is false, because the US bombing campaign destroyed the German fuel and transportation systems. Bombing had cascading, cataclysmic effects on the German economy and also significantly reduced the Wehrmacht's military capabilities. Gallagher also claims that destroying the Luftwaffe was "not one of the central objectives" of the bombing campaign. In fact, the Pointblank directive of June 1943 made the destruction of the Luftwaffe the No. 1 priority for Eighth Air Force.

Finally, Gallagher argues that the "wanton bombing of cities bordered on a war crime." Again, this is untrue. Wanton city bombing was not the doctrine or the intention of Eighth Air Force, but even Royal Air Force area bombing was not a war crime, according to the standards of the time. Geneva Convention protections for civilians were adopted in 1949, but no agreement, treaty, convention, or other instrument protected civilian populations or property during World War II. It is senseless to criticize the

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men of 1945 for failing to uphold the standards of 2011.

James Perry
Reston, Va.

The Rust Bust

General McKinley's comments regarding Air Guard aging fleet trouble me [*"Verbatim: Air Guard Worries," October, p. 36*]. His comments simply do not strike deeply enough into the heart of the problem, nor bring the weight that someone in his position can bring to bear on the subject. In June 2009, a study by LMI Inc. estimated the cost of corrosion prevention activities in the United States Air Force for aircraft and weapons systems was \$5.4 billion. This did not include the additional costs for the same corrosion prevention activities on Air Force equipment and infrastructure or F-22 maintenance. This is an astronomical operating cost and one that obviously everyone from the President on down knows cannot be sustained.

Despite the fact that the fleet of USAF is smaller than ever, the cost of corrosion is growing due to aircraft age. Today we have 2,600 fewer airframes than in 1990, yet we are involved in more missions than ever. Lt. Gen. Mark Shackelford testified in 2010 before an Armed Services subcommittee that in August 2009, USAF marked 21 continuous years of combat operations. Former USAF Chief of Staff Gen. T. Michael Moseley, while testifying before Congress regarding the readiness of the C-130 fleet, said, "We are fighting a global war while operating the oldest inventory of aircraft in USAF's history."

With every aircraft's increasing age comes an increased problem with aircraft availability. The older a plane becomes, the harder it is to get it going and keep it going. Older aircraft are more susceptible to widespread fatigue, corrosion, and overall damage, with all the associated availability and safety risks that involves. The repair and sustainment costs for these aircraft are increasing exponentially as parts become more difficult to source and environmental constraints force the use of incompatible prevention compounds. As far as these airframes are concerned, they have been going to war on a daily basis for decades; 88 percent of the tanker fleet alone was built during the Kennedy Administration. Even so, these airframes are expected to stay in service beyond 2040.

For the past few years, USAF, in conjunction with the other services, has made tremendous efforts to combat the corrosion issue while operating with limited resources. One readily available and highly effective method to combating this servicewide systemic problem is an appropriately funded Air Force Corrosion Prevention and Control Office (AFCPCO), without which the cost of corrosion will

continue to rise, slowing fleet recapitalization, reducing aircraft availability, and increasing flight safety risks.

The AFCPCO can keep General McKinley's aircraft flying, but not without an office that is supported in both manpower and funding from all its stakeholders!

JaLynn Hudnall
Warner Robins, Ga.

On a Clear Day

Retired Lt. Col. Donald L. Gilleland pointed out that the article [*"USAF and the UFOs," June, p. 68*] does not focus on any new ground, and stated the facts about thousands of sightings and why [he] is not ready to believe [*"Letters: Maybe We'll Get There First," August, p. 7*].

Sorry, neighbors, but I am a believer. I know that there is a lot of material out there about German development of anti-gravity machines that came along too late during World War II. I know that we cannot explain caveman drawings that look very much like present-day sightings. I have to admit, though, that I had the privilege of seeing a UFO on a clear day passing overhead at Cass Lake, Mich. Slowly at about 300 feet, totally silent, and not a weather balloon, it was marvelous.

It is true that by now, 64 years after Roswell, the craft could be a product of our own with the help of faraway friends, or the continued development of something

taken after the war. In view of Hollywood films with the terrible depictions of aliens, [a sighting] would make anyone hesitate, if not come to a screeching halt.

Since my wonderful experience, it has been my hobby to read about the subject from qualified, high-ranking individuals who are not in need of cheap tabloid publicity. After retirement, a lot of people say interesting things. Presidents Harry S. Truman, Dwight Eisenhower, Gerald Ford, Jimmy Carter, also General Twining, astronauts Dr. Edgar Mitchell and Col. Gordon Cooper spoke words of wisdom.

When high-ranking individuals talk, are they also part of the UFO cover-up? Lt. Col. Donald Gilleland stated that there were no really good photographs of the visitors. I can only say that George Adamski seems to have had all the clear moving pictures one would need.

U. Stephen Antos
Hollidaysburg, Pa.

"Kittinger's Super Swan Dive," our "Flashback" in the November issue (p. 76), contained a small black and white inset photo which did not, in fact, depict Col. Joe Kittinger. Our sources were the official websites of the US Air Force and the National Museum of the US Air Force, both of which, unfortunately, were wrong. We regret that we repeated the error and have notified both sources about the inaccuracy.



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Washington Watch

By John A. Tirpak, Executive Editor

Supercommittee punts; Still aiming for loopholes; Future bomber at risk; No more F-35B?

FAILURE. WHAT NOW?

WASHINGTON D.C., DEC. 5, 2011

Defense leaders warned for months of a national security disaster if the bipartisan congressional "supercommittee" failed to make a deal on reducing the federal deficit by \$1.2 trillion over the next decade.

The supercommittee failed. So now what?

The answer seems to be either catastrophic or merely very bad, depending on what Congress as a whole does now.

Most likely are major program terminations and cancellations, reduction of force structure, involuntary separation of tens of thousands of troops, overseas base closures, deferral of badly needed modernization, and foregoing reset of wartime equipment losses. And that could just be for starters.

To understand what happens now, though, a little background on this financial train wreck is in order.

Remember that last August, Congress refused to raise the federal debt ceiling unless drastic measures were taken to rein in spending. A deal was struck called the Budget Control Act. It required \$450 billion in defense spending cuts over the next 10 years, which the Pentagon leadership said is "manageable," but will raise the level of military risk significantly.

Translation: The armed forces will get smaller, able to be in fewer places at the same time, and wars will take longer to win. Air Force leaders have warned that multiple, simultaneous big operations—like Japanese tsunami relief, the Libyan campaign and operations in Iraq and Afghanistan, which all converged last March—will be impossible.

The cuts are to be guided by decisions stemming from a Pentagon in-house "strategic review" hastily launched in the wake of the BCA. It was to be finished by early December, in time to inform the Fiscal 2013 budget.

The BCA also created the supercommittee, which had to find \$1.2 trillion of additional deficit reductions by Thanksgiving or else automatic cuts, called sequestrations, would be triggered. Both sides had a hostage at stake: If the supercommittee failed, Democrats faced a half-trillion in automatic social spending reductions while Republicans faced a like amount of additional automatic defense reductions. The supercommittee's failure to agree now triggers those deeper cuts, which more than double the reductions previously levied against national security.

SCARY NUMBERS

The numbers are intimidating. Last year, the planned defense budget for Fiscal 2013 was \$571 billion; now, according to the Office of Management and Budget, it will be no more than \$524 billion. It's estimated the budget will drop to about \$480 billion if the sequestrations take effect.

As a minimum, defense will be cut by \$261 billion over five years under agreed budget levels, with \$47 billion coming out right away, in Fiscal 2013. Put another way, over the next

10 years, the combination of previously agreed cuts and—potentially—sequesters could remove two whole defense budgets of funding. That's about a trillion dollars' worth of equipment, personnel pay, readiness, modernization, and base operations, or about 23 percent of defense spending.

Put yet another way, however, the defense budget has grown so quickly in recent years that sequestration would only take DOD's budget back to its Fiscal 2007 level, according to an assessment by Todd Harrison, budget analyst for the Center for Strategic and Budgetary Assessments.



Meat-ax cuts are dangerous.

The sequestrations are more sinister than that, though. To make failure completely unpalatable to the supercommittee, the rules say the cuts must come right off the top of each and every line item. The practical effect is that nearly every Pentagon procurement program will break its supplier contracts, imposing stiff termination fees on the services. No one has estimated how much that would cost yet, but it will be huge, to say nothing of renegotiated prices for smaller runs of critical systems.

The BCA left two loopholes. One, the sequestrations don't cut in until calendar 2013. Congress could still collectively act to find some other \$1.2 trillion in cuts and head off the sequestrations, although 2012 being an election year makes its success dubious. Two, the sequestrations don't affect wartime spending, so Congress could slip some "base budget" items into the wartime budget.

Defense Secretary Leon E. Panetta said on Nov. 30 that the sequestrations are a "meat-ax approach" to cutting spending and will be "damaging [to] this country," creating a hollow military that can't deliver when called on.

In early December, Pentagon spokesmen said that Panetta himself was making line-item choices about what to gut and what to keep.

Sen. John S. McCain (R-Ariz.) and Sen. Lindsey O. Graham (R-S.C.) said the sequestrations would shrink the military to dangerous levels, and they promised to introduce legislation to undo them if Congress doesn't figure out an alternative. Rep. Howard R. McKeon (R-Calif.), chairman of the House

Armed Services Committee, made a similar pledge. In a Nov. 21 statement, McKeon said he would not be the HASC chairman who “presides over crippling our military.”

BACK TO THE DRAWING BOARD

The Obama Administration has initially refused to accept the supercommittee’s failure, saying it remains hopeful Congress will act to head off disaster before the sequestration deadline. It also promised Obama will veto any efforts like those promised by Graham, McCain, and McKeon to undo the BCA and void the sequestration penalty, unless it is part of a broader effort to capture savings in some other way.

The supercommittee’s failure fell quite late in the process of building the Fiscal 2013 budget. Deputy Pentagon comptroller Mike McCord told a conference in New York on Nov. 30 that it would likely “not be possible” to thoroughly redo the 2013 budget in the few weeks remaining before the spending plan goes to Congress. Any attempt to redo the budget in so short a time would result in broad slashing without the ability to calculate effects on other programs, he said.

Air Force leaders have said even the new baseline budget—before the sequestrations are counted—contains cuts that are onerous and not executable without doing fundamental damage. Vice Chief of Staff Gen. Philip M. Breedlove said in November that readiness and procurement accounts will be hit hardest because they can be squeezed for quick cash. Longer-term, more thoughtful reductions don’t yield enough savings to hit near-term targets, Breedlove said.

About the only breath of relief in the way the defense base budget will be reduced is the pace of the cutting. Rather than slash broadly up front, the Office of Management and Budget’s proposed five-year spending plan would maintain a fairly level ramp of reductions, compared with the plan it proposed along with last year’s budget.

The pace of cuts would be \$47 billion for Fiscal 2013, followed by \$53 billion in Fiscal 2014 and 2015, \$55 billion in 2016 and \$53 billion in 2017. OMB would not say how it would pace additional cuts imposed by the sequester, but chances are good it would follow a similar—albeit nearly doubled—annual pace.

So what are the programs most at risk?

Air Force leaders have pledged they will do their best to “protect” the KC-46A tanker, the F-35 fighter, and the penetrating bomber programs, all of which the service sees as essential to fulfilling its missions in the future.

However, the sequestrations could change that tune. As a program not yet under way, the bomber lacks a congressional constituency, and it has been deferred, canceled, and restarted several times in the last decade. Further delay may be one of the least painful choices for Congress, especially since the Air Force has said it will be able to fly the existing fleet for decades more; it plans to keep the B-1 and B-52 through 2040 and the B-2 through 2058.

The KC-46 tanker seems to have bipartisan support, as most members of Congress perceive that flying the Eisenhower-vintage KC-135 indefinitely won’t work. Much has been made of the fact that Boeing lowballed its bid for the KC-46, so it does not bear a perception of being gold-plated or a sweetheart deal for the contractor.

HIT LIST

The F-35 is a different story. Delays in flight testing in previous years, along with some redesigns and a general sense—deserved or not—that the program is not being well-managed could open the door for steep reductions. Certainly, the short takeoff and vertical landing Marine Corps variant—the F-35B—might be in trouble, as it is already



Lockheed Martin photo

Is the F-35B doomed?

under a “probation” ordered by former Defense Secretary Robert M. Gates due to cost overruns and schedule delays.

The Navy has decreed that the Marines will fly the F-35C carrier model as well as the B. Given that Britain has terminated its plans to buy the F-35B in favor of the C, costs of the B model are likely to rise. Focusing on the F-35A (Air Force model, the lowest-cost variant) and F-35C might make production more efficient but would alienate foreign partners who have signed up to buy the STOVL version.

Air Force Chief of Staff Gen. Norton A. Schwartz, in testimony before the HASC in November, said the service might have to forego buying the C-27J small airlifter, something that would cause him personal heartache as he had given his word to the Army Chief of Staff that the Air Force would not take over the C-27J just to kill it.

Michael B. Donley, Air Force Secretary, has said the service won’t curtail its plans to acquire enough MQ-9 Reaper remotely piloted aircraft to put up 65 orbits. However, the Reaper was largely designed for Iraq and Afghanistan and lacks any capability to survive in contested airspace. Postwar, USAF may need far fewer Reaper orbits.

The Air Force has toyed with retiring the B-1B bomber fleet several times in recent years. Senior leaders have said “vertical cuts” of whole systems—which eliminate the need for operating funds, air and ground crew, capability upgrades, and a logistics pipeline—are the best way to achieve the savings targets they must hit, especially if other systems can do the same job.

Alternatively, retiring the B-52H fleet would phase out a 50-year-old system, support of which has become difficult because replacement parts largely must be made to order at high cost. However, the B-52, as the platform for nuclear-tipped cruise missiles, is a significant element of the nuclear bomber force; eliminating it would leave only the 20 B-2s armed with nuclear bombs as the bomber leg of the nuclear triad.

Donley has repeatedly argued that the triad is more—not less—relevant in light of a smaller US nuclear arsenal and a new, broad range of threats that may or may not respond to traditional deterrence.

There have been repeated warnings since August that the Air Force will cut personnel, although the service has said in recent years it can’t diminish its ranks without giving up missions. Donley said in November the interdependence of the active duty, Guard, and Reserve forces will have to improve, even though “we are already good at that,” because the three facets of personnel are going to “get smaller together.”

He promised to protect compensation and quality of life spending for those airmen who remain in uniform, but acknowledged that compensation from here on out will have to be “sustainable” and not see the kinds of increases of the last decade. ■

New Deployment Model

To improve unit cohesion, the Air Force is changing the way it deploys airmen under the Air and Space Expeditionary Force construct.

Christened "AEF Next," the new system will deploy airmen alongside their squadron commander as an "airpower team," said Col. John Long, chief of USAF's war planning and policy division. However, "for most airmen, the differences will be minimal," he said. "We want to get the commander and immediate supervisors back into the deployment decision process. This will allow commanders to make key deployment decisions about their unit personnel rather than relying on functional managers at the major command or headquarters Air Force level to make those decisions."

The new model will simplify the existing structure, giving leaders a better perspective on the stress level for individual career fields.

Deployment-to-dwell time ratios will likely stay around one-to-two, meaning airmen will deploy for six months and return home for at least a year before redeploying.

The Air Force expects to phase in the change over the next two years.

Balad Farewell

The 332nd Air Expeditionary Wing relinquished the United States' second largest base in Iraq—Joint Base Balad—with the departure of the last airmen from the facility in early November.

The base once housed roughly 36,000 American troops and contractors. It passed to Iraqi government control Nov. 8. Known as al Bakr Air Base, the original airfield served the Iraqi Air Force before the US invasion in March 2003. After the US arrival, the base was split to become USAF's Balad Air Base and Camp Anaconda, a major Army logistics hub. In 2008, the base was realigned under the stewardship of USAF's 332nd AEW, becoming Joint Base Balad.

Boasting an 11,000-foot runway, Balad hosted USAF aircraft, including F-16s, MQ-9 Reapers, and MC-12 Liberty aircraft.

MOP Ready for War

The new bunker-busting Massive Ordnance Penetrator bomb is now available for combat on the Air Force's B-2 stealth bomber.

Whiteman AFB, Mo.—home of the B-2 fleet—received its first batch of MOPs "ready for operational use" in September, according to Air Force acquisition officials.

Coupled with the stealthy, penetrating B-2, the 30,000-pound-class conventional weapon gives US planners a potent means of attacking even the most challenging hardened targets.

Previously, some targets were difficult, if not impossible, to reach with other bunker busters due to their depth beneath the surface and protective layers of earth, stone, and concrete.

There is "no other weapon that can get after those hard and deeply buried targets like MOP can," said Brig. Gen. Scott A. Vander Hamm, commander of Whiteman's 509th Bomb Wing.

AirSea Battle Bureau

The fledgling AirSea Battle concept gained new impetus with the creation of a designated Pentagon office to push Air Force and Navy integration of combat resources.

Chief among its tasks are influencing wargames, fostering development and integration of air and naval capabilities, and facilitating collaboration with joint forces, Pentagon officials said.

A minimum of two field-grade officers or civil servants of equivalent rank from the Air Force, Marine Corps, and Navy will staff the new office, which has a core staff of some 15 people.

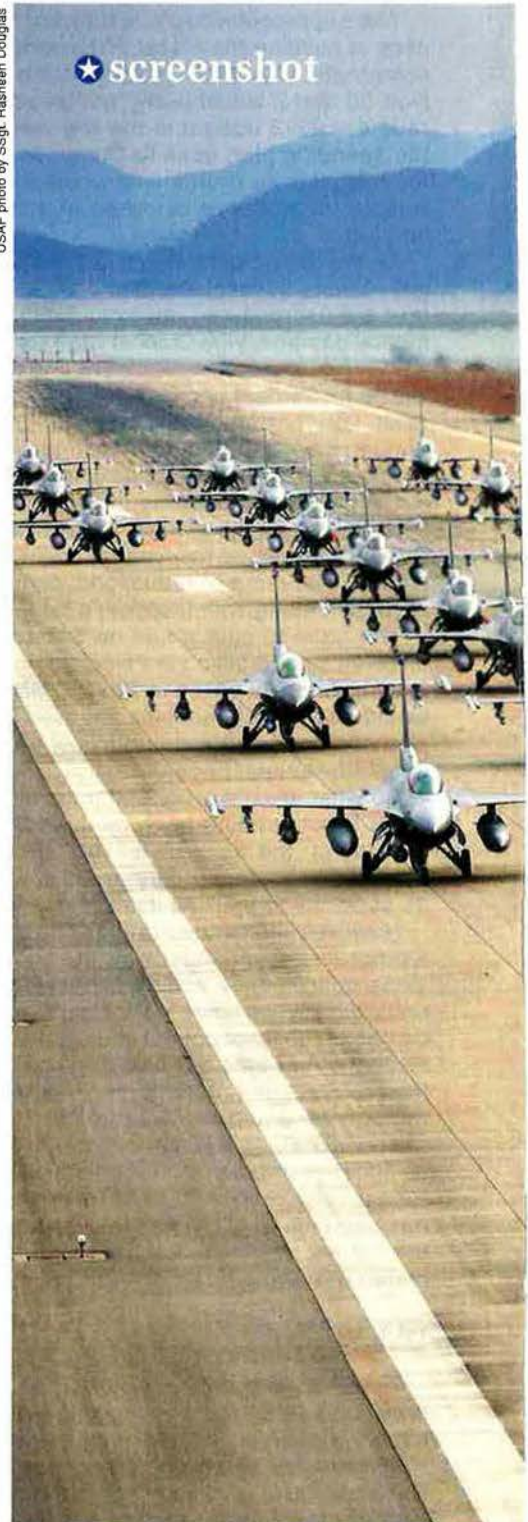
Under AirSea Battle, the Pentagon hopes to make better use of its assets to guarantee freedom of action in potentially contested areas such as the Western Pacific.

Global Strike Gets the Bomb

The next step in consolidating the nuclear mission under Air Force Global Strike Command will be for the command to assume responsibility for USAF's nuclear munitions support squadrons.

Nuclear-tasked squadrons will now report directly to wing commanders

USAF photo by SSGT. Rasheen Douglas



on base, replacing the centralized Air Force Materiel Command system, managed through the Air Force Nuclear Weapons Center at Kirtland AFB, N.M.

Various munitions units at F. E. Warren AFB, Wyo.; Kirtland AFB, N.M.; Malmstrom AFB, Mont.; Minot AFB, N.D.; Vandenberg AFB, Calif.; and Whiteman AFB, Mo., now fall under AFGSC, though both AFMC and the AFNWC will continue playing a key role in nuclear sustainment and integration.

The Air Force is "continuing to strengthen the nuclear enterprise while seeking constant improvement and doing things the best way possible for safe, secure, and effective operations," said Chief of Staff Gen. Norton A. Schwartz in signing the directive Nov. 20.

F-35 for Britain

Lockheed Martin recently completed assembly of the first F-35 strike fighter for Britain.

"This first F-35 for the first international program partner is symbolic of the proud partnership we share with the United Kingdom," said Tom Burbage, Lockheed's F-35 general manager of program integration.

Designated BK-1, the F-35B short takeoff and vertical landing variant left Lockheed Martin's production line at Fort Worth, Tex., for the flight line on Nov. 20.

The F-35 is "ideally suited" to Britain's combat needs since it "is capable of



F-16s from the 8th Fighter Wing and 419th Fighter Wing perform an "elephant walk"—taxiing in formation in a display of airpower—down a runway during an exercise at Kunsan AB, South Korea. The exercise with Kunsan F-16s and Vipers deployed from the Reserve wing at Hill AFB, Utah, demonstrated Kunsan's wartime operational practices. Airmen at the base generated the aircraft precisely as they would during war.

operating from both the land and our new Queen Elizabeth-class aircraft carrier," said RAF Group Capt. Harv Smyth, British national deputy for the F-35.

The aircraft was ordered, however, before Britain amended its procurement plan to buy only F-35C variants optimized for aircraft carrier operations. The UK will use BK-1 as an operational test and training airframe. There has also been talk of a swap of the aircraft for a US Navy F-35C to make the British aircraft's test and checkout more applicable to its eventual fleet.

Lockheed Martin will deliver the aircraft later this year, following initial testing and checks.

Raptor Grand

An Air Force Reserve pilot has become the first in the service to log 1,000 hours in the F-22 Raptor.

Lt. Col. David Piffarerio broke the 1,000 flight-hour mark on a check flight from JB Elmendorf-Richardson, Alaska, in November. Piffarerio is commander of Air Force Reserve Command's 302nd Fighter Squadron, an associate unit of the active duty 3rd Fighter Wing at Elmendorf.

Am I Blue?: Over Iraq, a USAF F-16 takes on fuel from a KC-135. Iraq wants to buy 36 of the fighters to secure its airspace.

Dover Morgue Mishandled Remains

Air Force investigators uncovered egregious mishandling of the remains of service members killed in combat—including lost body parts—by mortuary staff at Dover AFB, Del. At the behest of the US Office of Special Counsel, the inspector general's office in June 2010 began investigating allegations of "serious misconduct" reported by several whistle blowers.

According to OSC, "In two separate incidents, body parts of service members killed while on active duty were lost by the port mortuary." In another incident, OSC said that "a US Marine was dismembered with a saw in order to make the body fit inside a military uniform."

"The mortuary for the United States military should boast the best conditions and best practices of any mortuary," said Special Counsel Carolyn Lerner in the OSC release in November. "These events are deeply troubling, as is the Air Force's failure to acknowledge culpability."

Subsequent Air Force investigation found no evidence of intentional mishandling, though USAF officials acknowledged the "mortuary staff failed to maintain accountability while processing portions of remains." OSC recognized USAF's extensive overhaul of mortuary procedures to improve accountability, but asserted the service did not adequately discipline those responsible.

In direct reaction to the incidents, the Air Force disciplined the mortuary's then-commander, issuing him a letter of reprimand, and demoted two civilian employees to nonmanagement roles.

Defense Secretary Leon E. Panetta appointed an independent assessment of overall mortuary operations at Dover. "None of us will be satisfied until we have proven to the families of our fallen heroes that we have taken every step possible to protect the honor and dignity that their loved ones richly deserve," said Panetta.

As of press time, reports also surfaced that contractors had disposed of cremated remains in a Virginia landfill as recently as 2008—a practice the Air Force says it halted immediately upon learning of it, replacing the practice with procedures for burial at sea.

USAF photo by MSgt. Cecilia Ricardo



"More important to me than this milestone is that the F-22 fleet is safely in the air and accomplishing the mission," he added after the record sortie Nov. 4.

Piffarerio began flying the Raptor as part of USAF's operational evaluation team at Nellis AFB, Nev., in 2002 after transitioning from the F-15E. He has subsequently served in a number of different roles with the Raptor.

USAF To SLEP F-16 Fleet

To bridge any gap in the fighter force ahead of the F-35 entering service, USAF announced the modernization of a significant number of its later-model F-16s.

Under the plan, the service aims to fit new avionics and structural improvements to between 300 and 350 F-16 Block 40 and Block 50s—with the potential to upgrade as many as 600 in a worst-case scenario.

Testifying before House lawmakers, Lt. Gen. Herbert J. Carlisle said he doesn't expect the upper end number of life extensions to be needed, but cautioned that the F-35 is likely to miss its projected initial operational capability date of 2016 by more than two years.

"We've got work to do, but [the F-35 is] going to be a good airplane, and we have to have it," he said.

Funding for research, development, and testing on the first three SLEP airframes, as well as avionics upgrade development, is anticipated in the Fiscal 2013 budget request, said Carlisle.

The Air Force is conducting full-scale fatigue tests on an F-16 and F-15 to determine the true structural life potential of its fighter fleet.

CHIRP Goes to Work

The first Air Force payload launched aboard a commercial satellite successfully completed performance testing on orbit and is performing to standards, paving the way for experimentation to begin.

Now that the Commercially Hosted Infrared Payload (CHIRP) completed diagnostics, "the next step is calibra-

AFMC's Risky Business Case

Air Force Materiel Command is risking the future of aircraft sustainment by centralizing management of its three air logistics centers to a single base, warned Rep. Robert Bishop (R-Utah).

Under a cost-cutting plan announced in November, command officials want to consolidate management of the Air Force's air logistics centers where various aircraft fleets cycle through intensive scheduled maintenance. Oklahoma City ALC at Tinker AFB, Okla., Ogden ALC at Hill AFB, Utah, and Warner Robins ALC at Robins AFB, Ga., would be overseen by a new Air Force Sustainment Center at Tinker.

AFMC Commander Gen. Donald J. Hoffman said instead of "thinking separately about research, test, acquisition, or sustainment in a center-by-center, base-by-base mindset, ... the restructure will drive us to more standardized processes."

"This is not a new idea. It's been discounted in the past," said Bishop, quoted by Salt Lake City's *Deseret News*. AFMC officials "have not done their business case analysis to show us that this is the right thing," Bishop said, adding that until they do, he is "very skeptical" of the plan.

Likewise, AFMC plans to consolidate management of its acquisition centers under a new Air Force Life Cycle Management Center at Wright-Patterson AFB, Ohio.

Overall restructuring would reduce AFMC centers from 12 to five—eliminating 1,051 civilian positions, while saving \$109 million annually, by Air Force estimates. Previously announced Air Force-wide streamlining would reduce AFMC's civilian installation-support workforce by another 1,088 positions.

tion, followed by execution of planned experiments," said Col. Scott W. Beidleman, Space and Missile Systems Center development plans chief.

The sensor's information-gathering ability will be tried under a full range of atmospheric and terrain conditions over nine-and-a-half months of demonstrations.

"Given the pathfinding nature of CHIRP, the Development Planning Directorate is gathering invaluable lessons learned on these technologies" as well as learning how to work aboard a civilian satellite, he added.

CHIRP was boosted into orbit aboard the SES-2 communication satellite in September and is the Air Force's first focused wide-view infrared sensor.

Pole to Pickle Barrel

A B-2 bomber dropped four unguided BDU-38 practice bombs over the Edwards AFB, Calif., precision impact range following a flight to the North

Pole and back. The dummy bombs are used to simulate B61 nuclear warheads.

The bomber demonstrated it could successfully navigate to the release point with its new computer upgrades, including communication and navigation equipment.

The 18-hour-plus mission was "the first time the B-2 has operated at this extreme of latitude before, and [I believe] the longest flight so far for this hardware and this software," said Maj. Michael Deaver, 31st Test and Evaluation Squadron B-2 Extremely High Frequency Test director.

A KC-135 Stratotanker from Fairchild AFB, Wash., refueled the B-2 over Alberta, Canada, with a second tanker from Edwards supporting.

"We've proven the fact that they can get up into those [high] latitudes safely and effectively. That previously was a question mark," said Maj. Andrew Murphy, a B-2 experimental test pilot assigned to the 419th Flight Test Squadron.

Temperature Control

Northrop Grumman received a \$109 million contract in November to replace the fatigue-prone aft deck panels on the B-2 stealth bomber's upper wing surface.

"The B-2 industry team is working closely with the US Air Force and the Defense Logistics Agency to improve aircraft availability," said Gary Roehrig, Northrop B-2 program support director in a company release.

Stretching from the engine exhaust to the aircraft's trailing edge, the recessed metallic panels shield the aircraft's

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Counterfeit Crackdown

The Government Accountability Office recently conducted a sting operation to pinpoint sources of counterfeit or substandard electronic components that find their way into US weapons systems.

During the investigation, GAO created a fictitious company to lure dubious suppliers—specifically in China, said Richard J. Hillman, head of the GAO forensic audits and investigative service, testifying before the Senate Armed Services Committee in November.

In one instance, the vendor “misrepresented” the part, claiming it was nine years newer than it actually was. “Counterfeit parts—generally those whose sources knowingly misrepresent the parts’ identity or pedigree—have the potential to seriously disrupt the Department of Defense (DOD) supply chain, delay missions, affect the integrity of weapon systems, and ultimately endanger the lives of our troops,” stated GAO’s initial report.

“There is a flood of counterfeits and it is putting our military men and women at risk and costing us a fortune,” added Sen. Carl Levin (D-Mich.), chairman of the SASC, which also conducted its own investigation.

The SASC’s independent investigation found counterfeit components in systems including the C-27J and the Navy’s SH-60B helicopter and P-8A Poseidon aircraft, plus the Missile Defense Agency’s THAAD missiles.

Levin called on the Defense Department to change its acquisition rules to ensure the cost of replacing suspected fake parts falls on contractors. In the meantime, DOD must require part certification especially for parts originating from China, where the vast majority of fakes appear to originate, said Levin.

fleet of 20 B-2s to last through normal maintenance cycles without extensive intervening repair.

“Implementing a redesigned aft deck is an important part of guaranteeing the long-term viability of the B-2,” said Dave Mazur, Northrop’s B-2 program manager.

F-16 Rear-End

Pacific Air Forces investigators found “clear and convincing evidence” that pilot error caused a ground collision between two F-16 fighters at Kunsan AB, South Korea, last July.

Contributing factors in the collision were determined to be a “breakdown in [the pilot’s] visual scan, ... task mis-prioritization, and channelized attention,” as well as pilot overconfidence. Ultimately, the pilot’s “failure to properly monitor his aircraft’s position relative

Rack 'Em: TSgt. James Foster (l) and SrA. Ken Choate unload a GBU-38 from an A-10 Warthog at Kandahar Airfield, Afghanistan, in preparation for a rack inspection and cleaning. Keeping dust and sand out of weapons and aircraft is a constant chore in Afghanistan. Both airmen are from the Michigan Air National Guard.

sensitive composite airframe from being scorched by hot engine gases, but routinely fail before scheduled depot maintenance.

After a rigorous structural and thermodynamic study, Northrop Grumman says it redesigned the decks to resist damage and fatigue, allowing USAF’s

USAF photo by SrA. Corey Hook



Operation Enduring Freedom

Casualties

By Dec. 12, a total of 1,839 Americans had died in Operation Enduring Freedom. The total includes 1,836 troops and three Department of Defense civilians. Of these deaths, 1,467 were killed in action with the enemy, while 372 died in noncombat incidents.

There have been 15,040 troops wounded in action during OEF.

Bagram's Blind Saviors

Dropping ordnance through solid cloud cover, Air Force strike aircraft staved off an intense assault on a US combat outpost in Paktika province, Afghanistan, in early November.

Unable to fly in the severe weather below the cloud deck, the F-16s and F-15Es relied on coordinates relayed by a combat controller at the outpost. "We are able to employ precision weapons through the weather, which is one of the benefits of having GPS weapons," said Maj. Todd Dyer, an F-15E pilot from the 335th Expeditionary Fighter Squadron.

"It's a very disciplined type of attack to get weapons on target efficiently. We weren't able to use our targeting pods due to weather," he added.

Augmented by F-16s from the 121st EFS, the combined strikes killed up to 70 insurgents, stemming the assault before the base could be overrun.

C-130s Drop Winter Supplies

A C-130 crew air-dropped a winter's worth of provisions, including 18,000 pounds of fuel, to soldiers at a remote forward base in Afghanistan on Nov. 27.

Located at 8,700 feet above sea level, Combat Outpost Herrera is surrounded by mountains and trees, making airdrop difficult and convoy resupply dangerous and unreliable with the arrival of snowy weather.

The 772nd Expeditionary Airlift Squadron crew from Kandahar Airfield used the aircraft's Joint Precision Airdrop System to guide the parachute bundles from an altitude of 17,000 feet—out of reach of enemy ground fire.

"Utilizing airdrops with the GPS guided parachutes allows us that avenue to use in case we can't get resupplied by helicopters or vehicles by the road," said Army SSgt. Denton Poe of COP Herrera's 1st Platoon.

to the aircraft in front of him" led to the mishap, according to report findings.

Fourth in line for takeoff during an operational readiness exercise, the pilot failed to note that the three fighters queuing ahead of him had paused on the taxiway for a routine preflight check. His aircraft struck the third fighter in line.

Though neither pilot was injured in the accident, the fourth aircraft sustained more than \$2 million in damage while the third F-16 required some \$590,000 worth of repairs.

Return to Fairchild

Two KC-135s left the first tire marks on a pristine 2.5-mile runway recently completed at Fairchild AFB, Wash.

The \$43.6 million runway, which was finished ahead of schedule but over budget, was raised 12 inches over the previous surface to improve drainage.

Civil engineers narrowed the strip from 200 feet to 150 feet to match standard USAF parameters, recycling some 60,000 tons of concrete in the process.

For the first time since the 11-month project began, crews with the 92nd Air Refueling Wing landed a KC-135 at Fairchild, testing the new surface on a homecoming flight to the base Nov. 2.

Fairchild's tankers and 1,342 personnel temporarily operated from nearby Spokane Airport and Grant County Airport during construction.

Allies in Pixel Skies

US and Canadian forces linked computers for North American Aerospace Defense Command's first international real-time simulated air defense exercise late last fall. "These scenarios have always been executed in a US-only environment," said Steve Boe, distributed mission operations simulator program manager. In one scenario, Canadian F-18 pilots were able to simulate intercepting a hijacked airliner and handing it off to US F-15s as the aircraft entered US airspace. The exercise "provided a multiregional realism we've never experienced before using DMO," added Boe. Given the contiguity of Canadian and US airspace, "threats can easily transition from their area of operation to ours," said Royal Canadian Air Force Brig. Gen. Christopher J. Coates, deputy commander of the Continental US NORAD Region. For the first time, the Nov. 17 exercise incorporated California Air National Guard pilots of the 144th Fighter Wing, flying simulators at their home in Fresno.

MALD Jammer Production

The Miniature Air Launched Decoy Jammer has been cleared to begin low-rate initial production. Raytheon



Breaker, Breaker, Good Buddy: A USAF M915 tractor from the 70th Medium Truck Detachment leads a convoy through the desert in Iraq. Forty-three vehicles, loaded with equipment and supplies, traveled 1,100 miles in seven days, moving out of the country as part of the effort to meet the US troop withdrawal deadline.

USAF photo by MSgt. Jeffrey Allen

Senior Staff Changes

RETIREMENTS: Lt. Gen. Dana T. **Atkins**, Maj. Gen. Alfred K. **Flowers**, Maj. Gen. Harold W. **Moulton II**, Maj. Gen. Stephen T. **Sargeant**, Brig. Gen. Bryan J. **Benson**, Brig. Gen. Joseph T. **Callahan III**.

PROMOTIONS: To Lieutenant General: John W. **Hesterman III**, Robin **Rand**.

NOMINATIONS: To be Lieutenant General: John E. **Hyten**. **To be Major General:** Everett H. **Thomas**. **To be Brigadier General:** John D. **Bansemer**, David B. **Been**, Michael T. **Brewer**, Thomas A. **Bussiere**, Clinton E. **Crosier**, Albert M. **Elton II**, Michael A. **Fantini**, Timothy G. **Fay**, Edward A. **Fienga**, Steven D. **Garland**, Thomas W. **Geary**, Cedric D. **George**, Blaine D. **Holt**, Scott A. **Howell**, Ronald L. **Huntley**, Allen J. **Jamerson**, James C. **Johnson**, Mark D. **Kelly**, Scott A. **Kindsvater**, Donald E. **Kirkland**, Ricky J. **LoCastro**, Bruce H. **McClintock**, Martha A. **Meeker**, John E. **Michel**, Charles L. **Moore Jr.**, Sean L. **Murphy**, Gregory S. **Otey**, Charles E. **Potter**, John T. **Quintas**, Michael D. **Rothstein**, Kevin B. **Schneider**, Scott F. **Smith**, Bradley D. **Spacy**, Ferdinand B. **Stoss**, Jacqueline D. **Van Ovost**, James C. **Vechery**, Christopher P. **Weggeman**, Kevin B. **Wooton**, Sarah E. **Zabel**. **To be AFRC Brigadier General:** John P. **Currenti**, Brian E. **Dominguez**, Peter R. **Masciola**.

CHANGES: Maj. Gen. Edward L. **Bolton Jr.**, from Dir., Space & Cyber Ops., DCS, Ops., Plans, & Rqmts., USAF, to Dep. Asst. Secy., Budget, Office of the Asst. SECDEF, Financial Mgmt. & Comptroller, Pentagon ... Lt. Gen. (sel.) **Ronnie D. Hawkins Jr.**, from Dep. Dir., C⁴ Sys., Jt. Staff, Washington, D.C., to Dir., Defense Info. Sys. Agency, Fort Meade, Md. ... Lt. Gen. **John W. Hesterman III**, from Asst. DCS, Ops., Plans, & Rqmts., USAF, Pentagon, to Mil. Dep., Readiness to the USD, P&R, OSD, Pentagon ... Maj. Gen. **James M. Holmes**, from Dir., Strat. Planning, DCS, Strat. Plans & Prgms., USAF, Pentagon, to Asst. DCS, Ops., Plans, & Rqmts., USAF, Pentagon ... Brig. Gen. **Veralinn Jamieson**, from Dir., Intel., SOUTHCOM, Miami, to Dep. Commanding General, Detainee Ops., Combined Jt. Interagency Task Force-435, US Forces-Afghanistan, CENTCOM, Kabul, Afghanistan ... Lt. Gen. **Robin Rand**, from Spec. Asst. to the Vice C/S, USAF, Pentagon, to Cmdr., 12th AF, ACC, Davis-Monthan AFB, Ariz. ... Maj. Gen. **Darryl L. Roberson**, from Cmdr., 455th Air Expeditionary Wg., ACC, Bagram Airfield, Afghanistan, to Dir., Strat. Planning, DCS, Strat. Plans & Prgms., USAF, Pentagon ... Maj. Gen. **Anthony J. Rock**, Cmdr., 321st Air Expeditionary Wg., ACC, Baghdad, Iraq, to Spec. Asst. to the DCS, Ops., Plans, & Rqmts., USAF, Pentagon.

SENIOR EXECUTIVE SERVICE CHANGES: John R. **Bartley**, to Dep. Dir., Acq., TRANSCOM, Scott AFB, Ill. ... David R. **Beecroft**, to Dep. Dir., Log., DCS, Log., Instl., & Mission Spt., USAF, Pentagon ... Deline R. **Reardon**, to Assoc. Dep. Dir., Log., DCS, Log., Instl., & Mission Spt., USAF Pentagon. ■

is preparing to begin deliveries to the Air Force in 2012.

"MALD-J will save the lives of aviators because commanders will be able to use [it] ... to conduct dangerous stand-in jamming missions instead of using manned aircraft to do the job," said Harry Schulte, vice president of the company's Air Warfare Systems product line.

MALD-J adds a radar-jamming capability to Raytheon's MALD air launched decoy, which confuses enemy air defenses by duplicating the characteristics of US and allied aircraft.

Raytheon said the Air Force also exercised a contract option to convert Lot 4 production of the baseline decoy to the jammer variant.

BACN Baptized

Global Hawk remotely piloted aircraft equipped as Battlefield Airborne Communications Nodes have been officially

designated EQ-4B in recognition of their specialized electronic mission, announced Northrop Grumman.

Earlier this year the Air Force designated its manned but similarly equipped Bombardier Global Express jet aircraft as E-11A.

"The new designation of the manned and unmanned BACN aircraft reflects a unique aircraft mix that provides theater commanders complementary capabilities to support the BACN missions," said Claude Hashem, vice president and general manager of Northrop's Network Communications Systems business.

"The E-11A business jets provide rapid tactical deployment options, while the EQ-4B unmanned systems provide long endurance and unsurpassed persistence."

The Air Force awarded Northrop a \$43 million, five-month contract extension in September to operate, support,

and maintain the service's two E-11As and the BACN payload, according to Northrop.

Only Raptors Solo

Five Air Force single-ship demo teams—A-10 East and West, F-16 East and West, and F-15E—will not perform this year, due to budget reductions at Air Combat Command. Only the F-22 will make single-ship flight demonstrations for the 2012 air show season.

The command said it will distribute the flying hours normally allotted to those five teams to combat wings.

This "will allow us to reallocate more than 900 sorties to our wings so they can maximize their flying hours for combat readiness training, offsetting some of the reduction we've seen in flying hours," stated a December release. "Most importantly, reallocating those sorties will provide an increase in more than 25 combat-ready fighter pilots—that's a very good thing for our nation and wise stewardship of our limited resources."

The Thunderbirds air demonstration team is "set to complete a full season" for 2012, according to ACC.

New START Numerology

A total of 448 Air Force Minuteman III ICBMs stand in silos on operational status, based on an exchange of data between the United States and Russia under the New START arms control agreement. In addition, the Air Force holds 266 Minuteman III missiles on nondeployed status and maintains 58 nonoperational silos and six test silos, as of September.

The Air Force is moving forward with the task of eliminating a total of 100 deactivated ICBM silos and their associated alert facilities in accordance with the New START agreement. (See "Filling Holes," p. 17.)

Bundle and Save

Air Force officials announced plans for four new active duty associate fighter squadrons, pairing active duty and Air Force Reserve Command airmen as a cost-saving measure.

"We partner active duty and Reserve airmen together and create a powerful synergy that is cost-effective and results in a force that performs both daily operations as well as strategic surges," said Lt. Gen. Charles E. Stenner Jr., Air Force Reserve chief.

The new active associate units will share aircraft and equipment with existing Reserve fighter squadrons at Barksdale AFB, La.; Homestead ARB, Fla.; NAS JRB Fort Worth, Tex.; and Whiteman AFB, Mo.

Rebalancing the Rated Pipeline

The Air Force needs to boost fighter pilot production to 278 pilots a year as it works to rebalance the rated training pipeline, said Chief of Staff Gen. Norton A. Schwartz.

To achieve the goal, the Air Force aims to pair active duty units with reserve fighter squadrons to crank out "significantly more" B-course students, Schwartz wrote in a Nov. 2 letter to the Air Staff and major commands.

In the future, the Arizona Air National Guard at Tucson will host fewer international F-16 students, in order to ramp up production of USAF F-16 pilots. Meanwhile Air Combat Command will reduce the required F-16 syllabus.

A-10 crew ratios will increase and more aircraft will be added to the flying training unit in an effort to produce more pilots, Schwartz explained. While the location is yet to be determined, USAF's F-15C aggressor squadron will be converted to an FTU, and F-22 training output will be significantly increased.

Schwartz requested that ACC take the lead on most of the initiatives, to "rapidly implement" the various training plans.

In addition, USAF intends to "normalize" the MC-12 cadre to maintain pilot inventories at sustainable levels, while scrubbing rated requirements to fit "inventory realities," wrote Schwartz.

Previously, instead of designating pilots specifically for the MC-12, as has been the case since the Liberty entered service, pilots from across the force rotated in to temporarily fill MC-12 slots, then returned to their assigned type.

AFRC squadrons at Barksdale and Whiteman will continue A-10 operations, with the addition of 128 active duty airmen, and F-16 units at Homestead and Fort Worth will gain 168 active posts.

While some AFRC personnel will be cut, units will be granted "time to adjust," said Stenner.

Indonesian Vipers

The US will transfer 24 surplus F-16s to Indonesia under an agreement announced by President Barack Obama and Indonesian President Susilo Bambang Yudhoyono in November.

Unveiled during the Pacific leaders' summit in Bali, Indonesia, this acquisition "provides Indonesia with a much-needed capability to protect its sovereign airspace and represents the largest transfer of defense articles in the history of the US-Indonesia bilateral relationship," according to a Nov. 18 White House statement.

Upgraded with modernized radar and avionics, the regenerated F-16C/Ds will be capable of carrying advanced targeting pods and weaponry.

Indonesia also requested 28 refurbished engines and a stock of six airframes for use as spares. The United States will train at least 30 pilots Stateside and send teams to train Indonesian maintainers. Aircraft deliveries are set to begin in July 2014. Indonesia currently operates 10 F-16A/Bs.

Filling Holes

Air Force Global Strike Command officials announced Dec. 1 that environmental impact assessments are under way at F. E. Warren AFB, Wyo., and Malmstrom AFB, Mont., clearing

the way for empty infrastructure to be imploded or filled with gravel rendering it useless.

The Air Force intends to get rid of 50 silos and five alert facilities at each of the two missile bases. At F. E. Warren, the service will eliminate former Peacekeeper missile silos and alert facilities once belonging to the 400th Missile Squadron.

On the books for elimination at Malmstrom are Minuteman III silos and alert facilities formerly used by the 564th Missile Squadron.

Under New START, the United States has until February 2018 to eliminate the infrastructure.



Feed Me, Seymour: Amn. Jonathan Quinchia drags a fuel hose to an F-16 at Eglin AFB, Fla. In Fiscal 2011, Eglin took delivery of more than 14 million gallons of fuel and cryogenics products to fulfill some 8,000 test and training missions.

Globalizing Wideband

The Canadian Parliament recently authorized more than \$464 million to secure that country's place in the Air Force's Wideband Global Satellite Communications project.

Canada's experiences in Afghanistan and Libya have proved the necessity of reliable battlefield communications, prompting it to partner with the United States and Australia on WGS. Denmark, Luxembourg, the Netherlands, and New Zealand have also expressed interest in joining WGS.

Three WGS spacecraft are already operating on orbit and the next satellite, WGS-4, arrived at Cape Canaveral AFS, Fla., in November for a late January launch.

Seeking Upgraded Igloos

The Air Force chose Lockheed Martin to upgrade Atmospheric Early Warning System radars throughout the US and Canada, according to a company release in November.

About \$46.8 million worth of contract options cover initial planning and design work to modernize 29 AN/FPS-117 long-range surveillance radars, initially built by Lockheed in the 1980s under the Seek Igloo North Warning program.

Included in the contract are 15 radars in Alaska and 11 in Canada, as well as individual sites in Hawaii, Puerto Rico, and Utah.

The unmanned solid-state L-band radar sites are capable of continuous airspace coverage out to 250 miles, providing reliable service even in harsh Arctic climates.

Lockheed Martin expects a follow-on contract to update signal and data

USAF photo by Samuel King Jr.

processing, extending the network life span through 2025.

The company already completed similar work upgrading sites in Germany, Kuwait, Romania, and the UK.

Remapping Mobility

Air Mobility Command is restructuring the US Air Force Expeditionary Center and units of 18th Air Force to wring greater efficiency from daily operations.

Slated for inactivation are headquarters for the 15th Expeditionary Mobility Task Force and headquarters, 615th Contingency Response Wing—both located at Travis AFB, Calif.—and the 21st Expeditionary Mobility Task Force headquarters at JB McGuire-Dix-Lakehurst, N.J.

Subordinate units at both bases will remain in place under the control of the expeditionary center, as will air mobility operations wings at JB Pearl Harbor-Hickam, Hawaii, and Ramstein AB, Germany.

“The reduction of 18th Air Force’s span of control allows for greater focus on its mission to present operational flying air mobility forces to US Transportation Command,” said Lt. Gen. Mark F. Ramsay, 18th Air Force commander. “Ultimately, it will allow the 18th Air Force to put greater focus on the flying mission while the expeditionary center focuses on our contingency response, expeditionary combat support training, en route and installation support, and building partnerships missions.”

Unburdening SOF

The Air Force is trying to ease the burden on its special operators by transferring some of their duties to the regular force.

“An important point to make when you look at this conventional versus the irregular warfare and special operators out there, is what can we do to take the burden off them,” said Brig. Gen. Jerry P. Martinez, operational capability requirements joint integration director.

Testifying during a House Armed Services panel on irregular warfare capabilities, Nov. 3, Martinez said, “Our country has asked a lot of our special ops forces.” That’s why the Air Force is trying to improve, in the “general populace,” language, regional, and cultural training—instruction once reserved for air commandos, he added.

Longest Serving Airman Retires

Maj. Gen. Alfred K. Flowers retired as the Air Force’s longest serving airman, ending his 46-year career as deputy assistant secretary for budget. Flowers enlisted in the Air Force at age



USAF photo by MSgt. Cecilio Ricardo

Darkest Before Dawn: An airman from the 447th Expeditionary Security Forces Squadron talks with Iraqi Air Force security forces members after a Dec. 12 perimeter patrol at the Baghdad Diplomatic Support Center. The center, previously known as Sather Air Base, was renamed Dec. 1.

17, beginning his active duty career in 1965 as a supply warehouseman at Grand Forks AFB, N.D.

In 1968, he served as an air transportation specialist at Da Nang AB, South Vietnam. After 13 years in the enlisted corps, Flowers was commissioned as a financial management officer in 1978, serving as US Special Operations Command director of resources (2004-2006) and later as head of 2nd Air Force at Keesler AFB, Miss.

Flowers was awarded the Distinguished Service Medal by Air Force Secretary Michael B. Donley in a retirement ceremony at JB Anacostia-Bolling, D.C., Nov. 16.

Hawker Beechcraft Lodges Protest

Hawker Beechcraft filed a protest against the Air Force with the Government Accountability Office after the service excluded its AT-6 platform from further consideration in the Light Air Support aircraft competition. Company officials said they were “confounded and troubled” by the Air Force’s decision, claiming that the service unfairly kept them in the dark as to why the company’s bid was barred.

In a release Nov. 21, Hawker Beechcraft said the decision “appears at this point to have been made without basis in process or fact.” Accordingly, “we are very interested in learning more about the decision and look forward to the results of the GAO’s review.”

The Air Force said it is going ahead with the competition to acquire 20 LAS

platforms for the Afghan Air Force, with source selection due in early December.

The GAO has until Feb. 29 to issue its ruling in Hawker’s case.

Senate Passes Defense Authorization

By a vote of 93 to seven, the Senate approved its version of the Fiscal 2012 defense authorization bill, allocating \$662 billion.

This includes \$527 billion for baseline Pentagon activities, \$117 billion for overseas contingency operations, and \$17.5 billion for Department of Energy nuclear weapons and defense-related work.

Following passage of the House version in May which authorized \$690 billion, the measure’s approval cleared the way for the House and Senate to hash out a single bill in conference before sending it on to the President for signing.

While the House version passed before enactment of the 2011 Budget Control Act, the Senate’s includes \$27 billion in additional BCA cuts for Fiscal 2012.

Added were tough sanctions on Iran, in light of a recent International Atomic Energy Agency report that the country continues to develop nuclear weapons.

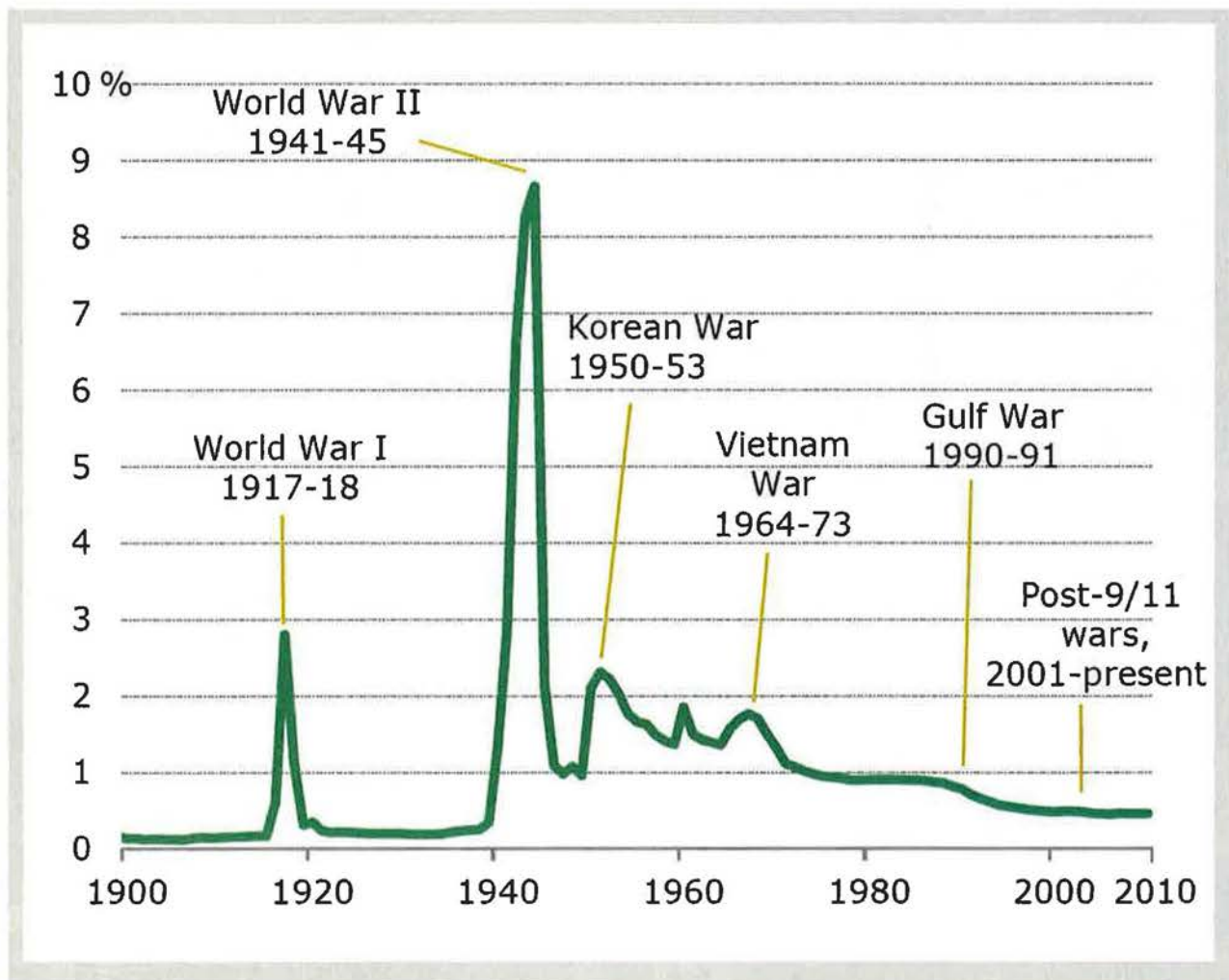
The Senate legislation also reaffirmed retaining captured terrorists in military custody, rather than handling them through the civil court system. President Obama threatened to veto the authorization if similar language found its way into the final bill. ■

The Relative Handful in Uniform

America's military needs—including the fighting of its wars—increasingly are seen to by a smaller and smaller share of the US population. Participation peaked in World War II; by 1945, nearly nine percent of the citizenry was in arms. As shown in this chart, the proportion of citizens serving rose again in the Korean War, early 1960s, and Vietnam War. In the latter, 8.7 million served, though the share never reached

two percent. In the post-9/11 era, about four million men and women have worn the uniform, but the rate of participation has fallen below 0.5 percent of all Americans, the lowest since the interwar 1920s and 1930s. Much of the percentage decline can be chalked up to huge growth in population, from about 133 million in 1945 to nearly 310 million in 2010, though the absolute size of the armed forces has also fallen.

Percent of Americans in US Armed Forces, 1900-2010




Source: "War and Sacrifice in the Post-9/11 Era," Pew Research Center, Oct. 5, 2011, Washington, D.C. Basic data from Molly Clever and David R. Segal, "After Conscription: The United States and the All-Volunteer Force," forthcoming.



The Air Force is the backbone behind military space, cyber, and ISR.

Hard Looks at Growing Missions

By Marc V. Schanz, Senior Editor



An artist's conception of an imaging intelligence satellite on orbit. DOD tracks 22,000 satellites and pieces of space debris.

Artist's conception by Erik Simonsen

The Air Force needs to start thinking about new ways of doing business, according to Air Force Space Command's Gen. William L. Shelton.

Evolving threats, expanding mission areas, and turbulent budgets mean USAF must look at contract reform, requirements for space launch, and even how it organizes missions.

The missions and tasks the Air Force is charged with today, particularly in the realms of space, cyberspace, and intelligence-surveillance-reconnaissance, are both critical and growing in importance. Dominance in these domains is far from assured.

Worldwide combat capabilities depend on the network of global reach and information systems set up and maintained by USAF, noted several top Air Force leaders at the Air Force Association's Global Warfare Symposium in Los Angeles in November.

From the Predators flying over Afghanistan, to the protection offered by missile warning satellites, to troops navigating unfamiliar streets thanks to Global Positioning System satellites—all of this will be endangered if new approaches are not used to protect capabilities.

Shelton called the service's budget struggles "the most pressing and perhaps the most vexing challenge our military is facing," saying any budget cuts north of \$800 billion in the next decade would not only necessitate force structure adjustment but also a conversation about an "entirely new national security strategy."

The Air Force's cyber capabilities, resident in AFSPC's 24th Air Force, also known as Air Forces Cyber, cross boundaries around the world and muddle the difference between civil, military, and law enforcement operations.

AFCYBER, for example, is covered by a range of authorities under US law—from Title 50 for war and national defense to Title 10 and even Title 18, encompassing criminal activity. "It's not about line and block diagrams," said Maj. Gen. Suzanne M. Vautrinot, 24th Air Force commander. "It's about relationships you need to make in order to make this mission happen." Operating in cyberspace is a unique area for USAF historically, she noted, as it is a medium where vulnerability is inherent.

"We don't own it, we didn't build it, but we have to get comfortable that this is the structure we work in," she added.

USAF is also looking at an uncertain future in space. It has presided over the buildup of an impressive array of space capabilities, but other nations are building theirs, too, and concern over the security of DOD's on-orbit tools is a topic that comes up in top-level discussions with frequency.

Today, 11 countries maintain 22 launch sites, and 60 countries and consortia operate satellites on orbit, said Lt. Gen. Ellen M. Pawlikowski, commander of USAF's Space and Missile Systems Center. DOD tracks 22,000 satellites and pieces of space debris on orbit, and those numbers are slated to steadily creep upward in the years ahead.

Bridging the Gap

In addition, there is not a lot of redundancy when it comes to on-orbit assets. "We have some satellites that are old enough to vote," Shelton quipped, highlighting the GPS constellation. He added that AFSPC is fortunate the satellites have lived as long as they have, but USAF planners predict the equipment will "barely make it" until the GPS Block IIF satellites replace them. The first of these was launched in May 2010 to bridge the gap to the Block III satellites, now scheduled to begin arriving on orbit in 2014. "Nobody lets you have ... strategic reserve," Shelton noted, due to the cost of developing and deploying satellites. "If we have some surprises along the way, we aren't going to be in very good shape."

To navigate this environment, Shelton said, USAF must move to save money and preserve the programs critical to the future of the entire DOD, and must focus on a few key concepts: keeping costs down and rethinking how the Air Force builds space architectures, curbing excessive requirements growth, and working closely with the aerospace industry to find new ways to save money and deliver needed capabilities.

"There won't be additional money. Let me say that again. There won't be additional money," Shelton said bluntly. "That's just the cold, hard reality of today. So it will be these innovative approaches that will help us make our own money internally, freeing up resources to do things that we know we need to do." There's a "foundational level of space capability" the US must retain in order to remain a global power, he added, and to avoid reverting to fighting the way it did in Vietnam, Korea, and the second World War.

The ground crew chases a U-2 landing on a runway in South-west Asia. USAF officials predict the need for "top shelf" ISR, such as that provided by the U-2, will continue to grow.



One of the areas being scrutinized is the launch business—and getting more value from it, Shelton said. USAF buys a lot of space launch, having ordered 15 evolved expendable launch vehicles since 2007. But the cost of EELVs has crept upward at a rate outstripping even the rising cost of health care, Shelton noted, and AFSPC believes a block-buy strategy will help stabilize the industrial base and save money.

Economies of Scale

USAF and the National Reconnaissance Office have proposed buying at least eight EELV core boosters a year from Fiscal 2013 to Fiscal 2017. Exact contract lengths and further numbers of boosters will be determined once the Air Force gets pricing information, but the regularity and predictability will help stabilize costs, Shelton stated.

Air Force Secretary Michael B. Donley noted "significant concerns" with the growing cost of EELV operations. "We have cracked into the cost of operations at [United Launch Alliance] and we've developed an acquisition strategy for EELV that will help us modulate the best deal for the taxpayer in terms of block buys," Donley said. Simultaneously, the Air Force has worked with NASA and the NRO on new launch entrant criteria and to get a three-agency agreement on standards for ventures and companies to get into the business.

USAF leadership is encouraging competition and newcomers for the

space business, but national security space is a risk-averse environment and officials are taking a cautious approach. Still, Shelton noted, not everything AFSPC launches is in the category of a critical payload, such as experiments in the space test program. "While we certainly value these, ... it's clear that they aren't in the same class as some of our satellites," such as those in the Space Based Infrared System, he noted. "They may present an opportunity for certification launches of a new entrant, due to our willingness to take a bit more risk."

Reusability and increasing economies of scale will be crucial to launch savings in the future. Elon Musk, the CEO of SpaceX, said the company's Falcon 9 booster will push the state of the art for commercial launch. Larger satellite carriage capacity means a "virtuous cycle" could begin where satellites get less expensive due to the lower costs of launch. Today, Falcon 9 is about \$16 million for a flight, but if a launch vehicle could be rapidly turned and reused, much like a jet airliner, space in the 21st century could become more accessible—and costs would drop.

"The big breakthrough is rapid and complete reusabil-

ity," Musk said. "When you think of any mode of transport, they are all rapidly reusable."

In addition to opening up launch competition, USAF is attempting to clamp down on contracts and requirements. The key to reform in this area, Shelton submitted, is to focus efforts on building mission "architectures"



Airmen compete in Cyber Nexus, the 67th Network Warfare Wing's force-on-force cyber competition. Cyber capabilities will likely play a large role in the Air Force's future.

that leverage multiple assets to achieve a range of effects on orbit.

"A well-crafted mission area architecture helps us define efficient approaches and can pay enormous dividends in both procurement and operational successes," he said, adding it would be the opposite of ad hoc. A dedicated sensor for terrestrial weather, for example, could be augmented by a comparable sensor supporting another mission by applying different ground processing. For military satellite communications, a more resilient future architecture might be built around larger numbers of smaller, less expensive satellites, perhaps supplemented by responsive platforms and hosted payloads.

Plotting a New Course

AFSPC's requirements directorate is now poring over programs within all mission areas trying to define the "minimum capabilities" each system must provide, based on current needs. "We are questioning everything," Shelton said, noting he had personally reviewed a contract for \$30 million—which in part included services to mow grass at an AFSPC base.

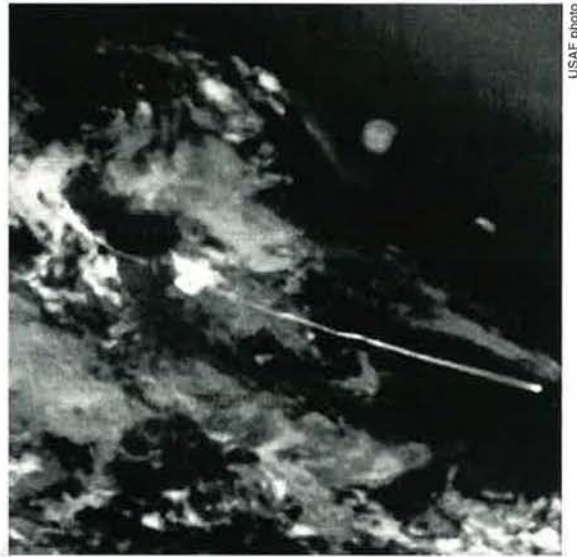
How the US buys space capability, and how industry builds it, must change to reflect the realities of the 21st century, said Michael A. Hamel, an Orbital Sciences senior vice president and retired USAF three-star. "If it doesn't work on orbit, there will be penalties," he said. The industry needs "skin in the game" and should not be afraid of doing business in a firm, fixed-price contracting environment.

If it can blend together tools and practices, from payloads to ground processing systems, the space business could soon see a very different result. "It's going to take more collaboration between industry and the government," Hamel said. "If we don't plot a new course, the budgets will plot the course for us."

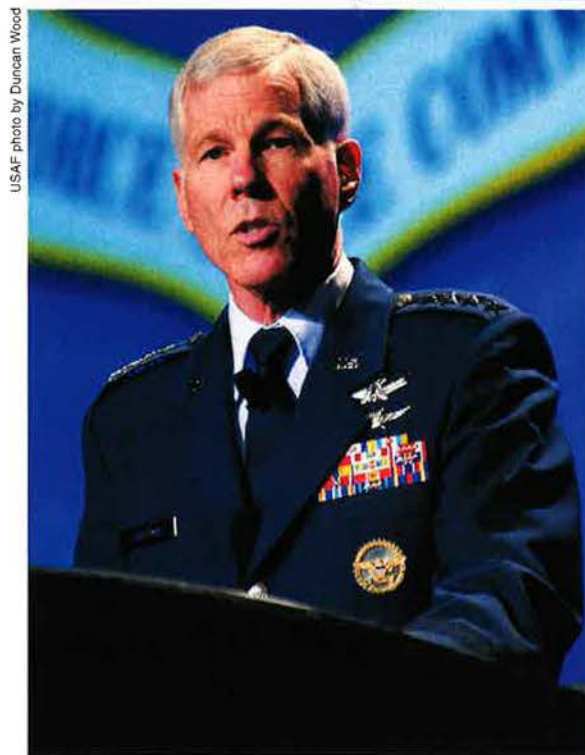
Both USAF and industry officials feel leveraging commercial assets will be crucial in the near future. Industry must adapt to a more crowded and contested environment on orbit by preparing for a setting that is less permissive, said Kay Sears, president of Intelsat General, a satellite communications provider. "We want to prepare for the future fight, ... including one that would not necessarily include communications dominance," she said.

Intelsat is thinking "a lot" about resiliency—a subject Shelton echoed—

and has invested much in security features in its products, such as type-one encrypted telemetry, tracking, and command links on some satellites. There is a great deal of commonality to be gained between the military and commercial sectors, Sears said, and while the latter will not likely launch nuclear-hardened satellites into orbit anytime soon, much work could be done to improve anti-interference tools, since operators in the commercial realm are seeing a dramatic increase in



USAF photo



USAF photo by Duncan Wood

Top right: Infrared imagery from the Space Based Infrared System's Highly Elliptical Orbit-2 sensor shows a missile launch through cloud cover. Above: Gen. William Shelton, AFSPC commander, wants the Air Force to consider new ways of doing business.

interference events as technology proliferates around the globe.

Several speakers noted cyber capabilities—and the need to counter threats in a world-ranging and largely unsecured operating domain—will play an even larger role in USAF's future. "We are arguably more dependent on cyber capabilities than we are on space," said Shelton. "As we debate the future in this brave new world, ... space and cyber capabilities provide the enabling foundation for our national security. We will need to be very cautious as we work our

way through reductions in these areas."

Caution in the space and cyber realm is not merely a parochial concern, as these operating arenas touch almost every mission area in DOD. Vautrinot highlighted the contributions of 24th Air Force's airmen to the remotely piloted aircraft mission in theater today, as cyber airmen ensure the data collected from Southwest Asia are secured on the worldwide network.

In addition to being flown from thousands of miles away, RPAs were not designed to be efficient, and there are between 40 to 80 "touch points" of vulnerability in their network. The airmen of the 624th Operations Center at Lackland AFB, Tex., are responsible for knowing what those points are and how to protect the

RPAs—watching tail numbers from across the world, in a 21st century version of fighter escort for bombers.

Controlling the network is a difficult proposition in the best of circumstances, Vautrinot said, because you can rarely solve a problem for good. "You can make things harder, but you can't make things impossible," she explained about network protection activity. Today's cyber airmen have become good at tracking the forensics of intrusions and attacks, she added, because both USAF and potential threats must operate in the same domain—there are both



risks and benefits constantly weighed. “What comes in [to your network] has to go back out,” she noted.

One of the Air Force’s other enduring global missions—providing intelligence, surveillance, and reconnaissance—has also proved inseparable from modern warfare in Afghanistan and Iraq. The demand for near-real-time intel and imagery has mushroomed since 2001, and the Air Staff is taking a hard look at the future of the ISR mission, said Lt. Gen. Larry D. James, deputy chief of staff for ISR.

Strategic Underpinnings

Officials recently wrapped up a review of the mission efforts. While USAF has put itself at the forefront of ISR operations in today’s conflict, the study, begun last February, concluded the Air Force does not have in place a disciplined or well-established process for organizing and pursuing new technologies: The research and development and science and technology piece of the ISR enterprise is not being handled effectively. On the positive side, the service will reorganize how it manages R&D funds, a paramount concern in the forthcoming budget environment, where all developmental funding will have to face tough scrutiny.

While the ISR enterprise won’t be immune to the budget ax, James believes this mission area would “fare well” since the need for top-shelf ISR will continue to grow.

The technology push in this area will have to be balanced between the collection aspect and the analysis piece, he noted. Operations in Afghanistan have revealed a mismatch between



Top: An E-8 JSTARS aircraft over Robins AFB, Ga. JSTARS uses a multimode side-looking radar to detect, track, and classify moving targets behind enemy lines. **Above:** An MQ-9 Reaper in a shelter at JB Balad, Iraq. Intelligence-surveillance-reconnaissance capabilities such as those offered by these aircraft are expensive and always in high demand.

these two pieces of the enterprise, and there remains an urgent need to automate processing, exploitation, and dissemination (PED) of intelligence products—the last leg of the mission—which consumes a great amount of resources and manpower. USAF has pushed state-of-the-art sensor technology into the field, but PED is so manpower-intensive too much of the material gathered in the execution of the mission “falls on the floor,” James said.

The military has already transformed how it utilizes ISR, said retired Lt. Gen. David A. Deptula, now CEO of Mav6. No longer tied to platforms or tactical or strategic mission stovepipes, ISR has become a critical mission area in and

of itself and there is no better time to change and update the organizational models for the collection, dissemination, and analysis of these products.

To reflect this change, Deptula proposed the Air Force move to stand up a major command dedicated to ISR, to reflect the place it occupies in the 21st century’s conflicts. “The nature of [ISR] hasn’t changed, but its character has,” Deptula said, observing that from the dawn of time to 2003, five exobytes of data were created in the world. Now, five exobytes are created every two days.

“We can’t afford to feed the old appetites and structures anymore,” Deptula said, and technology is moving faster today than ever before. A soldier or sailor or marine does not care how

many RPAs are on orbit, he noted; they care about getting more situational awareness—something maximized by leveraging automation of exploitation and analysis tools while reducing the need for more combat air patrols in the air, even as newer concepts become available to produce the same effects.

“Strategy needs to underpin budgetary decisions,” Deptula said. Knowledge—and getting useful information to those who need to make timely decisions about our national security—is what matters. Strategy must remain at the core of USAF’s efforts to embrace and maximize innovation and technology.

“This won’t be easy, but if we don’t do it, our adversaries will,” Deptula concluded. ■



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Global Power on a B

Airpower's importance will increase as resources decline.

By John A. Tirpak, Executive Editor

NEW budget realities don't excuse the Air Force from dealing with emerging strategic threats and security challenges. Top USAF officials believe new strategies and partnerships will be needed if the service is to maintain the ability to fulfill its missions—albeit with a significantly higher degree of risk.

"We're now approaching the conclusion of our strategic review," launched last summer when the debt-ceiling crisis put budgets under duress, said Air Force Secretary Michael B. Donley, who spoke along with other top officials at the Air Force Association's Global Warfare Symposium in Los Angeles in November. "We'll shortly begin finalizing major program decisions that will be consistent with the revised strategy

and will get the most out of available resources."

One strategic effect of the cuts: The "active, Guard, and Reserve components will get smaller together" as the service's budget compresses, and it will be more important than ever that the Total Force be "closely integrated. We're already very good at this, but we must get even better," Donley observed.

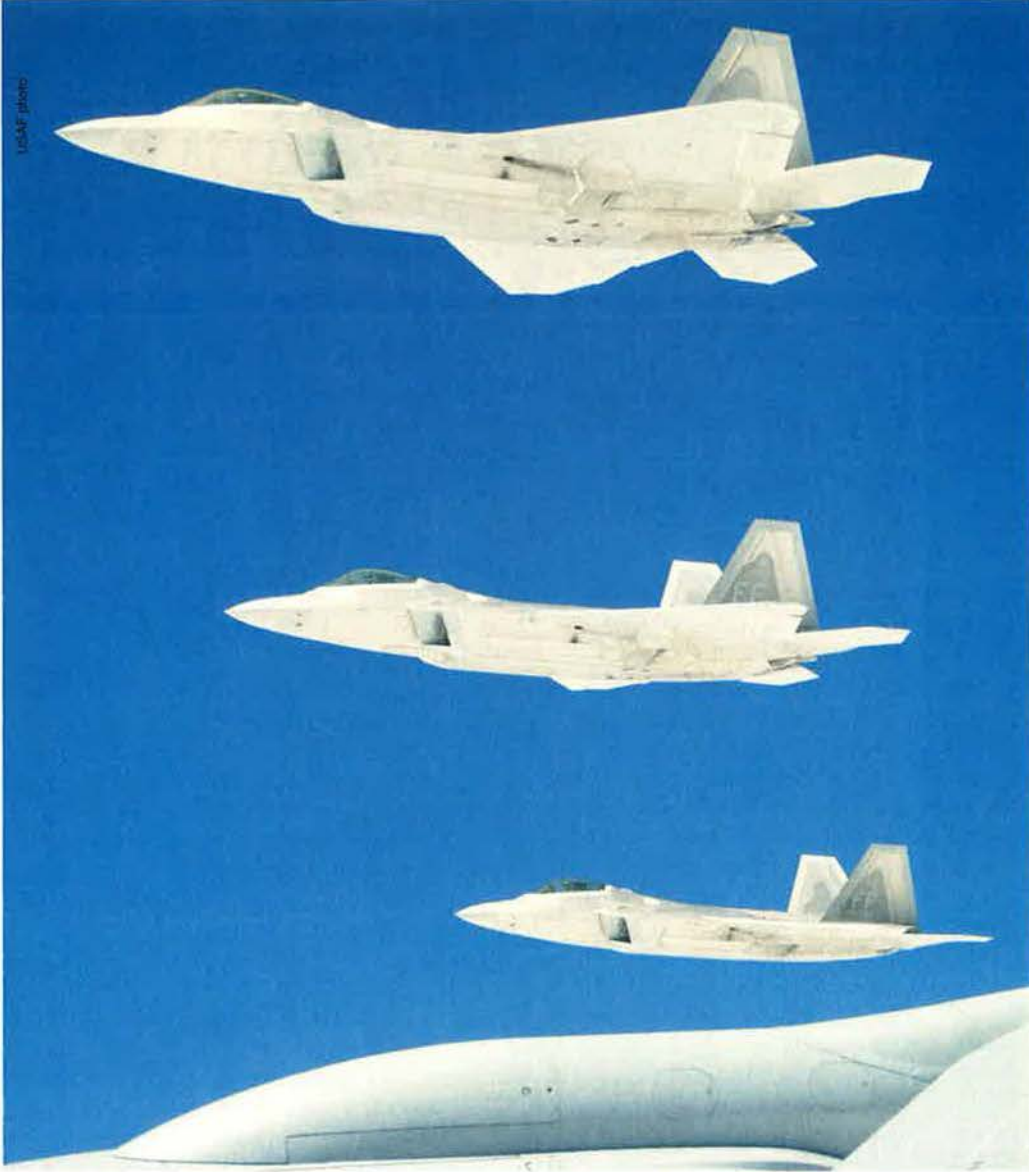
More than \$450 billion in planned reductions could be topped by as much as \$600 billion in sequestrations stemming from the failure of the congressional deficit-cutting "supercommittee." As these budget cuts take hold, USAF leaders will fight to "preserve Air Force core missions and capabilities," Donley said.

To achieve necessary savings—since "we know efficiencies alone will not be enough" to fit the new smaller budgets—

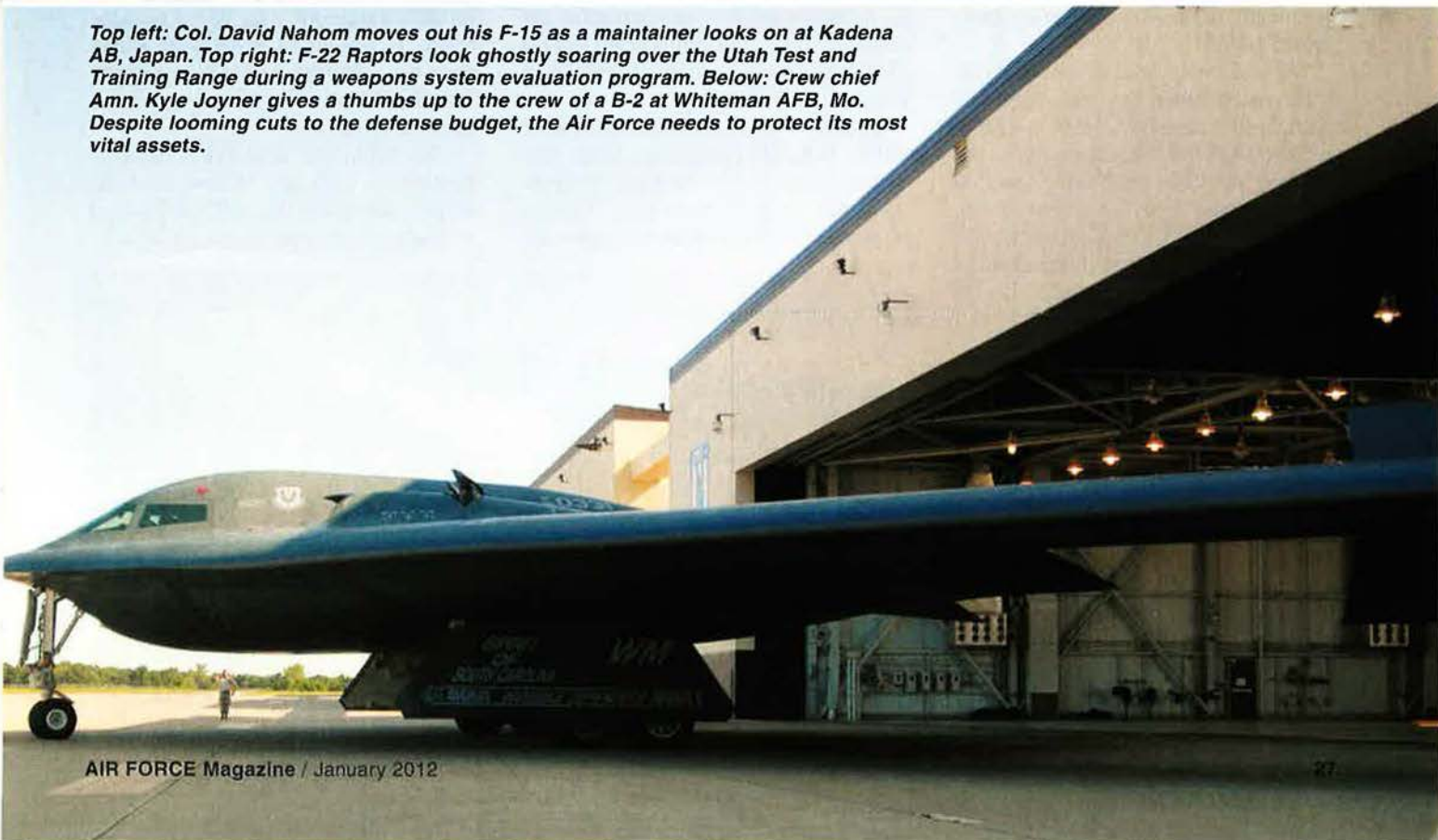
USAF photo by SRA Kenny Holston



AIR FORCE Magazine / January 2012



Top left: Col. David Nahom moves out his F-15 as a maintainer looks on at Kadena AB, Japan. Top right: F-22 Raptors look ghostly soaring over the Utah Test and Training Range during a weapons system evaluation program. Below: Crew chief Amn. Kyle Joyner gives a thumbs up to the crew of a B-2 at Whiteman AFB, Mo. Despite looming cuts to the defense budget, the Air Force needs to protect its most vital assets.





Launch team members at Vandenberg AFB, Calif., run preflight operations for a Minuteman III ICBM launch test. The nuclear triad will be preserved.

“we’ll need to accept greater risk in some areas, terminate some lower-priority programs, streamline others, continue driving efficiency in our operations, and make some tough choices about the core tenets of our national security strategy,” he explained.

In the midst of this downsizing, the service will labor to “protect” items such as “maintaining overseas forward presence,” the KC-46 tanker, the F-35 fighter, and the long-range strike family of weapons, “including the new bomber,” he said. The Air Force will work to “sustain” improvements made to intelligence-surveillance-reconnaissance assets that have been made since 2001—specifically, the development of remotely piloted aircraft.

“We must maintain freedom of action in the space domain to protect critical technologies” in communication, navigation, weather, and ISR, Donley said, and continue modernizing “aging satellite constellations.” USAF contributions to US Special Operations Command will remain a priority, as will sustainment of the nuclear triad. The Air Force will also “further develop and sustain freedom of action in the cyber domain.”

Despite being smaller than it has been “in previous decades,” Donley said the Air Force of 2020 “nonetheless must remain ready” to fight on short notice. “There will be little margin for lengthy mobilizations.”

Donley elaborated on the triad issue, saying the possible proliferation of nuclear weapons abroad means “flexibility across the triad is ... more important than ever.” The key issue, he said, is whether the “balance” of US nuclear forces—the mix of nuclear-armed bombers and intercontinental and submarine-launched

ballistic missiles—will be maintained in traditional proportions.

Under discussion is “whether this is the right ... model going forward,” Donley noted, but he maintained that the triad’s importance will only increase “as our nuclear forces potentially get smaller.”

He flatly asserted, “I’m pretty confident there will be a triad for some time to come.”

Industrial Base Under Stress

Donley was asked if the defense budget will continue to be divided in thirds among the three main branches of the armed forces. He predicted change may be coming because “I think there is much more appreciation ... emerging for the value of those capabilities that enable global operations”—capabilities USAF uniquely provides.

The Air Force’s facility with global airlift, ISR, and long-range strike “are valued assets in the strategic environment that we’re likely to face,” Donley observed. “I think there is a growing

understanding of the benefits of airpower going forward.”

However, he acknowledged that the Air Force’s industrial base is under severe stress.

“This is an important issue and it is getting more important as we consider the potential adjustments” to programs in the budget, Donley declared. Trying to simultaneously reduce spending, fight a hot war, and preserve the industrial base “hasn’t been tried before,” he said. Supply chains will become “much more fragile” and contractors will lack the flexibility and “rapid surge capabilities that we used to enjoy 30 or 40 years ago. So we have to be much more careful” about how budget decisions affect the industrial base, he warned.

Donley’s comments were forcefully seconded by Vice Chief of Staff Gen. Philip M. Breedlove. The Air Force is already woefully unable to surge production of munitions, Breedlove noted, and although there are—on paper—seven prime contractors that can make precision guided missiles and bombs for USAF, those seven companies depend on just three subcontractors for critical parts.

The situation “is our own doing,” Breedlove continued, as USAF has pressured contractors to reduce capacity, use fewer workers, cut overhead, and trim costs wherever possible.

“An industrial capacity is not there,” he said. “We do not have an industry to produce munitions at the speed we need them.” Out of all his worries stemming from the budgetary pressure on the service, Breedlove said, “this scares me as much as anything.”

The munitions production capacity problem is only one symptom of the severe constraints that will be imposed on the military, and increased interde-



The KC-46A tanker, seen here in a Boeing illustration, is still on the top of USAF’s priority list, and the Air Force will strive to protect the program from the budget cutters.

pendence will be necessary because “we know there will be much more than \$450 billion” in cuts to defense, he said.

The Air Force and Navy have been developing the AirSea Battle concept of operations to improve joint combat capabilities, eliminate mission and equipment gaps, and create efficiency by eliminating redundancy. He said the two services have been working on the concept for well over a year, but “by design,” the collaboration will not produce a “glossy document” available to the general public. Rather, Breedlove said, the ASB concept is highly classified, because the services have had to fully reveal to one another their most closely held secrets.

The mutual revelations have sometimes been disquieting, Breedlove said, producing reactions such as, “Oh my gosh, I thought *you* were doing that [mission or developing a capability] and you’re not.”

Ultimately, AirSea Battle “will put jointness on steroids,” he said, adding that it will soon be announced the Army will be involved in AirSea Battle. The Army’s inclusion is because the problem of tactical ballistic missiles is one of the toughest to overcome, and the Army will be “a huge part” of the solution. “We have to break the effects chain” of TBMs, he said, and the Army has a role to play in that work.

Breedlove also warned that the automatic sequestrations on the Air Force’s budget imposed by the failure of the deficit panel will be far worse than they seem at face value. The damage will fall hardest on modernization and readiness accounts, because only those types of cuts can hit the “hard target” reductions in the necessary time frame, he said. More reasoned, longer term approaches to budget reductions aren’t available because, under the law, “we have to find near-term dollars,” Breedlove said.

“We can’t build a [budget] slope that ramps over seven or eight years,” he said. Further base closures, for example, which the Air Force desires and which could significantly help reduce costs, would “take years” to render savings.

The sequester means the Air Force has no choice but to “look at missions” and choose to stop doing some that need to be accomplished but for which there will be insufficient funds, people, or equipment.

“Assuming that operational requirements decrease as planned, this future Air Force will be capable of accomplishing *many* of the mission sets of today, but



USAF photo by Jim Varthey

Gen. Philip Breedlove, USAF vice chief of staff (with Gen. Joseph Dunford Jr., assistant commandant of the Marine Corps), testifies before a Senate panel. Breedlove is concerned about the dwindling industrial base.

will do so at a significant level of risk and with less capacity to respond across multiple crises,” Breedlove said.

China Is First Class

With the sequestrations, “we can foresee an Air Force unable to repeat” the simultaneous operations in Libya, Iraq, Afghanistan, and tsunami response in Japan—the so-called “March Madness” of last spring, he pointed out.

The recent operation in Libya, Breedlove asserted, proved the economy of airpower. The Libyan regime was unseated and defeated in a matter of months at a cost equivalent to “one week” of the overall Afghanistan campaign, “with no loss of life” on the allied side. Airpower, he said, will be the likely instrument of choice in similar cases where “the cost in blood or treasure is too high” to mount a ground-based campaign.

In other ways, though, Libya was “not a model for future operations.” To deal with adversaries possessing the latest anti-access, area-denial measures, concepts like AirSea Battle will be essential to prevail against modernized foes.

Alan Vick of RAND Corp. said the nation has grown comfortable with the “American way of war” as it has existed for the last 20 years, but that the model has recently become seriously outmoded and will have to change. Anti-access and area-denial technologies and techniques—ranging from advanced air defenses to longer ranged, more precise tactical ballistic missiles that can be retargeted in-flight—are having a “disruptive” effect on the paradigm, and the US will have to adapt.

“We’re going to have to develop some new strategies, some new operational concepts in order to maintain our ability to project power,” Vick asserted. “It won’t be easy,” he added.

Enemies will not only have more means to keep the US at bay, but through cyber warfare and the widespread availability of commercial reconnaissance satellites, will deprive the US of much of its ability to act with surprise, Vick said. It’s increasingly unlikely the US will be able to set up “within 100 miles” of an enemy and choose the time and place it will begin combat, as it has been able to do in the wars of the last two decades.

Modernized TBMs, in particular “in the hands of the Chinese,” are disruptive weapons that demand a rethink of US strategy, since they can strike at US land bases within 1,000 miles and can find and cripple aircraft carriers. This development alone will compel the US to be able to act at longer ranges.

“The Chinese missiles are first class,” Vick said. “They are very well-engineered. ... They have GPS and INS [Global Positioning System and Inertial Navigation Systems]. They use remote sensing and over-the-horizon radars for cuing, for targeting.” Equipped with submunitions and terminally guided warheads, these weapons are “a very attractive and very efficient system” for China’s purposes.

While the US has tended to dismiss TBMs as backward, expensive, and limited, they are now a serious threat that must be dealt with. Vick said the Air Force will have to be far more involved in missile defense technology to counter



A ground-based missile interceptor launches from Vandenberg. Ballistic missiles are a serious threat, but not an insurmountable one.

them. “Over the last three years” it has done so, he said.

The TBM threat is not insurmountable though, Vick said.

“There are plenty of things we can do,” he noted. The missiles are nonreusable, so inventories will be depleted under prolonged use; their primary value is in pre-emptive attack; and to keep an air base from being repaired, multiple missile volleys are required.

Expanding Versatility

Work-arounds include dispersing assets in many places; developing the means to operate air bases while under attack; missile defense; and finally, long-range strike: the ability to attack from outside the range of the TBMs. Hardened aircraft shelters won’t solve the problem but would deny an enemy “a free ride” in attacking air bases, Vick said.

However, the key is long-range strike, which is “vital” to counter A2AD and is “critically needed in the early phase of a conflict.”

Vick said that a RAND study last year strongly suggested the US maintain a

penetrating bomber capability, rather than simply load up nonstealthy “arsenal planes” with cruise missiles that would attack only at standoff ranges.

RAND concluded that, with cruise missiles costing millions apiece, the US needs “that ability to deliver cheaper systems,” especially if a conflict lasts longer than 30 days. Besides expanding the possible target list, a penetrating bomber prevents the problem of an adversary simply waiting out the US, which it could do if it knew the cruise missile inventory and waited until the supply was exhausted, Vick noted.

Also touting the rising importance of airpower—specifically, the bomber—was retired Lt. Gen. Robert J. Elder Jr., former head of 8th Air Force and now on the staff of George Mason University in Virginia.

Elder said bombers are becoming “incredibly important” to deal with anti-access problems and add options in all phases of combat. Having proved they are equally adept at the range of operations from deterrence and close air support to strategic attack and securing the post-conflict peace, the Air Force

must maintain a healthy bomber force as a critical component of the national security toolkit, Elder said.

Bombers can be “toggled” on and off alert, each time speaking directly to an adversary, he said. Putting them on alert sends an unambiguous message that the US is getting serious about taking action in a crisis; taking them off alert can signal a reduction in tensions. Deploying bombers to key locations within range of an adversary’s interests can serve a similar “communications” function, he noted.

“They can also deter adversaries [and] assure allies,” he observed. The availability of large, precise weapons such as the Massive Ordnance Penetrator on the B-2 bomber—which could deliver an effect short of a nuclear weapon but well beyond the power of most conventional munitions—expands the versatility of the bombers and makes their being readied for combat a more serious and credible threat, Elder noted. A nation might assume the US wouldn’t use a tactical nuclear weapon; it would have no such confidence about the US using a conventional weapon like the MOP with almost as much explosive effect but without the escalation of resorting to nuclear attack.

Moreover, in an era when every weapon must serve multiple purposes and generate effects beyond their numbers, Elder said bombers offer a bargain: Under strategic treaty rules, a bomber “counts as one” whether it bears one cruise missile or 20.

“For comparatively little cost, you can add a lot of nuclear capability to the inventory using bombers,” Elder noted.

The Air Force faces tough challenges, needing to modernize with extremely limited funds while facing rapidly advancing threats, Donley said, and he observed that it would “benefit no one to play down the hard choices that confront us.”

However, he and other speakers emphasized that the situation is not beyond the Air Force’s ability to find its way through.

I don’t want to “paint a picture that is so bleak” that airmen would think the nation is turning its back on them, Donley said. Vick said these challenges “are nothing [the US] can’t overcome.”

In the course of the drawdown, Donley insisted, senior leaders will “apply best military judgment and oppose reductions that would cause irreparable harm.”

“The Air Force will make certain that our future force is an extraordinarily capable force,” he said. ■

By Robert S. Dudley

Sucking Wind?

"The [problems] that have arisen in the last 12 months or so in the [F-35 fighter] program have surprised us at the amount of change and at the cost. Most of them are little ones, but when you bundle them all up and package them and look at where they are in the airplane and how hard they are to get at after you buy the jet, the cost burden of that is what sucks the wind out of your lungs. I believe it's wise to sort of temper production for a while here until we get some of these heavy years of learning under our belt and get that managed right."—**Vice Adm. David J. Venlet, F-35 program manager, interview with AOL Defense, Dec. 1.**

The Air Force You Have

"The Air Force is going to get smaller. We'll have fewer airplanes, probably fewer wings, probably fewer squadrons. But whatever size we end up, we are still going to be a superb Air Force. ... If you don't like your physician, you can probably find another doctor back home. If the American people lose their trust in their Air Force, where do they go? What's the substitute? The reality is, there isn't one."—**Gen. Norton A. Schwartz, Air Force Chief of Staff, remarks to airmen at Kandahar Airfield, Afghanistan. Air Force News Service, Nov. 22.**

So Butt Out, Comrade

"Our estimate of the threat has gone up, not down. It is accelerating—this is the Iranian ballistic missile threat—and becoming more severe than even we thought two years ago. ... Whether Russia likes it or not, we are about defending NATO-European territory against a growing ballistic missile threat. We will adapt the timing and the details to that threat, which is why the focus of our joint effort ought to be about how to figure out how to reduce that threat rather than trying to threaten and retaliate for a deployment that has nothing to do with Russia."—**Ivo H. Daalder, US ambassador to NATO, remarks to the Defense Writers Group in Washington, D.C., Dec. 2.**

The Taliban Air Force

"There was absolutely no malicious, deliberate attack on the Pakistani military posts. If you hear American helicop-

ters, why would you lob mortars and machine gun fire at them? The Pakistanis can say, 'We thought it was insurgents,' except for the fact that the Taliban doesn't have helicopters."—**Unnamed but reportedly senior US defense official, reviewing "friendly fire" attack that inadvertently killed 24 Pakistani soldiers. Wall Street Journal, Dec. 2.**

Halloween Is More Fun

"Air Force Academy Adapts to Pagans, Druids, Witches, and Wiccans"—**Actual headline on story in the Los Angeles Times, Nov. 27.**

Fully Loaded Table

"If you compare the situation eight years ago, or four years ago, to today's situation, the Iranians are much closer to nuclear capability. Therefore the sanctions have to be intensified, quick, determined, ... and therefore everyone is saying that no option should be taken off the table."—**Israeli Defense Minister Ehud Barak, interview on Israel's Channel 2 television news program. Haaretz.com, Dec. 4.**

The Fertilizer Factory

"The United States has been incredibly patient with Pakistan. And we have been so despite certain undeniable and deeply disturbing facts. Most importantly, Pakistani Army and intelligence officials continue to support the Haqqani Network and other terrorist groups in Pakistan that are killing US troops in Afghanistan, and the vast majority of the material used to make improvised explosive devices used against US forces in Afghanistan originates from two fertilizer factories inside Pakistan. The time has come for the United States to fully review its relations with Pakistan."—**Sen. John S. McCain (R-Ariz.) and Sen. Lindsey O. Graham (R-S.C.), joint statement, Dec. 5.**

It Takes a Worried Man

"I'm concerned about a lot of things here, in addition to the nuclear deterrent. I'm concerned about space. I'm concerned about cyber. I'm concerned about missile defense. I'm concerned across the board."—**Gen. C. Robert Kehler, commander of US Strategic Command, remarks about budget cuts in interview with the Washington Times, Nov. 23.**

Sounds Good ...

"I've been struck by the degree to which our work on the strategy has caused some concern on our commitment to our European allies. We're not moving away from Europe. My message is that we will establish an effort to become more influential in the Pacific but that doesn't mean it has to be at the expense of our common interest in Europe."—**Gen. Martin E. Dempsey, Chairman of the Joint Chiefs of Staff, interview in London with the Financial Times, Dec. 1.**

... Until You Read This

"I have directed my national security team to make our presence and mission in the Asia Pacific a top priority. As a result, reductions in US defense spending will not—I repeat, will not—come at the expense of the Asia Pacific."—**President Barack Obama, remarks to Australian Parliament, Canberra, Nov. 17.**

National Neuterization

"We cannot have a strong defense without a strong national economy. But we will not solve this problem on the back of the Defense Department or on the defense industry. ... I think about sequestration more as fiscal castration. It truly will emasculate the industrial base."—**Brett B. Lambert, US deputy assistant defense secretary for manufacturing and industrial base policy, remarks to a New York investor conference. Reuters, Dec. 1.**

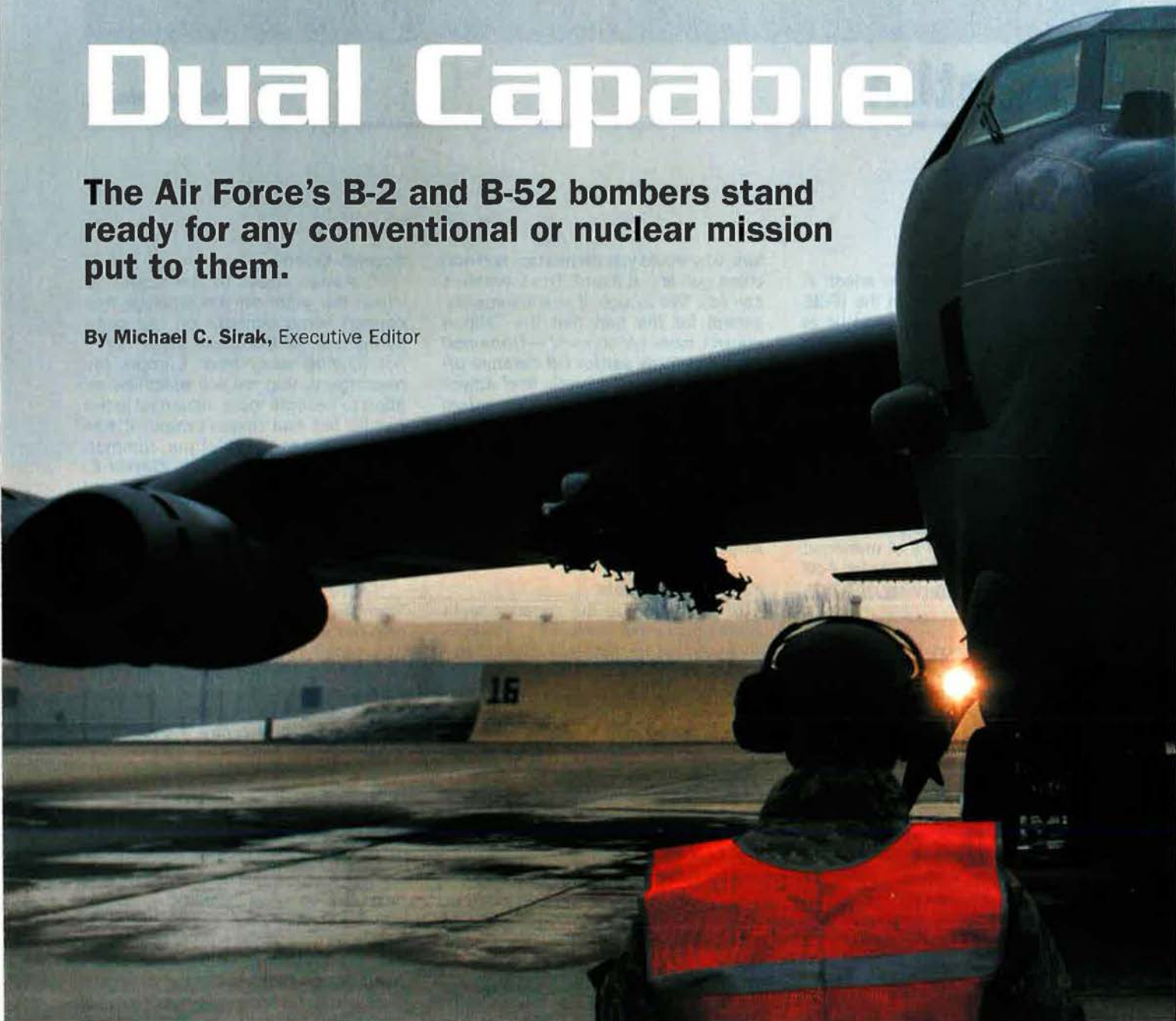
Great Power Clash?

"It would be extravagant to suggest that the United States and China are about to pick up a shooting war where they left off in [the Korean War]. ... But we should be in no doubt, that China and the United States are squaring off for a historic Indo-Pacific confrontation. Even if, for obvious economic reasons, China does not want outright war, few military men of any nationality doubt that the Pacific region is now the most plausible place in the world for a great power clash. ... It is hard to exaggerate the threat which this clash of wills poses for peace in Asia, and for us all, in the coming decades."—**British military analyst Max Hastings, The Daily Mail, London, Nov. 26.**

Dual Capable

The Air Force's B-2 and B-52 bombers stand ready for any conventional or nuclear mission put to them.

By Michael C. Sirak, Executive Editor



Today, some three years after the Air Force began revitalizing its nuclear enterprise, the nation's dual-mission bombers are prepared and ready to take on the full range of conventional and nuclear missions, should they be necessary.

If unleashed, Air Force Global Strike Command's stealthy B-2s and versatile B-52s could strike with extreme power, precision, and lethality against any foe on the globe, at any time, with conventional bombs or nuclear munitions.

Take last March's B-2 strike in Libya, for example. The 509th Bomb Wing at Whiteman AFB, Mo., which oversees the B-2 fleet, was still undergoing a nuclear inspection by Global Strike Command—and facing all of the de-

mands that come with it—when the call came for action.

On short notice, the wing swung into conventional mode. Three of its stealth bombers left Whiteman to strike nearly 50 targets at an airfield in Ghardabiya, Libya, seven time zones away. The aircraft delivered their conventional weapons loads with great accuracy, hitting hardened aircraft shelters, MiG combat aircraft, and military helicopters parked on the ground, kick-starting NATO's seven-month air operation against then-dictator Muammar Qaddafi's regime.

Maintaining such perpetual dual readiness is not easy, say the airmen who support and operate the bomber force. USAF's 76 B-52H bombers—a force already 50 years old—represent a small-size fleet by the aircraft type's

historical standards. The airframes are structurally sound, but face vexing issues such as corrosion. Further, the Air Force is still building its cadre of seasoned maintainers to tend to the demands of a new operational squadron—the fourth B-52 combat-coded squadron in the fleet overall—that USAF has established at Minot AFB, N.D.

The Air Force's 20 B-2s, the first of which entered service in 1993, comprise a tiny inventory by just about anyone's standard. That fleet size makes aircraft availability all the more important since even one aircraft down represents a five percent reduction in the total fleet's capacity. Currently, supply issues hamper B-2 availability, placing stress on flying schedules to maintain pilot proficiency.

Airmen ready a B-52 to taxi before a mission from Minot AFB, N.D. There are 76 of the venerable bombers in the USAF fleet. Below, a B-2 returns to Whiteman AFB, Mo., after a mission. The inventory of 20 B-2 bombers is small by anyone's standards.



USAF photo by SrA Jeremy Barna



USAF photo by SrA Kenny Holston



USAF photo by SSgt. Jamie Provell

SSgt. Dustin Hyden (l) and SSgt. Doyle Atkinson load Mk 62 naval mines onto a B-52 in preparation for a joint exercise with the Navy. The nuclear-capable aircraft is remarkably versatile.

Yet, this force of less than 100 bombers continues to impress the airmen who oversee it. “This jet,” the B-2, “can be a very complicated and finicky mistress on the best of days,” said Col. Matthew Kmon, commander of the 509th Maintenance Group, in an interview at Whiteman. “As much as I hate her at times, what she brings to the fight is phenomenal.”

That same respect applies to the B-52. “It is a workhorse. You can put just about anything on a B-52,” said Col. James C. Dawkins Jr., 5th Bomb Wing commander, in an interview at Minot.

“The B-52 has an awesome strategic nuclear deterrent capability,” added Col. Troy A. VanBemmelen, who heads Minot’s 5th Operations Group.

But it’s not just the machines. The airmen are the lifeblood of the dual-role bombers’ operations. On a daily basis, they get the job done in providing the nation both a nuclear deterrent as well as conventional options to combatant commanders around the world, including a continual presence on Guam through periodic rotations of expeditionary squadrons.

They overcome factors such as extremes of weather, mechanical issues with their platforms, and a demanding and unforgiving inspection regime.

“Despite all of those things, they have shown remarkable resilience,” said Brig. Gen. Scott A. Vander Hamm, 509th BW commander, of his airmen. “I am really proud of their performance

under significant stress, both in the nuclear [area], where perfection is the standard, and in conventional ops, where we are putting airframes and aircrews into harm’s way.”

Dawkins praised his airmen’s “ability to get the job done no matter what the conditions—whether that is a typical Minot winter or a natural disaster” such as the devastating flooding of the Souris River in North Dakota in summer 2011. That flood displaced hundreds of Minot airmen and their families from off-base homes, with full recovery not expected for several years.

Yet, the 5th BW suffered only “minimal” impact to its operations, said Dawkins. “We were at all times able to execute. In other words if the President called, we were able to generate the combat power necessary. That was never in doubt.”

What is still up in the air is what this bomber force will look like by the end of the decade. It’s going to become smaller as the United States reconfigures its nuclear force posture to meet its commitments under the New START agreement with Russia.

As part of these changes, the nation will significantly draw down the number of B-52s capable of both nuclear and conventional missions. The exact details, including the makeup of the two B-52 wings after the reductions, were still unclear as of late 2011.

Beyond a Global Deterrence Force

Dual-role bomber operations have evolved as USAF passed through the initial stage of reinvigorating its nuclear operations to the point of reaching today’s steady state.

Gone is the construct called Global Deterrence Force that the Air Force leadership created at the start of the nuclear reinvigoration. GDF imposed a more rigid schedule for when each of the two B-52 wings—Minot’s 5th BW and the 2nd BW at Barksdale AFB, La.—would concentrate on nuclear training and when each would focus on the conventional side.

“It was a pretty solid piece of thinking when it first set out and when the nuclear bomber force at that time was part of Air Combat Command,” explained Col. Robert F. Gass, 8th Air Force vice commander. The numbered air force, which oversees the nuclear-capable bombers, is headquartered at Barksdale. He added, “I think it was an effort to provide rhythm for a real focus on nuclear operations.”



A B-2 moves into fueling position under a KC-135. Maintainers say the stealthy bomber is complicated, but brings much to the fight.

USAF photo by SSgt. Jeremy M. Wilson

Not as much changed at the time for the 509th BW, as the B-2s continued to have concurrent conventional and nuclear taskings due to that fleet's limited size.

Over time, however, the B-52 wings found the GDF construct to be too constraining and realized that they possessed the flexibility to train and prepare for both missions without losing any focus on their nuclear deterrent responsibilities.

"We realized we can do more stuff. We can do both missions. We can do the nuclear mission; we can do the conventional missions," said VanBemelen. "We didn't realize that at the very beginning, but as we developed from that GDF construct to where we are today, we do realize that."

Additional factors made the move away from GDF possible. The USAF leadership created Global Strike Command to provide focus on the service's nuclear enterprise. Eighth Air Force shed its nonbomber assets to concentrate on the dual-role bombers. Further, a rigorous inspection regime emerged to ensure that the nuclear deterrence mission remained top priority throughout the dual-role bombers wings and the Air Force's ICBM forces.

Around the same time, combatant commanders expressed a growing desire for the bombers for use in conventional missions, and the fourth B-52 opera-

USAF photo by SSgt. Jennifer L. Flores



A B-52 takes off from Minot Air Force Base. The 50-year-old bombers are rugged and dependable, but face some vexing supply chain and corrosion issues.

tional squadron, Minot's 69th Bomb Squadron, came into being.

"The determination was made that it may even be more difficult to try to do this GDF piece, more difficult than it is to try to do both missions any time, any place," said Dawkins.

As a result, bomber operations "have successfully evolved from that initial position in the Global Deterrence Force into a more flexible and sustainable construct that we are working with today," said Gass. "I think we have a good plan, a good set of oversight, and great performance from the wings that allow us the confidence, backed up by a top inspection regime, that we are able to perform both missions to a no-fail standard."

At any given time, Whiteman has about 15 of the 20 B-2s in the fleet on hand. Three B-2s are usually cycling through depot, plus one aircraft is stationed at Edwards AFB, Calif., for testing.

Right now, there is a fourth B-2 in depot, an aircraft seriously damaged in an engine fire on Guam in February 2010. Vander Hamm, the 509th BW commander, said he does not expect that aircraft back until 2013.

US Strategic Command's recent Global Thunder nuclear deterrence exercise spotlighted the B-2's fleet capability, according to wing officials. During the October drill, "a fair number" of B-2s—they wouldn't be more specific, but suffice to say a large number by B-2



SSgt. Jon Alместica watches a B-52 being carefully lifted off the ground at Minot. The aircraft's struts and seals were replaced during routine maintenance.

standards—took off from the base in a drill that followed the same procedures as an actual nuclear mission.

"This was the single-best generation that I have seen in my Air Force career," said Kmon, who oversees the B-2 maintenance group. "We blew this one out of the water."

He said his maintainers had the B-2s "cocked on," meaning loaded with weapons and ready to go, in less than half the allotted time. "I couldn't have been prouder of my guys and the capability of the jet," he said.

Despite the wing coming together for such impressive displays, aircraft availability remains the wing's Achilles' heel, said Kmon. This is exacerbated by the transition from contractor logistics support to a government-run supply chain.

The B-2's current supply system "is not responsive enough," he said. "The vendors are not customer-service-oriented enough, and the models that we use to predict what we are going to need are outdated." The situation is not getting better, he noted.

When an aircraft goes down for lack of spare parts, "I am, no kidding, losing combat capability, but more importantly, right now in a peacetime environment at Whiteman, I am losing that ability to train aviators," said Kmon.

"When you miss a flight, ... that rolls the entire schedule" for aircrew training, noted Lt. Col. Eric R. Lapine, director of operations for Whiteman's 13th Bomb Squadron.

The Air Force has set a mission-capable-rate standard of 57.9 percent

for the B-2 fleet, meaning at any time, seven or eight of Whiteman's stealth bombers should be ready and available for operations. Meeting that target is difficult.

Vander Hamm said there is "a lot of heat and light" on that issue right now at the general officer level to yield improvements. "That resource-requirements mismatch ... is real frustrating to my maintenance and my ops," he said.

To mitigate the impact, the wing has revamped its flying-hour program, said Vander Hamm. Instead of trying to launch four "front line" aircraft a day, with one spare aircraft, the wing now targets three with two spares. "That is actually the same number of aircraft, but it gives us more stability in the schedule," he said.

Vander Hamm said the B-2 continues to be an extremely high-demand asset. Day-to-day requirements from the combatant commanders "far outstretch my capability to meet all of those requirements," he said. In fact, the combatant commanders have some 44 to 48 aircraft worth of requirements, exceeding his available B-2s by roughly four times, he said.

Venerable as Always

The B-52 force is based at Minot and Barksdale Air Force Bases. The Air Force established the 69th BS at Minot in September 2009. It became capable of full operations last May, and its members already have one conventional deployment to Guam under their belt.

Minot has 28 B-52s. Both the 23rd BS and 69th BS have 11 primary aircraft

and two backups. There is also one B-52 that the wing uses as a ground trainer and one aircraft in attrition reserve. Barksdale has similar numbers.

"We are getting used to having two squadrons here on base," said Dawkins, the 5th BW commander. "I am very optimistic about what the future holds for the B-52 force at Barksdale and up here. ... Every day we get better."

The wing is building up its maintenance force to handle the extra aircraft that the standup of the 69th BS brought. The base still needs additional infrastructure, too, to carry out its maintenance tasks effectively.

"We are making do with what we have," said Lt. Col. Patrick S. Ballard, deputy commander of the 5th Maintenance Group. "One of the leadership challenges here is to keep our airmen motivated while we are working through these infrastructure issues."

The B-52 is a "very tough, very durable" platform, said CMSgt. Douglas W. Brackett, superintendent of the 5th Maintenance Squadron. Dealing with fuselage corrosion, in areas such as longerons, demands attention, he said. The B-52H fleet probably averages about 20,000 flight hours per airframe.

"It's a badge of honor, really, to be able to maintain and keep a 50-year-old combat aircraft relevant," said Ballard.

Minot's B-52s currently are mission capable at a rate that hovers around the Air Force's 74 percent standard. Traditionally the 5th BW's MC rate has been higher, "but with growth comes pain," said Brackett, referencing the wing's expansion.

Fostering a cadre of experienced B-52 crew chiefs—giving these maintainers time to develop, while minimizing the impact on unit readiness—is one area of special emphasis for the wing.

"We received the aircraft and the pilots before we received the maintainers," said Brackett of the establishment of the 69th BS. "We are still playing catch-up. But we are healthy now compared to where we have been."

He said since "there is nowhere to draw B-52 personnel from," the wing has been taking on crew chief transfers from the mobility and fighter force.

The wing has changed its approach when it sends bombers out to Guam on conventional rotations by purposely sending its younger maintainers to give them that training opportunity and experience, said Brackett.

The Air Force is also considering a plan to lock airmen in the crew chief

career field in the B-52 until they reach the rank of technical sergeant, usually about a 12-year process, in order to bolster those ranks and experience level.

"We will have experienced people who have dealt with nuclear weapons for a long period of time," said Brackett. "That is probably the biggest thing that is going to help us."

Continuous Bomber Presence

The Air Force has maintained a continuous bomber presence, or CBP, at Andersen AFB, Guam, since 2004 to provide stability in the Pacific region. The bombers have added to the quiver of conventional options available to the US Pacific Command commander to dissuade would-be aggressors.

Originally, the B-1B, B-2, and B-52 wings took turns deploying expeditionary squadrons of several aircraft and an airmen contingent to the strategic air hub for stints of several months at a time.

While there, the bombers fly long-duration sorties over the vast expanse of the Pacific Ocean, have access to training ranges in places like Australia and off of Hawaii, and train with sister services and allies.

"We get some great training when we go out there," said Dawkins.

Those deployments also get aircrews "familiar with the area where they potentially could be deploying and operating" in real-world situations, said Lapine, who oversees operations of Whiteman's 13th BS. Airmen coming out of those rotations form "an extremely tight-knit" unit "ready for combat," he said.

B-1s have been out of the rotation for several years since they have constantly been rotating to Southwest Asia to support operations in Afghanistan and Iraq.

That left the B-2s and B-52s. For a while, B-2s deployed to Guam every third rotation under CBP, but more recently, the B-52s have carried the load.

More changes are coming. The CBP rotations will now occur every six months and each B-52 wing will be responsible for them for one year at a time, meaning it will dispatch two expeditionary squadrons over that span, said 8th Air Force's Gass.

"We are in the process now of going through a transition phase to align," he said. "[In] April, we will be on a yearly rotational basis."

Minot's 23rd BS sent an expeditionary contingent of airmen and B-52s to Guam in December, relieving the 20th



Photo by Bobbi Garcia

A B-2 flies to the Utah Test Range. At any given time, Whiteman AFB, Mo., has about 15 bombers in the fleet on hand.

Expeditionary Bomb Squadron from Barksdale. It will remain there until April when the six-month rotations will start, said Dawkins.

As for the B-2's future role in CBP, it "will continue to be a player in the deployments ... but on a more episodic basis," said Gass.

"We will probably be used more sparingly and in times when we want to do high strategic signaling. When we send a B-2, it might be to support some other theaterwide objective," said Vander Hamm of the 509th BW.

Beyond the rotations, the training that the expeditionary bomber units undertake on the island has morphed to include more nuclear-applicable drills, although the preponderance of activity is still on the conventional side.

"While they are on the island, ... they also pursue a baseline of nuclear training which provides them the ability to redeploy back from Guam to garrison and requires a minimum amount of spin-up and training to reassume their nuclear duties," said Gass.

"We see that we can do those items even while deployed and not impact the conventional tasking that we were sent out there to do," said VanBemmelen. "We are evolving as we go."

Smaller, but More Important

More changes lie ahead for the nuclear-capable bomber force. It's going to become much smaller.

By February 2018, the United States must convert at least 36 of its 76 B-52s to conventional-only roles to conform to the Obama Administration's posture for US strategic nuclear forces

and meet the caps on launchers (i.e., heavy bombers and long-range ballistic missiles) imposed by the New START agreement with Russia.

That means a reduction of more than one-third of the dual-role bomber force, which likely will touch both B-52 wings, based on what Air Force officials have said publicly.

Senior Air Force officials have maintained that the bomber leg of the US triad will remain just as important, if not more so, to national security at those lower numbers. In fact, the bombers may play a larger role in extending the nation's protective nuclear umbrella to US friends and allies as the nuclear arsenal shrinks, they say.

"We see the bomber as important not just to central deterrence but, even more important, to extending and projecting power, both conventional and nuclear," said Maj. Gen. William A. Chambers, assistant chief of staff for strategic deterrence and nuclear integration, during a speech on Capitol Hill in late October.

"As we move to meet the new numbers, not only of weapons, but of delivery vehicles, your nuclear deterrent still underpins everything we do on a national security stage," said Vander Hamm. "Our conventional forces would be nothing if we didn't have the backup of the big club of the nuclear deterrent."

The bombers, he said, bring unique attributes to the nuclear deterrent, including the ability to signal intent to would-be foes. "Generations do mean something," he said. "No other part of the triad gives you that capability to signal and to recall should you need to." ■

Rescue in Space

The first AEHF satellite looked like a goner, but the Air Force's unusual recovery effort pulled it back from the dead.

By Robert S. Dudley

The US soon will begin heavy usage of a first-of-its-kind Air Force spacecraft stationed 22,300 miles above Earth. The Advanced Extremely High Frequency satellite will link the President, commanders, and US forces the world over. It's built to work even in a nuclear war.

This step forward almost did not happen.

Space Vehicle 1, launched Aug. 14, 2010, suffered many serious setbacks. The \$2 billion spacecraft's main propulsion subsystem failed, it could have exploded, and it faced lethal space debris and radiation. The giant communications satellite could have died a quick death, but it didn't.

Instead, SV-1 was the beneficiary of a remarkable 14-month rescue effort. Last Oct. 24, against very long odds, SV-1 finally eased safely into its assigned orbit. The Air Force expects it to enter full operational service in March.

With the satellite safely in its proper orbit, Air Force Space Command officers have begun talking fairly openly about the rescue mission. It is an unusual tale.

The AEHF program, one of the largest space programs of the decade, is designed to augment and eventually replace the legacy Milstar satellite communications network. Lockheed Martin is the prime contractor, Northrop Grumman built the payload, and everything is run by Space and Missile Systems Center at Los Angeles AFB, Calif. The constellation of four cross-linked AEHF satellites is expected to provide a communications

United Launch Alliance photo



The first Advanced Extremely High Frequency satellite is readied for launch aboard an Atlas V.

capacity exceeding that of Milstar by a factor of 10.

However, the AEHF program fell behind schedule. A planned 2008 first launch was delayed by two years. For that reason, more than the usual anxiety attended its Aug. 14, 2010, blastoff.

A giant Atlas V rocket flawlessly lifted SV-1 from Cape Canaveral's Complex 41. Once in space, the booster and spacecraft separated exactly as planned. The 13,420-pound SV-1 went into a highly elliptical orbit, meaning its altitude varied greatly from apogee (the point farthest from Earth) to perigee (the one closest to Earth). In fact, the satellite swung from 31,000 miles above Earth at apogee to 143 miles above Earth at perigee.

No one intended SV-1 to stay on that unstable path. USAF planned to use three AEHF satellite propulsion systems to drive the perigee up and apogee down, in time creating a circular geosynchronous Earth orbit. SV-1 was to wind up 22,300 miles above the equator, hovering almost directly over the Galapagos Islands.

It was at this stage—the start of the satellite “transfer” from HEO to GEO—that things went haywire.

The mission profile called for operators to fire the AEHF satellite's hydrazine-fueled liquid apogee engine (LAE) several times. The thrust was supposed to raise SV-1's perigee to 11,800 miles in a short period. Smaller engines would then take over and continue the orbit circularization.

Alarm Bells

However, disaster loomed on Aug. 15. USAF controllers and their contractor partners ignited the LAE and, after several seconds, the hydrazine engine failed. The AEHF satellite had detected a problem and shut the LAE down.

Operators were puzzled but not yet alarmed. Two days later, on Aug. 17, they gave it another go. In a few seconds, the LAE shut down again, this time with ominous signs of overheating.

Col. Michael L. Lakos, the MILSATCOM command lead at AFSPC, recalled thinking that it was “an Apollo 13 moment.” The words that came to mind were, “Los Angeles, we have a problem.” The space vehicle had no readily apparent way to reach its orbit.

Alarm bells went off all over Space Command. The burden of response fell on David W. Madden, the chief of SMC's

MILSATCOM Systems Directorate and a recently retired Air Force colonel. His initial reaction was “that we'd lost the mission.” At the time, he added, “there was huge uncertainty.”

On Aug. 17, Madden moved to assemble four teams of handpicked experts. The first question to answer: What had happened to the LAE? Madden's engineers rapidly worked through the telemetry and modelled the problem. They concluded—correctly—that the LAE had suffered a propellant-line blockage. Worse, they said, another firing could cause an explosion.

“They probably saved the satellite,” said Madden of USAF's decision not to attempt a third firing. “We could have had combustion outside of the engine, which could have either totally damaged our payload or caused catastrophic damage to the vehicle.”

“We're very, very fortunate that satellite didn't blow up,” said Gen. William L. Shelton, AFSPC commander.

Thus warned, USAF sealed off the AEHF satellite's oxidizer tanks, rendering the LAE safe but unusable. Madden's experts then set to work on a makeshift strategy to raise SV-1's orbit. They pro-

Fig. 1: Phases of the AEHF's Recovery

Phase	Operation	Perigee	Apogee	Completed
0	Space injection	140 mi	31,000 mi	Aug. 14, 2010
1 & 2	REA burns	3,000 mi	31,000 mi	Sept. 22, 2010
3	HCT burns 1	17,000 mi	32,000 mi	June 2, 2011
4	HCT burns 2	22,300 mi	22,300 mi	Oct. 24, 2011

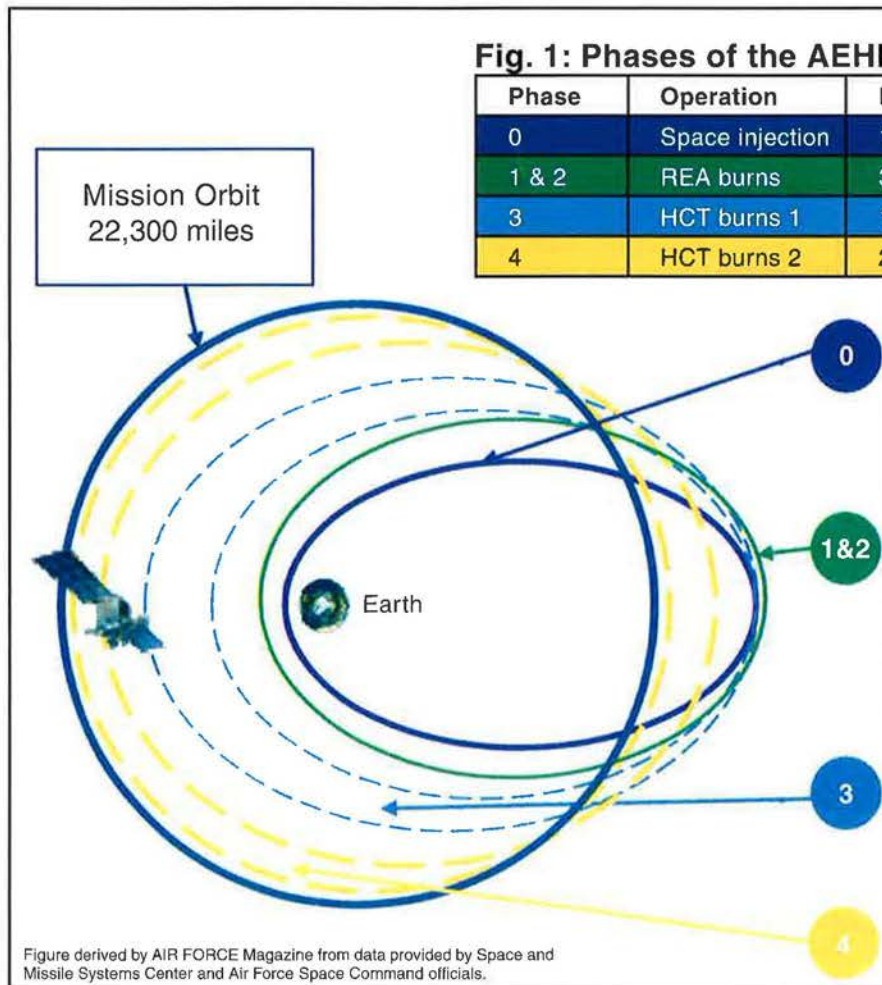


Figure derived by AIR FORCE Magazine from data provided by Space and Missile Systems Center and Air Force Space Command officials.

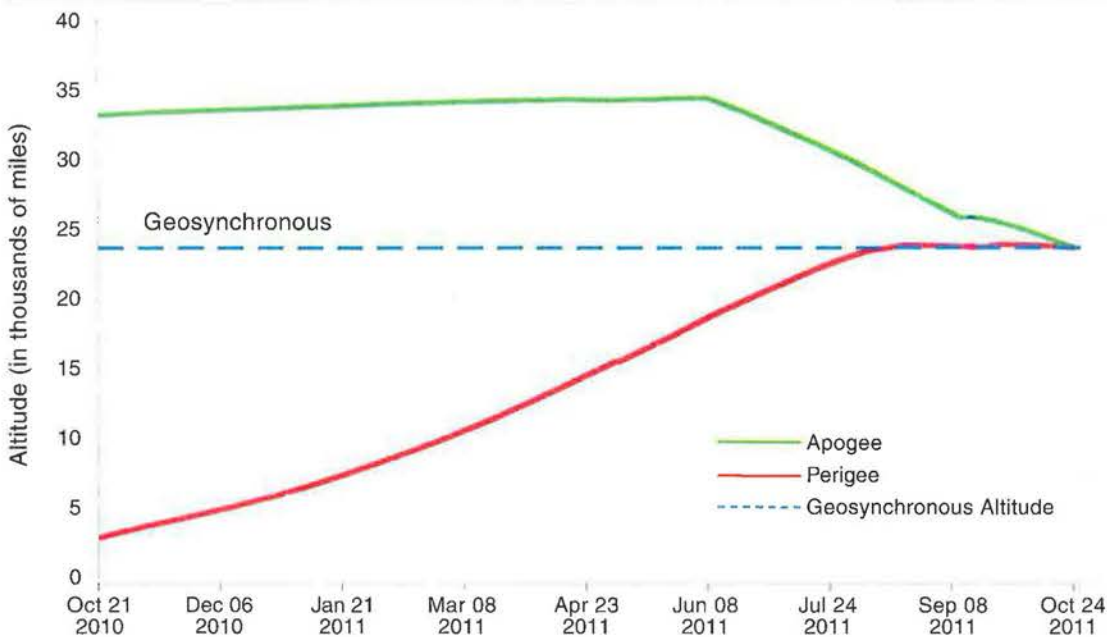
posed to use the AEHF satellite's two remaining propulsion systems, though in ways no one ever had tried.

As the project got under way, team members were told—politely, but firmly—they were to stay put and continue the work until they sorted out the critical issues and developed a get-well plan. “We literally were shoving pizza under the door so that these guys could keep working,” said Madden.

The pivotal show-and-tell moment came on Saturday, Aug. 21—a mere one week after launch and four days after the last LAE burn. Lt. Gen. John T. Sheridan, then SMC commander, held a meeting in Los Angeles, assembling senior experts from the contractors, program office, and AFSPC. Madden presented a notional plan, based on four distinct phases of action (see Fig. 1).

The stars of the plan would be SV-1's two smaller engine types—hydrazine-

Fig. 2: Closing In on Final Orbit



fueled reaction engine assemblies (REAs) and tiny xenon-fueled Hall Current Thrusters (HCTs) of about 0.05 pounds of thrust.

In a vote of confidence, Sheridan gave a go-ahead, stepped back, and let his experts work the problem.

“The trust was significant,” Madden said. “They gave us a lot of rope. Early on, that rope was critical. ... We were encountering problems [in] real time. We weren’t having to report on the crisis of the hour.”

“It was not a ‘mother, may I’ thing,” Lakos added. “It was basically an Air Force Space Command thing. It was, ‘Let’s go off and do this.’ We didn’t want to study something to death.”

Phase 1 began right away and lasted only a few days. In it, Madden’s team sought to quickly blunt the two most immediate dangers to the spacecraft. One was Earth’s gravitational pull. The second was orbital debris.

“The way this thing was put into its initial orbit, it was very low—a roughly 140-mile entry point,” said Madden. The drag exerted by gravity caused the satellite to lose more than three miles of altitude every day.

Equally worrisome was the prevalence of space debris at that orbital altitude. “That’s a pretty nasty area,” noted Madden. On several occasions, in fact, controllers had to maneuver SV-1 to avoid a collision with speeding space junk. This burned up valuable—and limited—fuel.

To get the satellite out of this danger zone, Air Force controllers on Aug. 29 began firing the spacecraft’s REA thrusters. These motors had been designed to

help stabilize the AEHF satellite, not propel it.

By early September, ground controllers had conducted four burns and the perigee had risen to some 600 miles above Earth. It was the end of Phase 1.

Phase 2 was essentially an extension of Phase 1, after a brief pause to assess results. USAF ground controllers continued to use the hydrazine-based REA thrusters to move the satellite. The goal was to raise the perigee from 600 miles to about 3,000 miles. That would prevent orbital decay, among other things.

Unusual Burns

New problems emerged. For one thing, the REA system was never expected to burn for hours at a time. During this time, SV-1 was held in fixed position, such that it was exposed to significant solar heating and potential damage.

In response, the team devised a technique that allowed ground controllers to occasionally flip over the spacecraft, thus giving exposed panels an opportunity to cool. Madden’s experts had to devise a whole strategy to carry out this maneuver while keeping the spacecraft on course.

The biggest problem of all: fuel usage. To minimize it, engineers had to write and upload new flight software to enable the plan to work and to save every ounce of fuel. This allowed the REA thrusters to be used in new, more efficient ways and allowed controllers to properly position the satellite using its onboard reaction wheels instead of fuel.

“We had to do the calculation to make sure that each time we burned, we knew

exactly where we were going to end up,” Madden said. “It’s kind of like in ‘Star Wars’—if you’re going to jump to light speed, you had better know what’s in your way.”

During all of this, Air Force Space Command’s 50th Space Wing worked the orbital aspects of these unusual burns. “It was almost like you’re doing a launch,” said Madden. “We had to do the orbital aspects every time we did a burn plan—every day, for a month. All of this was extra work, just absorbed by the 50th Space Wing guys,” even as they handled regular Milstar operations. In addition, 14th Air Force personnel handled the mission’s collision avoidance work, all of which was unplanned and taken up on an emergency basis.

In Phase 2, the daily burns of the thrusters tapped into the store of hydrazine once reserved for the LAE. The Madden team had calculated how much hydrazine could be used to try to get up to 3,000 miles at perigee, and still leave enough to do the mission once the satellite reached GEO—if it did.

On Sept. 22, 2010, the spacecraft reached a perigee of more than 2,900 miles. “That was the optimum place to stop [the firing of the REA thrusters] and our use of that fuel,” said Madden. The team had reached the end of Phase 2.

Phase 3 turned out to be by far the longest and perhaps most innovative part of the AEHF satellite rescue. It began in October 2010 and did not end until June 2, 2011. Those eight months saw the beleaguered satellite get far along in its trek to GEO.

Propulsion now was provided by the spacecraft's exotic Hall Current Thrusters, small motors that use electricity and xenon gas as propellant. The thrust of an HCT is far less than that of chemical-fueled power plants—it puts out small puffs of power—but a thruster can fire for thousands of hours.

The HCTs were designed mostly for station-keeping, so the Madden team would use them in an untested way. "The HCTs, at this power level, ... it's the first time that they have been flown in space," said Madden.

Moreover, the spacecraft was much heavier than it should have been at that point. Because the LAE had been shut down, most of the system's oxidizer—about 1,000 pounds' worth—remained in the sealed tanks.

A new danger arose. The AEHF satellite was now in the Van Allen Belts of radiation, a zone of energetic charged particles held in place by the Earth's magnetic field. These particles can damage a satellite, which must shield its sensitive components if it spends much time there.

The AEHF satellite needed to extend its solar-panel "wings," which until now had remained stowed against the side of the satellite. HCTs run on electricity produced from sunlight collected by the solar wings. However, they are sensitive to radiation.

The AEHF satellite's power-generating solar wings were unfurled and HCTs were deployed. "Every hour we were in that environment," recalled Madden, "we were beating up our solar panel, which would harm our ability to get power once we got to our final geosynchronous location. We did not want our solar panels to degrade." After much deliberation, the team came up with a burn strategy that got the satellite rapidly out of the Van Allen zone so that it could operate for longer periods.

From late October 2010 to June 2011, the HCTs burned for 10 to 12 hours per day. The motors were optimized to fire at the apogee of the AEHF satellite's orbit, so as to drive up the perigee. By last summer, nearly continuous firings were taking place. The HCTs had never been used in such a fashion in zero gravity conditions. The team began to see some features they had never seen before. For instance, they needed a warm-up period to operate at maximum efficiency.

"It seemed like every month or two, we thought we had the equation down for how to do it, and all of a sudden we'd see another hiccup," said Madden. "We'd get a fluctuation." He continued, "They're like a finicky old car, one that you've got to

constantly adjust to get it to optimize. There's no instruction manual for how to do that. It's basically an art."

That was a big challenge for the engineers. As the system got older, it exhibited unexpected variation. The team thus had no choice but to collect data, review operations on a regular basis, and make adjustments on the fly. Complicating the operation was another computational task. The HCTs had not only to drive the perigee up; by this time, they were also needed to make major changes in the inclination of the satellite's orbit. This was a complex task.

As Madden put it, "We had to get the inclination down, because that enables us to 'see' more of the Earth. The higher the inclination, the smaller the amount of the Earth that can talk to your spacecraft. That's really where most of the energy was used, trying to drive down that inclination."

In Phase 3, ground controllers conducted burns only at the apogee of the AEHF satellite's flight. The HCTs had been able to raise the low point of the orbit from 3,000 miles to more than 17,000 miles. The phase ended on June 2, 2011.

The Circle Was Formed

The last part of the rescue—Phase 4—saw USAF take steps to change not only the AEHF satellite's perigee but also its apogee. The latter was 32,145 miles above Earth, which was far too high. It had to be reduced by a whopping 10,000 miles.

At the same time, the perigee had to go up from 17,000 miles to about 22,000 miles. Finally, the satellite's inclination had to be driven down closer to alignment with the equator.

The HCTs again were firing for long periods every day. The forces they produced induced a convergence of the apogee and perigee altitudes (see Fig. 2). These maneuvers had many complex orbital aspects. Madden said the shifts were timed to optimize beneficial effects of Earth's gravitational pull, thereby conserving valuable fuel.

The AEHF satellite's perigee finally reached its required altitude of 22,300 miles in early August. The declining apogee reached proper altitude Oct. 24. The circle was formed.

The sophisticated recovery campaign, entailing about 500 propulsion burns, was over.



Illustration by Eric Simonsen

An artist's conception of the AEHF satellite in orbit.

When the spacecraft reached its orbit slot, USAF deployed the payload. It had been stowed to allow it to fit within the nosecone of the Atlas rocket. A long checkout of the antennas and other mission-critical equipment then commenced. Plans call for this checkout to take about three and a half months, after which SMC will turn over control to 50th Space Wing.

Madden said, as a result of the careful efforts to husband SV-1's hydrazine and xenon fuel during the orbit-raising phases, there will be no reduction in its planned 14-year life.

Moreover, the Madden team learned quite a few tricks along the way. "When we hand it over to the operator, we will show him how to use the system efficiently to make sure he gets at least 14 years of life."

Early in the rescue drama, Air Force leaders decided to postpone the launch of follow-on AEHF satellites. They wanted to have a chance to check out SV-1 before proceeding. Barring the discovery of more problems, the Air Force will launch SV-2 in late April.

"I'm feeling very good with the fuel that we have on board the vehicle," said Madden.

"All of the telemetry we're getting on the vehicle says we didn't violate any parameters. Our solar panels are doing great. We didn't do any damage that would hurt us in full operation. We've got a full mission life planned for this vehicle." ■

Robert S. Dudley is a former editor in chief of Air Force Magazine (2002-2010). His most recent piece was in "Airmen on 9/11" in the September issue.

An Air Force War on Sexual Assault

By Anna Mulrine

USAF is stepping up its prevention efforts after finding nearly one in five female airmen has been sexually assaulted since joining the service.

It was in 2006, after eight years in the US Air Force, that SSgt. Marti Ribeiro was raped by a fellow airman while on guard duty in Afghanistan.

She didn't report the assault immediately. Rather, she waited until the end of her shift, and in the meantime, did what she thought she should do.

"I didn't take a shower; I didn't wash my hands," Ribeiro remembers. "I'd watched 'Law and Order' and thought to myself, 'I'm going to do exactly what [lead character] Detective Benson says, ... so they can swab and do the rape kit.'"

That's not what happened, however.

After her guard shift, Ribeiro searched for the Air Force's sexual assault response coordinator (SARC) at Bagram Airfield, Afghanistan, where the assault took place just 10 feet from the guard station, and not much farther from Disney Drive—the main road running through the heart of the base.

The SARC sat her down in the middle of a room with other people and asked her what happened. After Ribeiro finished sharing her story, "her first question was, 'Where was your weapon?'"—implying, it seemed to Ribeiro, she should have been able to defend herself. She had left it in the guard post, along with her radio, when she went to have a cigarette break on a smoke deck a few feet away.

"Because I'd left my weapon in the guard shack, she told me I would be charged with dereliction of duty," Ribeiro recalls. "She told me to 'think about it.'" Ribeiro did. She returned to her base housing, showered, and did not

speak about the attack to another soul for six months.

Scenarios such as Ribeiro's are the ones the Air Force seeks to prevent as it moves to launch programs addressing not only root causes of sexual violence, but also leading to a more widespread awareness within the force of the crime itself.

In a push to more honestly address sexual crimes within the military, the Air Force in March 2011 released a groundbreaking survey, revealing that nearly one in five service women say they have been sexually assaulted since joining the service. The military definition of sexual assault includes a range of behaviors, among them sexual contact without consent.

Of the 18.9 percent of female airmen who reported being assaulted, 58 percent said they had been raped and 20 percent said they had been sodomized, which the military defines as nonconsensual oral or anal sex. Two percent of men surveyed reported having been sexually assaulted since joining the military.

Studying the Problem

While the data suggest the sexual assault rate in the Air Force is roughly equal to what it is in the broader civilian population, the survey also points to unique challenges presented by the military's culture. The vast majority of crimes identified in the survey are com-

mitted by male airmen on female airmen, and nearly half of rape victims said they did not report the crime because they "did not want to cause trouble in [their] unit."

The Pentagon has long wrestled with sexual assault in its ranks and at the military academies. Yet it had no clear picture of the pervasiveness of the crime.

Defense officials routinely release figures showing the annual rate of official sexual assault reports. When those figures go up—as they did between 2009 and 2010 when there was an 11 percent spike in reports—officials are often quick to respond that those figures don't necessarily represent an increase in incidents. It may simply mean, for example, victims feel more comfortable reporting them.

The Air Force survey, to which 18,834 male and female airmen responded between July and August 2010, had a response rate of nearly 19 percent and is expected to serve as a new baseline for tracking the crime. The survey, conducted by Gallup, will likely be repeated every 18 to 24 months, said Charlene M. Bradley, the Air Force's assistant deputy for force management integration.

It is one of the most comprehensive studies ever undertaken of sexual assault within the Department of Defense, and could ultimately become a model for how the military as a whole begins to address the problem, Pentagon officials say. "If we're ever going to get to the point where

In the vast majority of the assaults against women—more than 80 percent—the perpetrators are fellow service members.

we know how much progress we're making or not making, our leadership has to find out the extent of the problem," said Bradley.

Air Force leadership for its part was "very concerned" when they reviewed the survey's findings, she added. "They were concerned before, but they were very concerned when they saw this." Along with the troubling knowledge that sexual assault is pervasive in the ranks, defense officials were particularly concerned that in the vast majority of the assaults against women—more than 80 percent—the perpetrators are fellow service members.

Top Air Force officials openly acknowledge the need for change. "This crime threatens our people, and for that reason alone it is intolerable and incompatible with who and what we are," said Air Force Chief of Staff Gen. Norton A. Schwartz. The results have also prompted the formation of an Air Force task force, launched early last year.

Officials acknowledge they had some reservations about embarking on the survey, largely because of what they might discover. "You want to know what's wrong," Bradley observed. "But it's hard to know what's wrong."

It is important for the military to explore the extent of its own problem, says David Lisak, a clinical psychologist who specializes in sexual assault, from the University of Massachusetts at Boston and consulted by the Gallup poll. "It certainly puts the Air Force in an uncomfortable position, because now they are going to very publicly say, 'Here's the scope of our problem,' and frankly, that takes guts," he said. "There's no longer a way of saying, 'Maybe it's a big problem out there, but I don't think it's as big a problem in the Air Force,'" Lisak added.

"It's sort of a last bastion of denial. The next question is, so what are you going to do about it?"

The survey was designed to help the Air Force evaluate its prevention programs to find out "how much progress we're making or not making," Bradley noted.

Plenty of barriers remain to confronting sexual assault, the survey makes clear. For one, Gallup recommended to the Air Force that it begin to take a closer look at why only a small percentage of victims in the Air Force report the crimes, including less than one in five women and less than one in 15 men.

Though these numbers are similar to the findings of other national studies, some of the reasons why airmen may be reluctant to report the crime are also unique to the military. While the majority

Nearly half of rape victims said they did not report the crime because they "did not want to cause trouble in their unit."

of those who endured unwanted sexual contact said they did not think it was serious enough to report, another trend emerged as well: Nearly 50 percent of women who were raped said they did not want their superiors to know, and an even greater number, 63 percent, said they "did not want their fellow airmen to know." Nearly half said they "did not want to cause trouble in [their] unit." Such barriers to reporting in the military can be "a little harder" to overcome, Bradley said, particularly when the findings are at odds with the way the force is supposed to function. "You come into the Air Force as a family—you take care of one another," she added.

As a result, in the months after the survey's release, Air Force officials have been consolidating recommendations from sexual assault specialists within the military. Bradley said, "We visited different commands and installations to talk to commanders, to find out what from their perspective is working from the field." They have also coordinated with investigators, sexual assault coordinators, and chaplains who focus on spiritual support. "How can we continually keep this as a focus?" Bradley asked.

"Proactive leadership is absolutely the key to attacking this."

At the grassroots level, the Air Force is also concentrating its efforts on a large-scale bystander training program.

Better Training

The findings suggest that many people who are assaulted do tell a friend or fellow airman, whether they officially report the crime or not. "Every airman has the moral obligation and professional duty to intervene appropriately and prevent an assault, even when it means taking difficult or unpopular actions," said Schwartz and Secretary of the Air Force Michael B. Donley in a statement.

USAF needs to examine its training—and try to change attitudes and behaviors, Bradley said. This includes "training everyone to recognize behaviors

that are inappropriate and how to act in those situations—how to do it smartly and appropriately."

The Air Force has full-time, trained sexual assault response coordinators at every installation. Most are GS-12-level hires, but more than 30 are military positions the Air Force is keeping filled for deployment capability, said Bradley. "A lot of those folks are in overseas areas."

Some of the changes are simply logical, said Bradley. Though she argues the majority of sexual assaults in the Air Force appear to happen in the continental United States, not when troops are deployed, senior officials are in the process of speaking to commanders about areas around latrines and showers—to make sure they have enough lighting. Commanders are also being asked to reinforce concepts such as the buddy system.

The Air Force is also focusing on better training for military lawyers, who in many cases have little experience prosecuting such cases. This stands in contrast to the specialized civilian sexual-assault defense lawyers many accused perpetrators hire, says Lisak, who helps to train military lawyers. "All of us who work with the military in this respect, we see [young military] lawyers taking on these cases, and frankly it always seems to me very unfair that very young, relatively inexperienced lawyers are having to go into courtrooms and prosecute cases that are very, very complicated and require a lot of specialized knowledge," he observed.

Pentagon officials agree, and as a result USAF has begun to send its judge advocate general corps to receive additional training through the US Department of Justice, said James W. Russell III, associate chief of the Air Force's Military Justice Division. Here, they receive instruction in prosecuting sexual assault. "We do lawyer-specific training in terms of litigation techniques of addressing special issues—like alcohol issues in sexual assaults," he added.

Such training may be particularly necessary, say victim's rights advocates,

Some of the reasons airmen may be reluctant to report the crime are unique to the military.

“Never ask a victim ‘Where is your gun?’ It’s irrelevant. That person just got assaulted, and you’re not responding to what that victim needs.”

in light of findings that among those few troops who do report sexual offenses, even fewer see their attacker face justice—a fact that has come to the attention of some lawmakers on Capitol Hill. US Representatives Nicola S. Tsongas (D-Mass.) and Michael R. Turner (R-Ohio) have proposed legislation to address the crime and to encourage more victims to come forward. While 40 percent of civilian allegations are prosecuted, “this number is a staggeringly low eight percent in the military,” they said in a joint statement. A bill aimed at protecting US troops who have experienced sexual assault ensures that conversations between assaulted service members and victim advocates remain confidential. Currently, those conversations can be subpoenaed.

The bill also calls for more training of SARC and requires them to hold full-time DOD positions, not to be hired as contractors. The legislation would also allow victims of sexual assault to transfer out of their base or unit. DOD has recently implemented a policy to judiciously expedite requests from sexual assault victims to change units.

“It seems really simple, but when you start to get into the reassignments process, it’s not really simple,” Bradley said. “So that’s the kind of collaboration we’re getting together and trying to implement across the services.”

Troops of junior rank today have “few privileges and barely any freedom of movement to flee their perpetrators, to seek help when they need it most, or to leave the units or bases where they are being brutalized,” said Anuradha K. Bhagwati, a former Marine Corps captain and executive director of the Service Women’s Action Network.

Driven by interest on Capitol Hill, the military has begun its own changes to address sexual assault. Victim advocates must now volunteer for the position. Previously, it was an assigned job, sometimes used as extra duty or punishment.

Tsongas said she became particularly interested in the issue of sexual assault in the military during a wounded warriors luncheon on Capitol Hill. “A nurse who had deployed a number of times to Iraq and Afghanistan said she was actually more afraid of our own soldiers than she was of the enemy. As she traveled around

the base, she was always sure of what she had to do to defend herself. She had never been assaulted, but she felt the constant presence of a threat,” Tsongas recalled.

Such stories are not isolated events, she added. “We hear from a variety of sources about the prevalence of it—and the fact that it’s vastly underreported. The victims often feel very much at risk, after the assault, about coming forward. We hear testimony from the services about all of their preventive measures, but despite that, their numbers are very high.”

Such testimony mirrors the experience of many service members, Tsongas noted, including Ribeiro’s. Particularly striking to Ribeiro was the response of the sexual assault response coordinator, which she found to be “cold.” This was especially difficult given the fact that she was deployed.

“When you’re deployed, I don’t know why, it gets a million times worse,” she says. “You get this whole ‘boys will be boys’ mentality, because you are there in a combat zone and serious things like lives are at stake. It seems like sexual assault, it doesn’t really get the attention. If you were going to make a complaint, they’re not going to take you seriously because it’s this idea that ‘we’ve got bigger things to worry about.’”

Paying a Price

Even if she had been advised about a way to report the crime and gather information without going public—as exists in the military—much of the frustration from fellow female airmen Ribeiro has spoken with comes from the fact that they did report it, but nothing happened, she said. There is a “keep it to yourself culture” that continues to exist around sexual assault and the military, Ribeiro says, despite the Air Force’s outreach efforts. In her base housing in Afghanistan in 2006, Ribeiro lived with six other women.

“We talked about everything—absolutely everything. We’d talk about creepy guys, but never about assault. I felt like it was my dirty little secret. If I didn’t verbalize it, if I didn’t tell anyone about it, it would go away.” Ribeiro says that

for that reason, she believes the numbers surrounding sexual assault, particularly when it comes to reporting, “are way off” and quite low.

Bradley said the SARC behaved in a way inappropriate to what Air Force training would direct, in Ribeiro’s case. “I would hope that we would never have an Air Force SARC respond in that way,” she said. “That is certainly contrary to all of the training the SARCs receive.” What’s more, she said, there is now a two- to three-day course specifically focused on SARC duties in a deployed environment, she added. “You would never ask a victim, ‘Where is your gun?’ It’s irrelevant. That person just got assaulted, and you’re not responding to what that victim needs. I would hope that we would never talk to a victim in the middle of a crowded room, either.”

As the Air Force publicly grapples with the problem of sexual assault within its ranks, Bradley has found other services are coming to the Air Force for advice.

“The other services do research. They just do it internally,” she said. “In the other services, there are people just like us who work this program. We do a lot of collaboration. We have given them a copy of the Gallup poll, and they give us from time to time different things that they have done.”

In addition to the harm to the victims of sexual assaults, the military as a whole pays a price for these crimes in losing dedicated and skilled personnel, Pentagon officials acknowledge. Ribeiro was a third generation service member whose grandfather was in the Army Air Corps and whose father had served in the Air Force for 28 years. One heartbreaking aspect of the rape, Ribeiro says, “is that I absolutely loved my job.” She would have been interested in a military career, she adds, were it not for the assault.

As the Secretary of the Air Force receives the recommendations of the task force, “we’re going to have a lot of priorities,” said Bradley, who added that the key is to continue to seek new solutions to sexual assault.

“What I really want to emphasize is that it’s an ongoing thing, especially with the turnover in the military, which is tremendous every year,” she said. “It’s a constant process. We try to go out and say, ‘What’s not working, guys?’ We just have to keep after it. We can’t let it go.” ■

Anna Mulrine, a staff writer for the Christian Science Monitor, reports frequently from Iraq and Afghanistan. Her last article for Air Force Magazine, “Wear and Tear,” appeared in September 2010.

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The Strike Eagle's

**Airmen at Seymour Johnson Air Force Base
keep 96 F-15Es ready for action.**

Photography by Rick Llinares



A four-ship of F-15Es cruises the burning blue on a recent training mission from Seymour Johnson AFB, N.C. They are part of the 333rd Fighter Squadron.

Nest



Based on the F-15C air superiority fighter, the F-15E is a newer, tougher machine, built to withstand the stresses of low-level heavy ordnance delivery. The Strike Eagles are distinguished from their F-15 brethren by conformal fuel tanks and the dark gray paint scheme of a strike fighter, not to mention racks usually full of bombs. Despite their attack emphasis, F-15Es retain all the Eagle's dogfighting power. **111** Like many USAF aircraft, this F-15E sports the "Let's Roll" insignia honoring passengers aboard Flight 93, who on 9/11, fought the terrorist hijackers and prevented their airliner from being used as a missile. **121** The life support shop keeps aircrew flight gear—helmets, hoses, oxygen bottles, parachutes—in good working order. Working here are SrA. Kevin Boyne (background) and SSgt. Jonathan Rivera (foreground).



131 Capt. Drew Bures (l) and 1st Lt. Mark Russell preflight their Strike Eagle. **141** Seymour Johnson's F-15Es have the luxury of tankers located at their base. Here, an F-15E tops off from a KC-135 of the 916th Air Refueling Wing.



11 A landing F-15E deploys its huge dorsal airbrake, known as the "board," to slow its speed and rollout. The pilot will also hold the nose up to slow the big jet aircraft down. **12** A1C Kelsey Brown disconnects a grounding wire on an F-15E. **13** Afterburners lit, an F-15E prepares to blast off on a training flight, carrying LANTIRN pods and a Sidewinder air-to-air missile. **14** A 333rd Strike Eagle pulls up to a tanker.

Visible under its air intakes are LANTIRN pods used for navigation and targeting. The LANTIRN system, which saw its first combat use in the 1991 Gulf War, is gradually being replaced by Litening and Sniper targeting pods. Typical for such photos, the combat systems officer in the back seat affects a relaxed pose. **15** In a classic shot, a pair of F-15Es shows off the type's large fuel tanks.

111 Capt. Sriram Krishnan (l) checks in at the 333rd FS ops desk. Running the show (left to right) are Lt. Col. Thomas Hazlebeck, SrA. Cassandra Guzman, and SrA. Kristina Hood. Seymour Johnson is home to four Strike Eagle squadrons. The 333rd and 334th are training units, while the 335th and 336th are operational. There are also two support squadrons. 121 A 335th FS Strike Eagle prepares to taxi out from a weather shelter adjacent to the ramp. Such shelters can make a huge difference for maintainers working on aircraft in the North Carolina summer heat. 131 Although Seymour Johnson's runway 8/26 has a length of nearly 12,000 feet, this F-15E on afterburner will use considerably less to take off. 141 While the pilot keeps the aircraft steady, the backseater monitors the progress of a tanker's boom into the aircraft's aerial refueling port on the left side.





1 An F-15E gets airborne. More than 63 feet long and with a max takeoff weight of 81,000 pounds, the F-15E is huge for a fighter. The upper fuselage between the vertical tails is sometimes referred to as "the tennis court." **2** A 916th tanker maneuvers with an F-15E for

an air refueling hookup. **3** The Air Force has 221 F-15Es, almost all bought in the 1980s and 1990s. The 4th Fighter Wing has 96 of them. **4** Maj. William Johnson suits up for a flight, donning G pants. The garment, sometimes called "speed jeans," automatically inflates with

air when the airplane pulls heavy G loads, compressing blood vessels in the legs and preventing too much blood from draining from the pilot's upper body. Along with tensing of the stomach muscles, this keeps the pilot or CSO from blacking out.

111 The last stop before stepping to the aircraft is at the ops desk. These aircrew are wearing the harnesses that will connect them to the parachutes integral to their F-15E ACES II ejection seats. 121 The 4th Fighter Wing received its first F-15E at the end of 1988, and the 336th FS became the first operational Strike Eagle squadron the next year. 131 An F-15E prepares to leave the weather shelter for a mission. A typical training sortie will take the crew out over the Atlantic Ocean near North Carolina's Outer Banks, but there are nearby ranges where ordnance can be dropped. 141 The Strike Eagle has been a fixture at Seymour Johnson since it began replacing the F-4 Phantom II. 151 Bures and Russell get ready to lower the canopy and taxi out.



1



5



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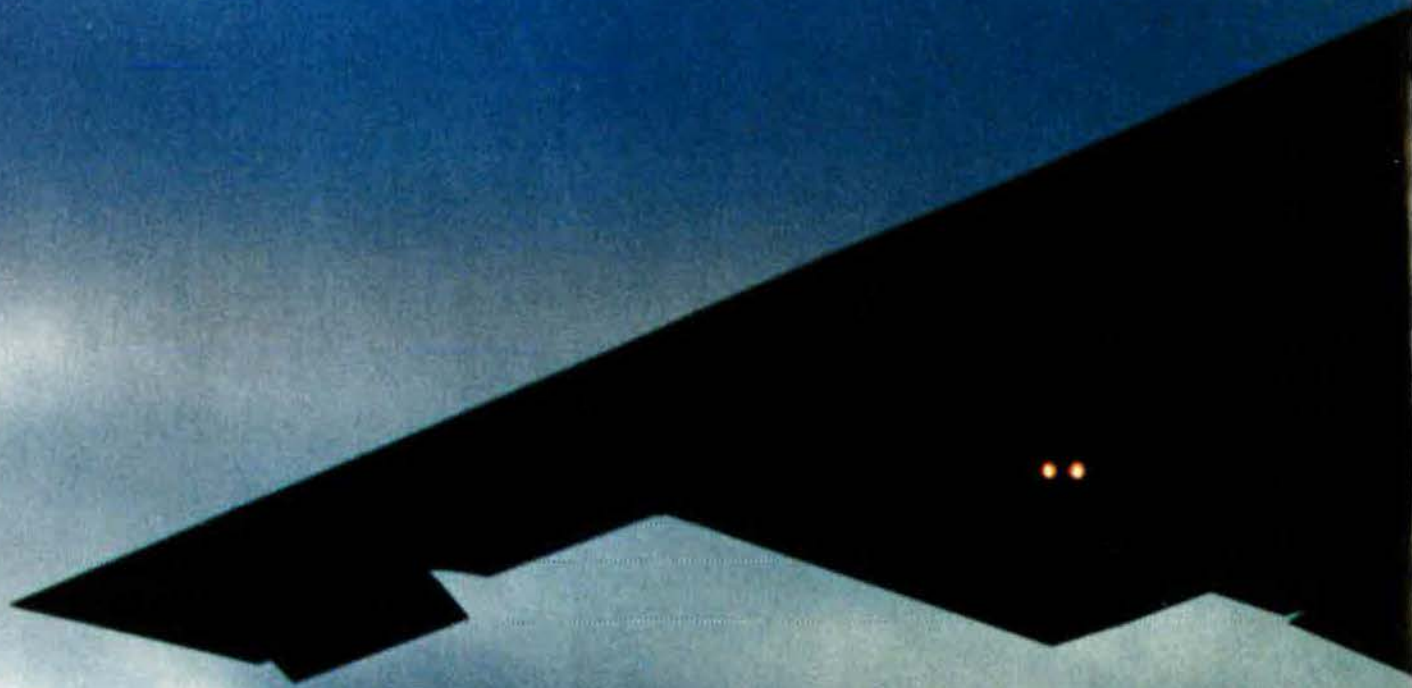
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3



1| The "Lancers" of the 333rd FS date to 1957, when they flew the F-100 Super Sabre. 2| The front-on angle shows the conformal fuel tanks mounted on the side of the two air intakes and fuselage, as well as the "ramps" at the top of the inlets; they change shape depending on the engines' need for air. 3| The airmen of the 334th FS have perhaps the most coveted nickname for an F-15E squadron: "The Eagles." 4| The F-15E was supposed to be replaced by the F-35 at some future date, but the type is highly effective and has plenty of life left in it. USAF expects to keep the Strike Eagle in service well into the 2030s. ■



Black Bom

The B-2's tortured acquisition program

USAF's new bomber seems to have survived 2011's budget battles, but a dark specter still hangs over it: the ghost of the B-2 program, begun more than 30 years ago.

Of course, the B-2 bomber has notched outstanding combat success in numerous air campaigns. Fears of revisiting the B-2's brutally truncated acquisition process, however, continue to exert an eerie influence on bomber politics.

"What we must not do is repeat what happened with our last manned bomber," then-Secretary of Defense Robert M. Gates warned in 2009. "Looking ahead,

it makes little sense to pursue a future bomber—a prospective B-3, if you will—in a way that repeats this history."

Deputy Secretary of Defense Ashton B. Carter likewise said the goal for future programs is to "ensure that we do not find ourselves, after spending billions on development, with a system we can't afford to produce."

The next bomber's critical design trade-offs still have to be made. Will it focus on high subsonic flight versus an option for supersonic dash? What type of weapons and sensors will it carry? Will it operate mainly with an onboard or remotely located crew?

The 20 B-2s in service are still central to the plans of most regional combatant commanders. That's one of the biggest reasons why the Air Force has fought hard to start a new program for a penetrating bomber, with serious dollars in the 2012 budget.

There are clearly lessons to be learned from the B-2's development program. Are the skeletons rattling in the closet relevant today or blown out of proportion?

Based on the B-2's cautionary tale, senior defense leaders seem to believe that the trick to keeping the next bomber on track depends on not reaching too





ber Blues

By Rebecca Grant

casts a shadow even today.

The B-2 bomber Spirit of Missouri lands at Whiteman AFB, Mo.

far with technology development. “By the time the research, development, and requirements processes ran their course, the aircraft, despite its great capability, turned out to be so expensive—\$2 billion each in the case of the B-2—that less than one-sixth of the planned fleet of 132 was ever built,” Gates said in 2009.

Of course, the B-2s cost \$2 billion apiece *because* only 21 were built. Had the originally planned 132 been built, although the total program price would have been higher, unit cost would have been far less. This false cause and effect has been like a millstone around the

stealth bomber’s neck ever since the program was halted.

The technologies for the B-2 included stealth, precision attack, electronic countermeasures, and sophisticated mission planning. All these were deemed essential due to the leap in Soviet air defense capabilities, the premier threat of the day. The attempt to build a stealth bomber was a natural evolution from high volume research on stealth and other precision attack technologies in the 1970s.

Officials as far back as the Nixon Administration conceived a stealth fighter—which led to the F-117—and

got industry thinking about a stealth bomber. Ronald Reagan’s 1980 election brought in Caspar W. Weinberger as SECDEF and put even more emphasis on invigorating national military capabilities. Soon after Weinberger was sworn in, reporters asked what surprised him most about the Pentagon.

“The principal shock was to find out, through daily briefings, the extent and the size of the Soviet buildup and the rapidity with which it had taken place—in all areas, land, sea, and air,” Weinberger replied.

He became a staunch supporter of the B-2.

USAF photo



Tacit Blue, Northrop Grumman's stealthy battlefield control technology demonstrator aircraft on one of its 135 flights, which began in 1982.

Even given its high national security priority, USAF took a fairly conservative acquisition approach to the stealth bomber. By mid-1980, service officials approved a competition for an advanced strategic penetrating aircraft known by the acronym ASPA. The secret contest pitted Lockheed and Northrop against each other for the third time in less than seven years. They'd already gone head-to-head on the highly secret F-117 stealth fighter and the one-off battlefield control technology demonstrator aircraft known as Tacit Blue but nicknamed the Blue Whale for its fat curves.

New Design Components

The B-2's flying wing design was logical. It was the brainchild of a group of Northrop designers who agreed that for all-around survivability, the flying wing came closest to the radar engineer's ideal shape: an infinite flat plate. The Northrop team's principal innovation was to introduce curvature. The combination of flat flying wing and curved surfaces allowed engineers to predict and control the amount of radar energy returned from the B-2. (The Lockheed competitor, also a flying wing, relied somewhat more on faceted surfaces like those on the F-117.)

All this assumed the B-2 would fly its mission at high altitudes, 50,000 feet and above. This maximized stealth properties and gained efficient range and payload. A bomber flying at high altitudes diminished the effectiveness of the Soviet Union's air defense radars and stood the best chance of getting around the centrally controlled Soviet interceptor fighters. With smart mission planning, B-2 pilots could avoid most of

the dangers of Soviet airspace and reach their targets in a way that the B-52, with its blazing radar-reflective signature, could not hope to match.

The B-2 was also pushing the envelope in precision weapons targeting. Unlike the F-117, the B-2 would incorporate advanced mission systems designed especially for it.

"It had a very sophisticated radar that took [synthetic aperture radar] images at high-fidelity resolution to go identify targets, with an electronic defensive system to be incorporated," as well as "four engines instead of two," said retired Lt. Gen. Richard M. Scofield, who spent eight years as the Air Force's B-2

program manager. He started in the job as a colonel in 1983 and rose to become a two-star general in the same position.

For the F-117, off-the-shelf systems were used wherever possible. For the B-2, however, "all the components were basically new design," recalled Scofield. In fact, the B-2 would be the first aircraft to carry Global Positioning System guided bombs as its standard weapons and later was first to employ the now-ubiquitous Joint Direct Attack Munition, or JDAM, in combat. In that sense, it was a pathfinder for USAF's combat fleet.

The Air Force was treating the bomber program with an urgency reminiscent of the Manhattan Project. Even so, systems engineering risk reduction was a key part of the program from the beginning.

Northrop was awarded the contract on Nov. 2, 1981. Configuration freeze of the entire design was scheduled for summer of 1983. Northrop at first proposed a brisk schedule with first flight in December 1986. As a backup, however, Weinberger restarted the B-1 program canceled under President Jimmy Carter.

To be safe, the Air Force added a year to the original production schedule, specifically for risk reduction. That pushed the first flight deadline to late 1987. After that, the program was slated to ramp up to peak production of 30 aircraft per year. On that schedule, the B-2 would reach initial operational capability with the Air Force in 1990.



Northrop Grumman photo

The B-2 was designed and built with a 3-D, integrated database. It required engineering and computation that were, at the time, utterly state of the art.

Then, Strategic Air Command, responding to a new threat analysis, changed the game. It added a second combat mission profile—flying low on the deck—and required the B-2 to now achieve speeds near Mach 1 at low altitude.

Back at the drawing board, Northrop's engineers reviewed the B-2's design.

"Everything was going along fine until we got to the aeroelastic analysis," said James Kinnu, who managed the program for Northrop from 1981 until 1985. The idea behind aeroelastic analysis was to test loads and structures in wind tunnel models, derive the results, and use the data to design actuators swift enough for the hydraulic controls.

When the data were in, they showed that the control surfaces worked fine in the smooth air at high altitude, but at low altitude, they would become saturated in strong gusts and fail.

"My airplane just blew up on me," Kinnu recalled telling his boss.

"It turned out to be a much tougher environment than they thought," said Scofield. The problem was severe because both pitch and roll were handled by trailing edge surfaces. To fix this, two more "sawtooth" planform features had to be added to the tail.

On top of the problems at 200 feet, there was the requirement for speed. SAC's insistence that the B-2 now fly at high subsonic speeds on the deck increased the proportional response from the gust loads.

By the spring of 1983, when he joined the program, "they'd pretty much decided that they had to redesign the planform to add the additional flight-control surfaces and beef up the structure," Scofield recalled. It fell to him to take the news to the then-Chief of Staff, Gen. Charles A. Gabriel.

"The first briefing I had to give on the program was to General Gabriel to say we're going to change the airplane," he said.

"If that's what we have to do to have a good airplane, that's what we'll do," Gabriel said.

Northrop's flight control manager, a specialist named Al Meyers, came up with a gust load alleviation system to quell it. Quick response by the flight controls would allow the B-2 to compensate for gusts.

The technical fix was extensive but elegant. It was also expensive—with estimates for the redesign running close to \$2 billion.

Northrop Grumman photo



B-2s under construction at Northrop's Pico Rivera plant in California. The facility was subjected to the highest security measures.

Even though inadequacy of the flight controls forced the redesign, engineers took advantage of the reopened configuration to make other beneficial changes, including improvement of the center body shape with the sawtooth trailing edge. That put flight-control surfaces well aft of the center of pressure. Other changes included a symmetric W-shaped air inlet and a symmetrical exhaust. The cockpit also moved forward.

Nuclear Hardening

Ultimately, SAC had to take other steps to keep up with the threat environment. Although the redesign yielded a better airplane, the lesson learned was not to lock in a bomber design until those who will fly it are comfortable that its technology meets upcoming threats.

Another cost driver for the B-2 was its nuclear mission. SAC had no choice at the time but to opt for both nuclear and conventional capability.

Making the B-2 a survivable nuclear bomber was an extremely difficult process because designers had to learn how to harden stealth coatings against radioactive effects. None of the previous stealth programs had taken hardening to the level demanded for the B-2.

Originally, designers had theorized about flying around the "atomic cloud" caused by earlier missile detonations, for example. With the design change, there would be no chance of staying up at high altitude and avoiding some areas of radiation. The B-2 had to be ready to "go low" on the deck through an atmosphere full of radiation or cope with the shock waves from its own nuclear bombs on egress from the target. While the B-2

relied on low observable technology to get into the target area, it depended on structural strength to survive the blast from its own nuclear weapons or those of nuclear-tipped Soviet air defense missiles in order to get home.

Thus, the effect of radiation on the B-2's unique composite structure and radar absorbent material had to be taken into account.

This was uncharted territory. "None of the materials we used on Tacit Blue made it to the B-2," said airframe designer Irving T. Waaland. "They hadn't been developed for the nuclear environment."

Nuclear hardening actually involved several different, nasty scenarios. First there was predetonation dust. The detonation itself gave off gamma-neutron radiation. Next, a massive thermal wave of great intensity could sweep over the aircraft and scorch everything inside it. Then came electromagnetic pulse, or EMP, the result of exoatmospheric gamma rays interacting with the magnetic field.

"We had to make sure coatings, crew, and systems survived," said engineer John Mall, who worked on the problem for Northrop. The principal challenge was testing the stealth coatings to find the ones that could do their stealth "jobs" and still survive the spate of nuclear blast effects. That meant a lot of time and journeying to test facilities where Mall and his team would fry various low observable materials at 10 times solar power and measure the effects.

Sometimes, materials that passed the test still had to be discarded because they were too toxic to use in large-scale



The B-2 Spirit of Georgia.

Illustration © Zaur Eylanbekov/Air Force Magazine

production. Southern California's air quality management district enforced strict environmental compliance for the Pico Rivera plant, underlined by inspections, fines, and at one point, a lawsuit.

"Environmental compliance drove us nuts," recalled Mall.

Ultimately, the B-2 team found the right materials for vital systems such as the cockpit. It had a passive thermal protection system and a windscreen with "a quick-reacting photochromic that reflected thermal waves back," said Mall. The process had been developed especially for the B-2 by one of the program's suppliers.

"About the only thing that was not rad-hardened was the anti-skid system" of the brakes, Waaland later jested.

Another aspect of the B-2's development was the intense secrecy shrouding the program.

Here, USAF seems inclined to follow the B-2 model. While the existence of the next bomber program is no secret, USAF has already tucked it away from view as a Special Access Program, meaning that only those with the highest clearances and bomber-specific security slots will know much about it.

In theory, so-called black world acquisition streamlines the process and lowers cost. Yet here again the B-2 program offers a cautionary tale. It, too, was a totally classified program, but heavy secrecy actually imposes heavy costs. All the management, labor, and accounting procedures integral to any major program were required for the B-2, but every single person had to have a security clearance. Nor was this just a secret program; there were numbered levels of security and access, and thousands of workers at every skill level had to be cleared.

"One of the biggest struggles was manning up and getting the right people," said Kinnu. Top talent came from programs such as the space shuttle and from around the pool of Southern California's aerospace industry. Even

so, clearances often took months, slowing the overall project. New workers stayed on the program payroll while awaiting clearances. The B-2 security structure included complete document control, as well as background checks, physical access control, and measures to keep the plant work environment secure. Subcontractors also had to follow the tight standards for the black program.

Cruel Math

Kinnu and Waaland later estimated that security alone added between 10 percent and 20 percent to the overall B-2 program cost, a figure consistent with that for the F-117 program.

Despite all this, B-2 program managers tried to hold to the schedule for first flight in 1987. They didn't make it. The B-2 rolled out of its hangar in Palmdale, Calif., in November 1988 and took to the skies on July 17, 1989.

Despite the major technology hurdles, the B-2 didn't spend an inordinate amount of time in development. Not quite eight years passed from contract award until first flight.

Trouble hit the B-2 at the typical place: the transition between flight test and low-rate production. The next three B-2s made their first flights at the rate of one per year in 1990, 1991, and 1992. Test and development of the pilot cadre was slow as a result.

Mission systems proved to be a risky area. One of the program's worst flubs came well into the flight-test program, when the aircraft failed a summer 1991 stealth test. The Air Force rushed to explain the test results to the handful of congressional members and staff cleared to know. The test by itself was not an insurmountable problem, but the signs weren't good—especially with pressure mounting for a national budgetary "peace dividend," given the rapid decline of Russian military

capability after the Soviet Union went out of business in 1991.

"I am not closing the door on the B-2," Democratic Sen. James J. Exon of Nebraska warned in 1991, "but I wish to send a very loud and very clear signal that they had better get their act straightened out or the program will die a fast, rather than a slow, natural death."

Crumbling congressional support was a bigger blow than the collapsing Soviet Union. The denouement of the cost tragedy came in just a few months. The bipartisan support that guided the B-2 from contract award to flight test fell apart completely under President George H. W. Bush.

Bush's Secretary of Defense, Dick Cheney, had already trimmed the buy from 132 to 75 in April 1990. In January 1992, he decided not to fund any more than the 15 production aircraft then in the works or with parts on long-lead purchase. President Clinton later added funds to turn a test article into the 21st operational aircraft.

The cruel math hit hard. The final tally for the B-2 program at the end of production was a hefty \$44.2 billion. More than half—\$23.4 billion—had been sunk into costs for research and development, while another \$18.5 billion went to production; half-a-billion more went to military construction.

The nation clearly did not get a full return on the massive B-2 development program, but a complicated lesson from the B-2 is that conquering a major technology challenge can pay off handsomely in indirect ways.

The B-2 achieved the revolutionary goals of applying low observable technology to a bomber-sized aircraft, while incorporating avionics for precision weapons missions. More than 20 years later, that's an achievement still unmatched by any other program or air force. ■

Rebecca Grant is president of IRIS Independent Research. Her most recent articles for Air Force Magazine were "Bomber Diplomacy" and "Tora Bora" in the December 2011 issue.



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MULTIVIEW



With both nations casting a wary eye toward China, the US has quietly expanded low-key military relations with Vietnam.

Return to Vietnam

By Richard Halloran

The long, bitter war the US fought in Vietnam from 1954 to 1973 was never mentioned as a group of American troops spent 20 days on a humanitarian deployment. More than 40 service members worked alongside host-nation soldiers and civilian contractors last August, renovating three medical clinics and building a library in an orphanage.

What made this unusual is that the Americans were working in Vietnam.

Four airmen participating in the US Pacific Command deployment—SMSgt. John Buendia, SSgt. Gil Miguel, SrA. Brynn Stephany, and SrA. Darren Clemen—all agreed they did not see any anti-American antagonism during the mission. The trip itself would have been impossible even two decades ago, when diplomatic relations did not exist between the nations.

In conversations at JB Pearl Harbor-Hickam, Hawaii, the airmen said the Vietnamese were friendly, worked hard, and managed to overcome the language barrier.

“We used lots of hand motions,” Stephany said. She added that the Vietnamese were a bit surprised to see an American woman working as a laborer.

The airmen were posted in Ha Tinh province, some 200 miles south of Hanoi along the coastal neck of what was once North Vietnam. A poor province today, during the war it was a supply location, along an infiltration route for troops slipping into South Vietnam. The US bombed it, but Ha Tinh was not the site of fierce ground battles.

Clemen, whose father was a helicopter crewman in the war and whose mother is Vietnamese, said the Vietnamese were

puzzled because he could speak their language—though in his mother’s southern dialect rather than the northern dialect of Ha Tinh. When he explained, he chuckled, “they didn’t believe me.”

The work was rewarding. “We were touching people and touching lives,” Miguel said of the clinic he worked at.

Despite the good vibe overall, there were still some distinct difficulties. Buendia said his troops were “frustrated” by what they saw as a lack of quality control. What took Americans a half-day to complete was left unfinished by the Vietnamese at day’s end. Clemen had one “eerie” experience, when the proprietor of a souvenir shop tried to sell him a necklace made up of American dog tags.

“I don’t think he knew what they were, but I didn’t want it,” he recounted.

Remarkable Turnaround

The sight of American airmen and Navy Seabees working side by side with Vietnamese soldiers and workers some 40 years after the war in Vietnam can only be termed as remarkable.

Over nearly 20 years, hostilities between the US and North Vietnam took the lives of 58,000 Americans, an estimated 224,000 South Vietnamese soldiers, and about 1.1 million Viet Cong and North Vietnamese fighters. This doesn’t count several million civilian Vietnamese and the toll on forces of allies on both sides. The wartime generations in both the US and Vietnam have retired from military service, however, lessening the personal reminders of the war.

The airmen’s humanitarian mission was far from the only military engagement the US has had with Vietnam. Exchanges, visits, and cooperative efforts





USAF photo by MSgt. John Herrick

Airmen and Navy Seabees make progress on renovating a medical clinic in Ha Tinh province, Vietnam. The US service members worked alongside Vietnamese soldiers and civilians during the humanitarian mission.

Then-Secretary of Defense Robert Gates (c) participates in a ceremony with Vietnamese Minister of Defense Gen. Phung Quang Thanh. Gates said, "Wars end," and nations would be wise to put bitterness aside to build an international partnership.



DOD photo by MSgt. Jerry Morrison

have quietly but steadily ramped up over the past decade. Just this year, the carrier *USS George Washington* received Vietnamese senior civilian officials and military members.

The cargo-ammunition ship *USNS Richard E. Byrd* docked at Cam Ranh Bay, the port and base built by the US during the war. The ship was the first of the US to respond to a Vietnamese decision to repair ships of all nations at Cam Rahn Bay, and *Byrd* remained there for a week while Vietnamese crews cleaned the hull underwater, polished the ship's propeller, fixed shipboard piping, and overhauled the salt water cooling system.

From both the US and Vietnamese points of view, the prime motive for their reconciliation can be summed up in one word: China.

The Vietnamese have long memories and make little effort to hide mixed feelings about their northern neighbor.

China occupied much of Vietnam for a thousand years until 1010 A.D. For the next 850 years, the Vietnamese fought off repeated Chinese incursions until Vietnam, and the rest of Indochina, fell under French colonial rule. French rule of Vietnam ended when Ho Chi Minh's army prevailed at Dien Bien Phu in 1954.

Vietnam's most recent battle with China was in 1979, when Chinese forces sought to teach Vietnam a lesson for getting involved in Cambodia by launching a short-lived punitive invasion. Instead, the Chinese were bloodied by the Vietnamese—who by then fielded what was perhaps the most experienced army in the world.

China seeks to limit the US military presence in East Asia and may seek eventually to push American forces back across the Pacific. China has begun openly flexing its strategic power in Asia and sees the US as the main obstacle to establishing a modern version of the ancient Middle Kingdom.

In response, the US has been cultivating allies and friends, including Vietnam, to counter the Chinese drive.

"US relations with Vietnam are growing," said Gen. Gary L. North, commander of Pacific Air Forces, who visited the nation last year. Relations are obviously not as robust as they are with some other nations, "but they are promising," he said.

A focal point of common interest is the South China Sea. China has claimed most of the sea as sovereign territory, while the US, Vietnam, and Southeast Asian nations along the sea's shores have asserted it is an international waterway—a position that American officials say is

supported by international law. Keeping the South China Sea open to shipping traffic is vital to the economies of Asia, including that of China, because more traffic passes through those waters each year than through the Suez and Panama Canals combined.

Butt Out

For the US Navy, the sea-lane is a crucial passage through which warships transit between the Pacific and Indian Oceans—precluding the time-consuming and costly need to sail far south around Australia.

The focus on both the South China Sea and Vietnam seems likely to sharpen as the Air Force and Navy push ahead with the AirSea Battle concept. Among the doctrine's salient features is the need to acquire access to as many bases as possible over a wide expanse. This strategy will complicate the offensive operational plans of the Chinese (and other adversaries, senior military officials almost always add) by forcing them to target multiple bases to pursue an anti-access, area-denial strategy.

The Chinese government in Beijing is aware of the new US-Vietnam military relations and has expressed its displeasure.

"For countries outside the region, we hope they will respect and support countries in the region to solve this dispute through bilateral channels," a spokeswoman for Beijing's foreign ministry said. The statement reveals China feels other nations should butt out of the South China Sea and let China and other Southeast Asian nations resolve differences themselves. In this specific case, the spokeswoman referred to a dispute over India's plans to drill for oil under the South China Sea—but similar words were

Two Decades of Warming Relations

For years after the fall of Saigon in 1975, relations between Hanoi and Washington were nonexistent. But in 1991, President George H. W. Bush presented Hanoi with a "roadmap" for a phased normalization of ties. In 1995, the Veterans of Foreign Wars announced it would agree to support US diplomatic relations with Vietnam, thus removing a domestic political barrier.

In 1995, Washington and Hanoi opened diplomatic relations. President Bill Clinton visited Vietnam in 2000 and a trade agreement followed the next year. Secretary of State Colin L. Powell, who had fought as an Army officer in Vietnam in 1969, attended an international forum in Hanoi in 2001.

The first US Navy ship to make a port call after the war, the guided missile frigate *Vandegrift*, docked in Ho Chi Minh City (formerly Saigon) in 2003. Adm. Thomas B. Fargo, then PACOM commander, visited Hanoi and Da Nang in 2004.

The following year, Prime Minister Phan Van Khai made the first visit to the US by a Vietnamese leader since the war, and the destroyer *Gary* made a port call to mark the 10th anniversary of diplomatic relations.

In 2006, President George W. Bush took part in an Asia-Pacific Economic Cooperation meeting in Hanoi.

The following year, President Nguyen Minh Triet made the first visit to Washington by a Vietnamese head of state since the war. The same year, the amphibious ship *Peleliu*, reconfigured into a hospital ship, docked at Da Nang on a medical mission.

In 2008, the hospital ship USS *Mercy* dropped anchor off Khanh Hoa province on a similar medical mission, and Prime Minister Nguyen Tan Dung met with George W. Bush in the White House. Later, Sen. James H. Webb (D-Va.), the chairman of the East Asian and Pacific Affairs subcommittee of the Foreign Relations Committee who had fought in Vietnam as a marine, visited the country.

2009 proved to be a busy year in the now rapidly warming relations. Gen. Carrol H. Chandler, then-PACAF boss, became the first USAF four-star to travel to Vietnam since diplomatic relations resumed. The aircraft carrier *John C. Stennis* received Vietnamese military and civilian officials flown out to the ship at sea.

The command ship USS *Blue Ridge* and the guided missile destroyer *Lassen*, commanded by Cmdr. Hung Ba Le, a Vietnamese-American, made port calls.

Sen. John S. McCain (R-Ariz.) met with Prime Minister Nguyen in Hanoi, where the senator as a naval aviator spent more than five years as a prisoner of war. A Vietnamese military delegation made the first visit to PACAF headquarters to discuss search and rescue missions. In Pacific Angel, 60 Air National Guard medics flew into Quang Tri province to treat about 5,000 patients.

In 2010, Prime Minister Nguyen participated in the nuclear summit convened by President Barack Obama.

In Pacific Angel 2010, PACAF medics treated 12,000 patients and renovated two medical clinics in Tan Thoi and Truong Thanh. The hospital ship *Mercy* returned to Vietnam during Pacific Partnership 2010 to treat 19,000 patients and perform 132 surgical procedures. Engineers renovated a clinic and school for disabled children.

USAF photo by MSGT. John Henrick



USAF 2nd Lt. Rachel Crawford (l) and Navy Utilitiesman 3rd Class Daphne Bender put the finishing touches on a construction piece for a medical clinic in Ha Tinh province.

earlier directed at the US. "It is wise for those trying to feel out China's bottom line to wake up to the reality that China will never yield an inch in its sovereignty and territorial integrity to any power or pressure," she added.

For months, Beijing has claimed "indisputable sovereignty" over large reaches of the South China Sea. Chinese officials have asserted that US and Vietnamese training, even in noncombat air-sea rescue exercises, is "inappropriate." The Chinese have asserted that US warships have no right to sail into China's exclusive economic zone while the US and most other nations contend warships can sail in all waters outside of a nation's 12-mile limit on territorial waters.



After the US opened diplomatic relations with Hanoi in 1995, political and economic relations moved ahead steadily. By 2010, US exports to Vietnam came to \$3.7 billion, up 10-fold from 2000. Imports from Vietnam were valued at \$14.3 billion, a nearly 20-fold increase compared with the \$821 million in imports 11 years earlier.

Testing Waters

Alongside that trade, US investments in Vietnam totaled \$13.2 billion by the end of last year, making the US the seventh largest foreign investor in Vietnam, according to Vietnamese government figures.

Former Secretary of Defense William S. Cohen was the first SECDEF to visit Vietnam after the war, going to Hanoi in 2000. Vietnamese Defense Minister Pham Van Tra visited Washington in 2003.

Secretary of Defense Donald H. Rumsfeld flew to Hanoi in 2006 and his successor Robert M. Gates seemed to set a new tone in a speech at the Vietnam National University in October 2010.

"Wars end," Gates said. "Nations wise enough to put past bitterness and heartbreak behind them can find in each other future friends and partners. There is no doubt that the war left an indelible imprint on both our peoples. But by addressing its legacies together, our two nations have been able to demonstrate how you can build upon the past without being bound to repeat it."

Adm. Robert F. Willard, commander of Pacific Command, was more specific when he spoke with reporters in Singapore, saying the Vietnamese set the pace of reconciliation.

"The military-to-military relationship with the Vietnamese [has] lagged the



Top: TSgt. Eric Moss (l) and TSgt. Tamica Rippke (r) work with a local vendor during a mission making improvements to medical clinics in Ha Tinh province. **Above:** Maj. Diep Le (l) performs dental work on a Vietnamese patient in Quang Tri province as part of the humanitarian assistance operation Pacific Angel.

rest of [the government's] engagement with Vietnam, but was always positive," he said in a *Defense News* interview. "Incrementally, they were testing waters and improving and asking for new forms of engagement between us, and in recent years, [that has] begun to turn upward." He added that PACOM is looking for Vietnam to assume a bit more of a "leadership role" in the region, provided the right opportunities, in efforts such as peacekeeping or maritime security.

PACAF is engaged in forging military relations on the ground in Vietnam, North said in an interview. "The point of these exchanges, which are very much welcomed by Vietnam, is to build trust and confidence." Vietnam, like other countries

in the region, is "understandably concerned with figuring out the behavior of large neighbors, including China," North said. Due to Vietnam's long coastline on the South China Sea, the nation is acutely worried about maritime security.

Even with strengthening ties, limits still exist. So far, no plans have been made for combined training in combat operations. "We're not ready to do anything kinetic," said a staff officer.

The Vietnamese are eager to learn how the US projects power, especially in logistic support for those operations, but the US has been reluctant to move too fast. Further, the laws governing the International Traffic in Arms Regulations (ITAR) were eased in 2006 to permit the US to transfer "nonlethal defense articles"

to Vietnam but not to export lethal items, crowd control equipment, or high-tech night vision devices.

Current efforts have centered on humanitarian and trust-building measures, so little consideration has been given to lifting the restrictions on combat-related equipment.

The US, with Vietnamese help, continues to search for the remains of Americans who died there.

"We have had C-17s on the ramp at Tan Son Nhut," said North, referring to the wartime air base, "for a reparation ceremony in keeping with our standards of a dignified return of our fallen heroes."

Even with reconciliation, the war has not been forgotten. ■

Richard Halloran, formerly a New York Times foreign correspondent in Asia and military correspondent in Washington, D.C., is a freelance writer based in Honolulu. His most recent article for Air Force Magazine, "Japan at a Crossroads," appeared in the April 2011 issue.

Few know it now, but enlisted gunners protected B-52 bombers through the 1991 Gulf War.

By Peter Grier

From his gunner position in the back of the bomber, SSgt. Samuel O. Turner detected the enemy fighter just before it began its firing pass.

The attacker came in from below and behind, climbing quickly, while a second bogey lingered in the distance to observe the coming combat. The wrangle did not last long. As the fighter came within range Turner fired a six-second burst from his tail guns—about 700 rounds.

“There was a gigantic explosion to the rear of the aircraft,” said Turner. “I looked out the window but was unable to see directly where the [fighter] would have been.” Turner turned his attention back to the fighter’s wingman.

After about 15 seconds, the second fighter turned and fled. “As we left the threat area, my aircraft commander told the other [US] aircraft, ‘I think we got one,’ and they knew what he meant,” he recalled.

This encounter was notable, aside from the gunner’s skill in the face of



Below: SSgt. Samuel Turner, a B-52 gunner, receives the Silver Star from Gen. John Meyer, head of Strategic Air Command.

USAF photo



danger. It did not involve a B-17 or a B-24 facing off against a Luftwaffe attack, or a B-29 defending itself in the Korean War—Turner was a tail gunner on an aircraft still flying but not usually associated with machine gun defense: the B-52.

Today the B-52 is one of the most versatile and long-lived airframes in

"B-52s Over Hanoi," by Robert Bausch, from the Air Force Art Collection.



B-52 Gunners

history. It has morphed over time from a long-range strategic nuclear bomber, to a conventional bomb delivery wagon, to a precision guided munitions carrier. The B-52 remains in the US Air Force arsenal because it is durable, economical, and effective.

The fact that B-52s once featured guns as a defensive armament is evi-

dence of how long they have been in service.

The bombers never bristled with turrets, as World War II bombers did. But B-52s featured defensive armament in the tail: A through G models had quad .50-caliber machine guns, and H models employed a single M61 20 mm rotary cannon. The gunners who

manned these weapons were enlisted personnel. They were the only enlisted airmen in a B-52 crew.

Turner was the gunner on a B-52D from U Tapao airfield, Thailand, on a Dec. 18, 1972, mission to bomb targets near Hanoi during Linebacker II, the Vietnam War's last major air campaign. The fighter he shot down



Above: A B-52F rolls out (back). In the foreground is a tail detail, showing, from left to right, the ammunition access door, the drag chute compartment, and the gunner's entry hatch. Right: Maintainers service the four .50-caliber M3 machine guns in the tail of a BUFF.

was a North Vietnamese MiG-21, and it was the first time a B-52 gunner destroyed an adversary.

For this achievement Turner was awarded the Silver Star. "By his courage in the face of hazardous combat conditions and outstanding professional skill, he successfully defended his aircraft and its crew and enabled it to complete its mission and return safely to base," reads the citation accompanying the decoration.

Between You and Eternity

The gun defenses of aircraft began with pistols, rifles, or machine guns fired by the pilots and observers pre-World War I. Machine guns mounted in "turrets"—little more than circular hardwood tracks—were the next step.

Guns in these early designs rotated on hardwood casters, noted a secret history of turret development compiled by the US Air Historical Office in 1947. "They were cumbersome and unmanageable; the wood warped and bound with every flexing of the aircraft fuselage; and manipulation, even at the laggard air speeds of that day, was complicated by the fact that the gunner never had enough hands to perform the many operations involved in training his guns," it reads. The history was written by Capt. Irving B. Holley Jr. and was declassified in 1959.

But World War I gunners were deadly despite the primitive technology. The first American to shoot down five enemy



aircraft was Frederick Libby, an ex-cowboy from Colorado who joined the British Royal Flying Corps in 1916 and served as an observer-gunner in FE-2B two-seat pusher aircraft.

FE gunners used two machine guns, including a rear-facing Lewis gun, mounted on a steel pole, which re-

quired them to stand up on their seats when firing. "Only your grip on the gun and the sides of the nacelle stood between you and eternity," said Libby years later. This did not stop Libby from destroying five adversaries in his first six weeks in the air—as a private (he was later promoted to lieutenant). "Only the fact that he performed this feat as an observer instead of a pilot prevents his occupying the historic spot of first American ace," according to authors Raymond Toliver and Trevor Constable in their book *Fighter Aces*.

As bombers increased in size and speed, guns were enclosed within the fuselage, and the number of weapons increased. Early models of World War II's B-17 Flying Fortress featured five guns. Eventually they sprouted tur-

rets in the nose, tail, belly, and upper fuselage, along with waist machine gun emplacements. This allowed the B-17 to cover almost all possible angles of attack.

A formation could produce a ferocious wall of defensive fire. At the height of the war, gunners were es-

essential to strategic bomber defense in all theaters. Tens of thousands of US gunners flew missions over Europe alone, as the Army Air Forces attacked Germany's industrial base.

One of them was SSgt. Forrest L. Vosler, a radio operator-gunner who had taken a six-week gunnery course at the completion of his radio training, and who was awarded the Medal of Honor for his exploits in the skies over Germany on Dec. 20, 1943. Severely wounded by a German 20 mm shell, Vosler nevertheless kept up a steady stream of fire from his gun position. Though partially blinded he fixed his damaged radio by touch alone and managed to send distress signals before his B-17 ditched in the North Sea. Vosler survived.

In the Pacific, SSgt. John D. Foley was a legendary B-26 top turret gunner. In 63 combat missions he destroyed seven enemy aircraft, a number of them Japanese A6M Zeros. Back home he became so famous a popular lyricist wrote a song about "Johnny Zero" in 1943, and "Johnny Zero" boots, watches, and coats were popular department store items.

As jet fighters took to the skies, aerial gunnery remained an effective means of defending long-range bombers. In the Korean War, B-29 gunners scored 27 victories. This was a "remarkable feat" given the lumbering B-29s were often up against speedy MiG-15s, wrote author Albert E. Conder, himself a former gunner, in *The Men Behind the Guns: The History of Enlisted Aerial Gunnery, 1917-1991*.

In this context, it is easy to see why Boeing engineers included active gun defense in their plans for a new long-range jet bomber intended to maintain the Cold War balance of power—the B-52.

The first USAF B-52s entered service in November 1955. Initial Air Force requirements for the long-range strategic bomber called for a crew of five, plus turret gunners. But the B-52B—the first deployed variant of the bomber—carried only one gunner, who manned four .50-caliber M3 machine guns. The barrels of these weapons protruded menacingly from the bomber's rear, like a giant multipronged stinger.

The gunner sat in the aircraft tail underneath a transparent canopy, allowing a wide field of vision. The view directly in front was blocked by the control panel and the guns themselves,



A B-52 releases a bomb load on a target southeast of Saigon in 1966. Until the G model, the gunner was confined to a tiny space in the tail of the massive aircraft but had a great view of his surroundings.

but an optical periscope overcame the blind spot.

B-52 gunners reached this isolated position by climbing over the fully reclined back of their seat. When they snapped the seat upright, they were physically isolated in a space more than one airman compared to the size of a coffin. With some variation as to weaponry and fire-control systems, this layout remained the same through the B-52D, the version used extensively in Southeast Asia beginning in the 1960s.

Last Kill

Though B-52 gunners served throughout the Southeast Asian conflict and into the Gulf War period, their most intensive combat experience came during Linebacker II, the massive bombing of North Vietnamese targets ordered by President Richard Nixon when the Paris peace talks faltered in late 1972.

The operation began on Dec. 18, 1972, and ended on Dec. 29. USAF B-52s flew 729 sorties and dropped 15,000 tons of bombs on 34 targets. Fifteen bombers were shot down, all by North Vietnamese surface-to-air missiles. During this period B-52 gunners claimed five MiG kills. Only two were confirmed. The first was Turner's aerial victory.

The second involved A1C Albert E. Moore, gunner on the B-52D *Diamond Lil*.

Late on Christmas Eve 1972, Moore's bomber took off from its Thai base headed for the North Vietnamese rail yards at Thai Nguyen. Before it arrived on target Moore spotted something in his radar scope, low, and about eight miles distant.

"I immediately notified the crew, and the bogey started closing rapidly," Moore wrote six days later. "It stabilized at 4,000 yards, 6:30 o'clock low. ... I called the pilot for evasive action and the EWO [electronic warfare officer] for chaff and flares. When the target got to 2,000 yards, I notified the crew that I was firing. I fired at the bandit until it ballooned to three times in intensity then suddenly disappeared from my radar scope at approximately 1,200 yards, 6:30 low."

A crewman from another B-52 saw the MiG explode in a fireball, confirming Moore's account.

As he returned to base following the mission, Moore wrote later, he did not know whether to be happy or sad. He knew there had been a pilot in that fighter who wanted to return to base just as badly as he did. "But it was a case of him or my crew. I'm glad it turned out the way it did," Moore wrote.

This incident marked the last confirmed kill of an enemy fighter by a bomber gunner.

Diamond Lil remains intact. The bomber flew more than 200 missions during the Vietnam War, with the Air

Force retiring her on Oct. 6, 1983. Today she sits on pedestals just inside the main gate of the US Air Force Academy in Colorado Springs, Colo.

The tail's rear seat was a great office in which to work, remembers Daniel Danish, who served as a B-52 gunner from his enlistment in the Air Force in 1974 to 1991. There was not much elbow room—you had to stick your arms out like a chicken—but you could not beat the view. “You had this window all around you,” said Danish, who retired in 2004 as a chief master sergeant, and today serves as an officer of the Air Force Gunners Association.

The ride could be a little rough. Given the length of a B-52 fuselage, the tail moved up and down quite a bit. The ratio was about one-to-six; for every foot the cockpit moved, the tail bounced six. The ride was especially rough during low-level flight. “Lots of times you wore your helmet throughout the flight,” recalled Danish. “You could get knocked around pretty good.”

Directly in front of the gunner seat was a radar scope. In World War II bombers, gunners for the most part aimed their weapons themselves, taking into account the curve of a fighter's approach and their own aircraft's direction. In the B-52, search and track radars and computerized fire-control systems took over this aiming process.

The End of an Era

Though it had many different modes of operation, and could be set on manual, the fire-control system essentially automated much of a gunner's job. “Once you locked on to a target it just followed it in and did everything but pull the trigger for you,” said Danish. The guns fired in short bursts. The kick was such that the entire crew could feel what was happening. “It just shook the whole airframe,” Danish said.

Active defense of the aircraft was not the B-52 gunner's only responsibility. With a range of up to 12 miles, the search radar could serve as a valuable adjunct to the aircraft's main navigational systems. If the bomber was flying in cell formation, the gunner could serve as the pilot's eyes to the rear, directing following aircraft to stay in position.

In poor weather conditions the radar provided range and bearing information to the rest of the cell. If an aircraft in the rear lost its own radar, the

gunner of a lead airplane could direct it to its target. Gunners also worked closely with electronic warfare officers. Together they constituted a B-52's defensive team—one with active weapons, one with more passive electronics.

Although the rest of the B-52 crew were officers, gunners report that they were not treated as second-class citizens. Said Danish, “We all had an important role to play.”

Beginning with the B-52G, gunners were moved from the aircraft tail to the main cabin. The pilot and copilot sat in the front seats, while the gunner and EWO sat behind them, next to each other.

This change was intended to allow the crew to work more closely together. It also saved weight and gave the gunner an ejection seat. But many gunners rued the loss of their wide-screen view.

Also, firing guns by remote control from the middle of the aircraft seemed less active than shooting them from the rear. Without the view out the rear of the bomber, gunner trainees sometimes found it hard to get used to flying backward. When they felt the airplane was going to their right, for example, it was actually turning left, and vice versa.

John E. Stallings, who served as a B-52 gunner from 1989 through 1991, had this problem. He kept getting sick on training flights, to the point where his superiors almost decided the job wasn't for him. But Stallings kept at it and eventually flew 130 combat hours in the Gulf War. The missions he flew on did not draw much anti-aircraft fire, he remembers today, and the Iraqi Air Force did not come up to engage his aircraft.

“I do remember how the airplane shook as 45 bombs were released,” said Stallings, today a master sergeant in the Illinois Air National Guard and a firefighter. On one Gulf War mission, an EF-111 flying support got separated from the group, and no one could raise it on radio. When they got



Airmen load a B-52 with bombs. The machine guns jutting from the tail jolted the entire airframe when fired.

back to Diego Garcia, the B-52 crew members saw on CNN that the Raven had crashed with no survivors. To this day, Stallings remembers the EF-111's call sign, Ratchet 75. “I could not tell you what my call sign was on that flight, but I remember theirs,” said Stallings.

In the B-52H, the .50-caliber machine guns were replaced with an AN/ASG-21 defensive fire-control system using a 20 mm six-barrel cannon—a modern, high-rate-of-fire weapon. But as long-range air-to-air missiles became more lethal, the very notion of having a gunner came under review.

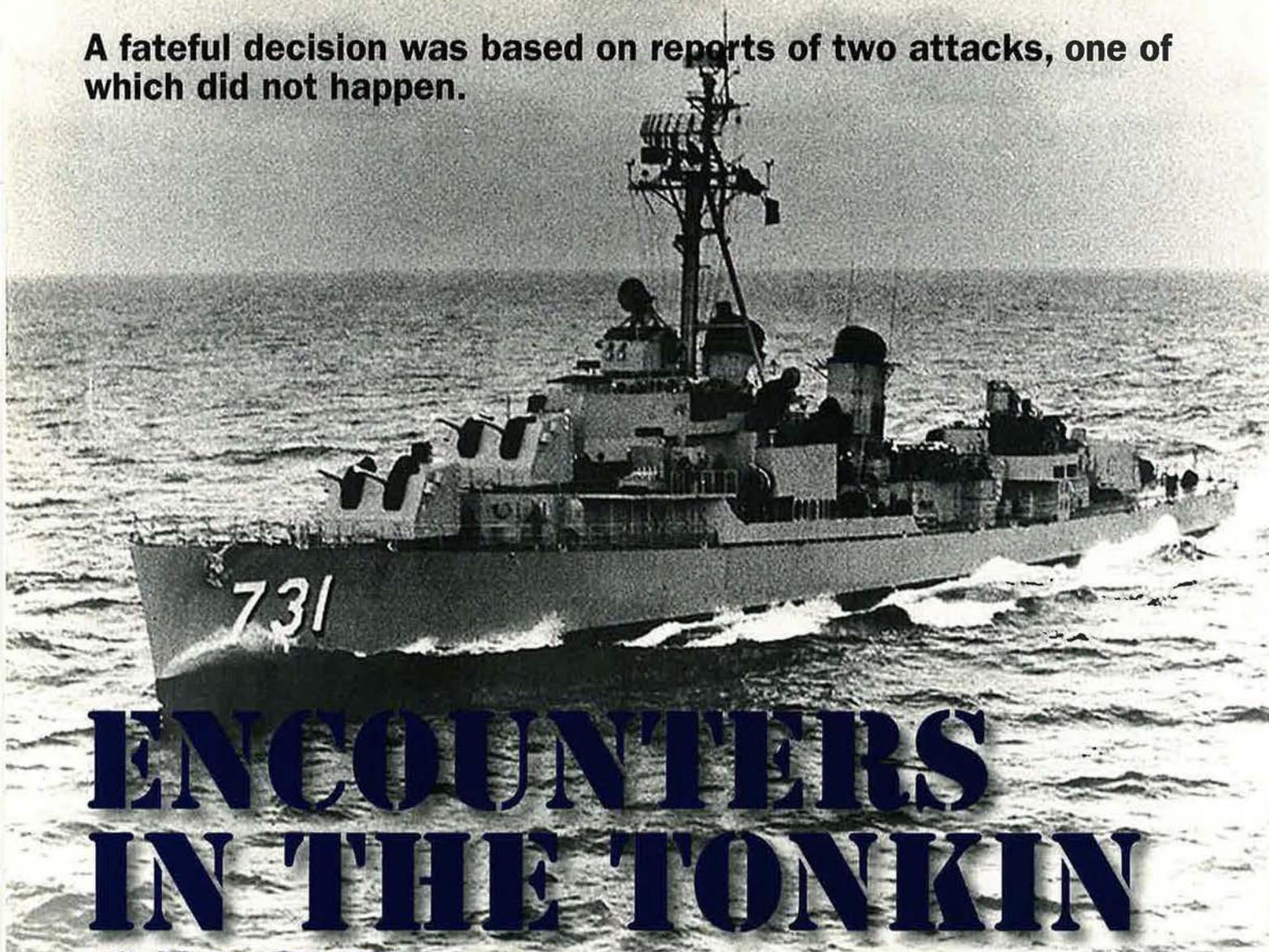
From the 1950s beginnings to the last class in September 1991, about 5,000 airmen earned their gunners wings. Then, in late 1991, Strategic Air Command announced it was eliminating the B-52 gunner—saving money and cutting 525 positions.

Stallings was the last gunner to fly out of Loring AFB, Maine. Upon landing the pilot informed him his fellow gunners had set up a portable water tank and were waiting to throw him in. “This was late September, and it was starting to get cold at night so the water was not very warm,” said Stallings.

On Oct. 1, 1991, the B-52s flew without a gunner—and a long and proud tradition came to an end. ■

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, is a long-time defense correspondent and a contributing editor to Air Force Magazine. His most recent article, “When the Nuke Plan Changed,” appeared in September.

A fateful decision was based on reports of two attacks, one of which did not happen.



US Navy photo

ENCOUNTERS IN THE TONKIN GULF

By John T. Correll

It was late for a presidential address, almost midnight on Aug. 4, 1964, but the situation was dire. Since midmorning, the Pentagon and the White House had been following reports of a battle in which North Vietnamese gunboats attacked two US destroyers, USS *Maddox* and USS *Turner Joy*, in the Tonkin Gulf off the coast of North Vietnam.

President Lyndon B. Johnson had let a previous attack on *Maddox* two days before in the Tonkin Gulf go by with a stern warning. He would not refrain again. In his midnight address, Johnson called the second attack “open aggression on the high seas” and said

that air strikes were on the way to retaliate. Sixty-four sorties in several waves from the carriers *Ticonderoga* and *Constellation* struck gunboat bases and supporting facilities in North Vietnam, where it was already the middle of the day on Aug. 5.

On Aug. 7, Congress passed the Tonkin Gulf resolution, authorizing Johnson to “take all necessary measures” to repel attacks and prevent further aggression. Within days, the US Air Force moved into Southeast Asia in force. The conflict escalated, and by spring the United States was engaged in a full-scale theater war. The Tonkin Gulf resolution was the only congressional authority given, then or later, for the commitment of force in Vietnam.

The public’s understanding of the Aug. 4 encounter was summed up vividly by *Time* magazine. “Through the darkness, from the west and south, the intruders boldly sped,” the *Time*

USS Maddox under way during the early 1960s. North Vietnamese PT boats attacked *Maddox* and USS *Turner Joy* on Aug. 4, 1964. The attack, and an alleged one two days later, shaped the authority under which the war would be fought.

article said. “There were at least six of them, Russian-designed ‘Swatow’ gunboats armed with 37 mm and 28 mm guns, and P-4s [PT boats]. At 9:52 they opened fire on the destroyers with automatic weapons, this time from as close as 2,000 yds. The night glowed eerily with the nightmarish glare of air-dropped flares and boats’ searchlights. For three-and-a-half hours, the small boats attacked in pass after pass. Ten enemy torpedoes sizzled through the water.”

Except for the air-dropped flares, the *Time* story was wrong in every detail. There were no gunboats, no PT boats, no torpedoes, no three-and-a-half-hour battle. The Aug. 4 attack never happened. It was not until years later that

accurate accounts emerged of events that night in the Tonkin Gulf.

The First Incident

In the election campaign of 1964, Johnson faced the hawkish Barry M. Goldwater, who was nominated at the Republican National Convention in July. Challenged by Goldwater to take a stronger stand on Vietnam, Johnson sought to look moderate but firm. He was waiting for an opportune moment to ask Congress to adopt a resolution, drafted by his aides, expressing support for his handling of the war.

US armed forces had been in Vietnam for three years, mostly in an advisory and support capacity, although air commandos were secretly flying combat missions. Deeper in the shadows was the "Studies and Observation Group," its bland-sounding name a cover for clandestine activities under Operations Plan 34-A, approved by Johnson in January 1964. One SOG enterprise sent fast patrol boats, based at Da Nang and manned by South Vietnamese crews, to raid up and down the North Vietnamese coastline. Like all 34-A operations, the raids had to be authorized in advance by the Secretary of Defense, the Secretary of State, or the President.

Returning from a raid the morning of July 31, the fast patrol boats passed within sight of *Maddox*, which was just entering the Tonkin Gulf for a signals intelligence patrol. The mission of such patrols, code-named DeSoto, was "to update our overall intelligence picture in case we had to operate against North Vietnam," said Adm. U. S. G. Sharp,

head of US Pacific Command. Lashed to the decks of the ships were signals intercept vans, operated by naval security personnel. The DeSoto patrols were under Navy control and separate from the 34-A raids, but the North Vietnamese did not know that.

Cmdr. Herbert L. Ogier was captain of *Maddox* but also aboard was the mission commander, Capt. John J. Herrick, commander of Seventh Fleet Destroyer Division 192. On the afternoon of Aug. 2, *Maddox* intercepted an order for North Vietnamese P-4 torpedo boats—called PT boats by the Americans—to attack the destroyer. *Maddox* turned toward the open sea and was about 15 miles from shore when the PT boats caught up.

The pursuers rapidly became the pursued. *Maddox* opened fire with its five-inch guns and summoned air support from *Ticonderoga* in the South China Sea. The PT boats fled, ineffectively scattering torpedoes as they went. The action lasted 37 minutes. The North Vietnamese believed they had shot down one airplane and hit another; in fact, one F-8E Crusader was damaged slightly by the deck guns but landed safely. *Maddox* sustained a single bullet hole and no casualties. The Americans believed they had sunk all three PT boats; actually, they had damaged one of them.

Johnson decided against a military response. "We concluded that an overeager North Vietnamese boat commander might have been at fault or that a shore station had miscalculated," he said. He issued a stern warning that the North Vietnamese should "be under

no misapprehension as to the grave consequences" that would ensue if they attacked again.

Maddox resumed its patrol, joined by *Turner Joy*. They were instructed to stay at least 11 miles offshore, one mile less than the territorial limit claimed by North Vietnam, which the US did not recognize. Johnson gave the two destroyers specific orders to destroy any vessels that attacked them.

The fast patrol boats from Da Nang conducted another raid the night of Aug. 3-4. That day, *Maddox* entered the Tonkin Gulf with *Turner Joy* 1,000 yards astern. They divided the radar surveillance duties. The *Maddox* radar was set for long-range detection and *Turner Joy's* radar was tuned for shorter range, including the tracking of surface targets.

Skunks and Bogles

About 6:15 p.m., the Marine signals intelligence unit at Phu Bai in South Vietnam notified *Maddox* of a probable North Vietnamese operation that night against the destroyers. Herrick promptly forwarded the warning up the line. It got instant attention in Washington where it was still morning, 11 hours earlier than in the Gulf of Tonkin. Nerves were on edge in anticipation of another attack.

Not until later would it be understood that the warning was Phu Bai's interpretation of an intercepted message segment, and that the actual communication dealt mainly with the towing and refueling of boats. One line of the intercept directed unspecified "military operations" with no reference to the US ships.

At 7:46 p.m., the *Maddox* radar picked up the first three "skunks"—potentially hostile surface contacts—about 40 miles to the east, opposite the direction from which an enemy approach might have been expected. Several bogies, or aerial blips, also popped up. A steady stream of reports flowed from the Tonkin Gulf through channels back to Washington.

Over the next two hours, *Maddox* tracked at least eight skunks and *Turner Joy* reported four more at shorter range. At 9:37 p.m., the *Maddox* sonar detected a noise spike, which was interpreted as an incoming torpedo. The two ships maneuvered evasively as the *Maddox* sonar reported an astounding total of 26 torpedoes. *Turner Joy's* sonar did not detect any torpedoes. The destroyers opened fire at 9:39 p.m., eventually

US Navy photo



Capt. John Herrick (l), DeSoto commander, and Cmdr. Herbert Ogier, *Maddox* commander, on the destroyer in August 1964. Herrick would come to believe that the "torpedoes" heard were in fact echoes from *Maddox's* outgoing sonar beams.



Secretary of Defense Robert McNamara points out communist supply routes during a 1965 press conference. In his 1995 memoirs, McNamara insisted that evidence of the first attack was “indisputable” and that the second attack was “probable.”

expending more than 300 rounds, plus depth charges and star shells.

The night was exceptionally dark and visibility was hampered by intermittent drizzle. However, in later interrogation, deck and bridge crews on both destroyers said they saw torpedo wakes, a searchlight, smoke, and the silhouette of attacking boats.

The situation looked completely different to the carrier pilots flying overhead. They could see no ships other than *Maddox* and *Turner Joy* and the only wakes they saw were from the destroyers themselves. The aircraft launched rockets and strafed the general area of reported radar contacts.

Commander James B. Stockdale, leading the fighters, said the *Maddox* air controller “kept giving rapid-fire, blow-by-blow descriptions of ongoing sea battles that for the life of me I couldn’t find on my horizons.” In his memoirs, published in 1984 after his years as a POW in North Vietnam and receiving a Medal of Honor, he recalled that night in the Tonkin Gulf.

“I had the best seat in the house from which to detect boats—if there were any,” Stockdale said. “I didn’t have to look through surface haze and spray like the destroyers did, and yet I could see the destroyers’ every move vividly.” There were “no boats, no boat wakes, no ricochets off boats, no boat gunfire, no torpedo wakes—nothing but black seas and American firepower.”

The destroyers ceased firing at 11:44 p.m., with no casualties or damage to either ship. It was just after noon, 12:44 p.m. EDT in Washington.

The Smoking Gun

Throughout the morning, Herrick had reported the destroyers under attack and returning fire. He soon became less certain. North Vietnam had only 12 torpedo boats, each carrying two torpedoes, so the entire fleet could not have launched the 26 torpedoes identified by the *Mad-dox* sonar.

Shortly after midnight, at 1:27 p.m. Washington time, Herrick sent a message saying, “Review of action makes many reported contacts and torpedoes fired appear doubtful. Freak weather effects on radar and overeager sonarmen may have accounted for many reports. No actual visual sightings by *Maddox*. Suggest complete evaluation before any further action taken.”

By then, the President had already reached his conclusions, and according to Assistant Secretary of State William P. Bundy, “It became very clear that he was in no mood for discussion.”

In a telephone call to the Pentagon at 1:37 p.m., Sharp said many of the reports were probably the result of “freak effects on radar and overeager sonarmen,” who “get keyed up with a thing like this and everything they see on the sonar is a torpedo.” Even so, Sharp said there was “no doubt” that an attack occurred.

Herrick was bombarded with inquiries from Washington and other levels, jumping channels and the chain of command. Unwilling to set aside the sightings and inputs from his crews, Herrick certified at 2:48 p.m. Washington time that the attacks were “bona fide.”

Any remaining uncertainty was swept aside by signals intelligence intercepts

that Secretary of Defense Robert S. McNamara described as “unimpeachable.” The smoking gun was a North Vietnamese “after-action report” furnished to McNamara that afternoon by the National Security Agency. It read, “Shot down two enemy planes in the battle area, and one other plan[e] was damaged. We sacrificed two ships and all the rest are okay. The combat spirit is very high and we are starting out on the hunt and [are waiting to] receive assignment. ... The enemy ship could have been damaged.”

This was not the usual format for an after-action report, and inexplicably, the “two ships” in the text NSA provided had been “two comrades” in the original translation. Much later, Louis Tordella, deputy director of NSA, told the Senate Foreign Relations Committee that the message almost certainly referred to the Aug. 2 skirmish, not to Aug. 4. The “two comrades” were most likely casualties on one of the boats from the earlier incident. The Vietnamese language intercept on which the translations were based was missing from the NSA files.

During the Aug. 2 attack, there had been numerous intercepts of boat-to-boat communications and instructions to the attacking boats. No such communications were heard on Aug. 4.

Johnson was champing at the bit. For political reasons, he dared not look weak or indecisive. He wanted the retaliatory air strikes to be delivered at 7 p.m. to coincide with a televised address to the nation, but to his dismay, the reprisals slipped forward. *Ticonderoga* was short of available aircraft. A second carrier, *Constellation*, was pressing toward Yankee Station, east of Da Nang, but was not yet in range of the targets. The first sorties were launched about an hour before Johnson began his address at 11:37 p.m.

Two aircraft were lost during the strikes, one of them an A-4C Skyhawk flown by Lt. j.g. Everett Alvarez Jr., who was captured and became the first American POW of the Vietnam War.

Future President Nixon and Republican presidential candidate Goldwater issued public statements of support and on Aug. 7, Congress adopted the Tonkin Gulf Resolution, giving Johnson the backing and authority he wanted.

The Search for Proof

The Pentagon, obviously uneasy with the evidence in hand, called for supporting information in a pointed message sent to US Pacific Command Aug. 6, with copies to the destroyers and the carriers.

"An urgent requirement exists for proof and evidence of second attack by DRV [Democratic Republic of Vietnam] naval units against TG 72.1 [the destroyers] on night 4 Aug. as well as DRV plans and preparation for the attack, for previous attacks, and for any subsequent operations," the message said. "Material must be of type which will convince United Nations Organization that the attack did in fact occur."

The carrier pilots were "re-debriefed" Aug. 7 and Aug. 11. The Department of Defense sent two high-ranking officials for the second re-debriefings: Both of them were lawyers.

The JCS message drew additional confirmation that the attack had happened, and the re-debriefings found an A-1 crew that had seen bursts of light (possibly gunfire from destroyers) and tracers (possibly from other US aircraft). The report sent forward amplified the possibility that this was a sighting of the enemy. In 1968, McNamara cited the crew statement in testimony and construed it as a significant element of proof of attack.

A Harris poll showed a huge jump in public approval for Johnson's handling of the war. Vietnam was neutralized as a campaign issue, and in November, Johnson won the election in a landslide.

Johnson had doubts of his own but he did not agonize over the possibility of error. He told Undersecretary of State George W. Ball, "Hell, those dumb, stupid sailors were just shooting at flying fish!" Later, when many in Congress criticized the war, Johnson said, "Congress gave us this authority, in August 1964, to do whatever may be necessary."

Questions and Challenges

Leaks and rumors about the Tonkin Gulf continued to circulate. The Senate Foreign Relations Committee, to which a number of the leaks had been directed, managed to obtain the official logbooks for *Maddox* and *Turner Joy* and opened hearings in February 1968. The White House attempted to block the inquiry, but was unable to do so.

The key witness was McNamara, who repeated his assurance that "while sonar and radar readings may be subject to interpretation and argument because of sea and atmospheric conditions, we had intelligence reports of a highly classified and unimpeachable nature which established, without question, that the attacks took place on both Aug. 2 and Aug. 4."

Sen. J. William Fulbright, the committee chairman, accused McNamara

of "selective declassification of security material," but the committee released its report without stating a conclusion. The DeSoto commander, Herrick, told United Press International that he still believed some of the sonar contacts had been torpedoes.

Congress repealed the Tonkin Gulf Resolution in 1970, but did so in the context of the war powers of the President and made no particular statement about the facts of the Tonkin Gulf incidents.

Nevertheless, the credibility of the government's story was hanging by a thread. "I think it was a complete phony," Goldwater said in 1980. "I think that Johnson plain lied to the Congress and got the resolution."

Further revelations appeared in books and articles. After reviewing the facts, Herrick told *US News & World Report* in 1984 that most likely, there had been no torpedoes. "It was the echo of our outgoing sonar beam hitting the rudders, which were then full over, and reflected back into the receiver," he said. "Most of the *Maddox's*, if not all of the *Maddox's*, reports were probably false." Herrick stated that conclusion again in 1985 and 1986.

On the other hand, in 1986 an official history, *The United States Navy and the Vietnam Conflict*, said that the evidence of a second attack in the Gulf of Tonkin was conclusive. McNamara moderated his position in his memoirs in 1995 but did not concede altogether. "The evidence of the first attack is indisputable," he said. "The second attack appears probable but not certain."

The Missing Pieces

Eventually, two historians finally pieced together the full story. Edwin E. Moise's *Tonkin Gulf and the Escalation of the Vietnam War*, published in 1996, used official documents and correspondence to reconstruct the night of Aug. 4 in great detail, plotting on maps the courses of the ships and each of the radar skunks.

Further information about signals intelligence, previously secret, appeared in, "Skunks, Bogies, Silent Hounds, and the Flying Fish," by Robert J. Hanyok in NSA's classified journal *Cryptologic Quarterly* in 2001. The article included the texts of the key intercepts and other details. It was declassified for public release in November 2005 with some sections blacked out.

John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributing editor. His most recent article, "The Bear Went Over the Mountain," appeared in the November 2011 issue.

After the Aug. 2 attack, NSA set up a team to collect and analyze the field intercepts. Responsibility was left to midlevel management, which probably felt the pressure to produce "proof" of the Aug. 4 attack.

According to Hanyok, the NSA summaries were "deliberately skewed to support the notion that there had been an attack." In preparing its reports, NSA used only 15 of the 122 available intercepts, selecting those that fit the official scenario. "US Sigint never intercepted anything associated with an [Aug. 4] attack," Hanyok said.

Meanwhile, McNamara had recanted about the Aug. 4 attack. Interviewed for "The Fog of War," a documentary film in 2003, he said, "Events afterward showed that our judgment that we'd been attacked that day was wrong. Didn't happen."

Edward J. Marolda, lead author of the 1986 Navy history, changed his mind as well. In a summary done in 2005 for the Naval History and Heritage Command, he said, "More recent analysis of that data and additional information gathered on the 4 Aug. episode now makes it clear that North Vietnamese naval forces did not attack *Maddox* and *Turner Joy* that night in the summer of 1964."

Some Navy veterans insist that Moise, Hanyok, and all the others are wrong and that the Aug. 4 attack did happen. Their arguments essentially boil down to the accusation that eyewitness sightings by deck and bridge crews have been disregarded or discounted. Their points are overwhelmed by the weight of other evidence.

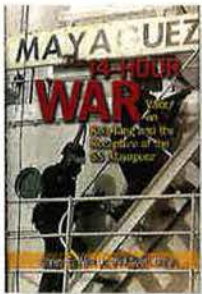
The misjudgments of Aug. 4-5 were not deliberate. For the most part, a chain reaction of mutually reinforcing mistakes built up to conclusions decision-makers were predisposed to believe.

These events did not start the war. It had begun much earlier—instigated, directed, and sustained by the North Vietnamese. Both North Vietnam and the United States were deeply committed. Escalation was probably inevitable, but it was the Tonkin Gulf imbroglio that determined how and when the buildup of US forces took place and shaped the authority under which the war was fought.

Whatever else, a cloud hangs permanently over the record of that amazing night in the Tonkin Gulf and the actions related to it. ■

Books

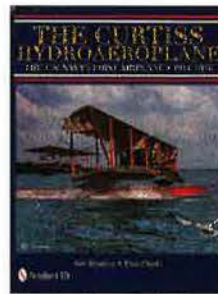
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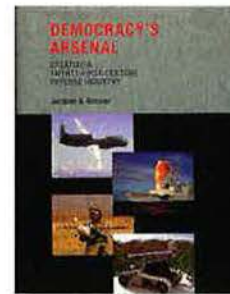
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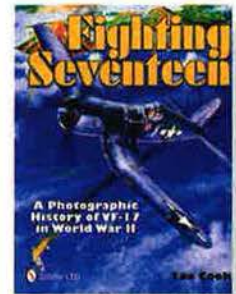
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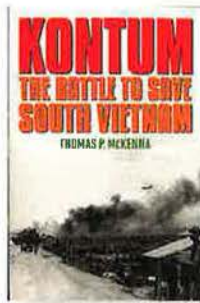
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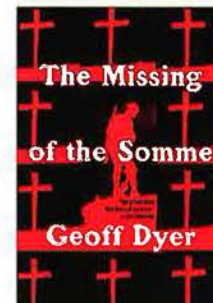
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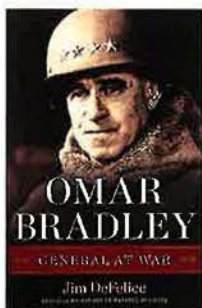
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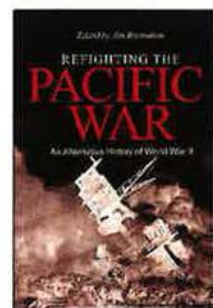
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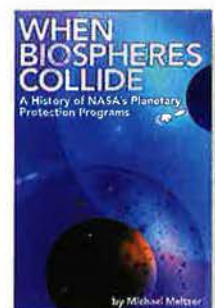
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AFA National Report

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By Frances McKenney, Assistant Managing Editor

Veterans Day in Washington, D.C.

On Veterans Day, Air Force Association Chairman of the Board S. Sanford Schlitt attended the annual breakfast reception hosted by President Obama and First Lady Michelle Obama at the White House.

In the East Room, he joined distinguished guests, including Department of Veterans Affairs Secretary Eric K. Shinseki, Defense Secretary Leon E. Panetta, Chairman of the Joint Chiefs of Staff Gen. Martin E. Dempsey, and Air Force Secretary Michael B. Donley.

The dignitaries afterward traveled across the Potomac River to Arlington National Cemetery, where the President laid a wreath at the Tomb of the Unknowns.

Schlitt, too, presented a wreath, on behalf of AFA, and attended the ceremony in observance of Veterans Day, held in the cemetery's outdoor amphitheater. Before the President addressed the audience, the master of ceremonies read the names of veterans organizations—and their top leaders—acknowledging those supporting the memorial service.

C-SPAN aired the wreath laying and ceremony live.

Veterans Day in Iowa

In Fort Dodge, Iowa, on Veterans Day, Justin M. Faiferlick's cell phone rang just before 7:30 a.m.

AFA's vice chairman of the board for field operations picked up to find US Sen. Charles E. Grassley on the line.

The Iowa Republican called to say he would be attending the **Fort Dodge Chapter's** annual Veterans Day ceremony.

Do you want to address the audience, Faiferlick asked the state's senior senator. Grassley declined and said he just wanted to be part of the audience gathered for the observance in the St. Edmond High School gym.

An Air Force Outstanding Airman of the Year delivered the keynote address. SMSgt. David L. Newman traveled some 180 miles to Fort Dodge from Offutt AFB, Neb., where he is a US Strategic Command superintendent in knowledge operations management.

The local *Messenger News* newspaper reported that Newman described



President Obama greets AFA Board Chairman Sandy Schlitt (left) and Patricia Schlitt at the White House breakfast reception on Veterans Day.

More photos at <http://www.airforce-magazine.com>, in "AFA National Report"

the day as "a celebration of those who made victory possible."

In organizing the celebration, Fort Dodge Chapter members rounded up an honor guard from the 133rd Test Squadron, Iowa Air National Guard, to present the colors and perform the POW-MIA remembrance ceremony. The Veterans of Foreign Wars provided a rifle cordon, with representatives from the Marine Corps League as flag detail.

St. Edmond students provided the music, with their band, choir, and buglers. The school's CyberPatriot team was introduced, as well, giving the students recognition and Faiferlick a chance to explain the program to Grassley and the audience.

Afterward, Faiferlick took the senator to the local VFW "to spend some time with veterans and have some bean soup and corn bread."

We've Got Wi-Fi

An AFA matching grant, arranged by the **Gen. Bruce K. Holloway Chapter**, has brought wireless Internet service to transient lodging at McGhee Tyson Arpt., Tenn.

Some 14 enlisted professional military education courses and more than 40 skills training classes take place at the base's I. G. Brown Air National Guard Training and Education Center.

According to a center press release, the students asked for Internet access "for years," to do research, work on online courses, manage personal finances, and communicate with their families.

In June 2010, chapter officials presented a \$2,000 grant to the center to help purchase hardware to put five dormitory buildings online.

"As things often happen in the military," wrote James M. Mungenast, chapter past president, "they got tied up in the contracting process and also needed some additional funds to make the system function for all its dorms. Well, it finally came to pass this fall."

On hand in September for a thank-you from the center were Joseph E. Sutter, former AFA board chairman; Stephen J. Dillenburg, current chapter president; Alfred M. Coffman, former Tennessee state president; and Mungenast, now Tennessee state president.

Some 4,200 service members attend training at McGhee Tyson each year.

Old [Military] Wives' Tales

Military wives were the focus of the **Southern Indiana Chapter's** observance of Veterans Day in Bloomington, Ind.

Air Force spouse Barbi Pugh entitled her talk to the November chapter meeting "A Waiting Wife of Vietnam."

Army spouse Catherine W. Lynch called hers "Old Army Wives' Tales."

Pugh's husband, William R. Pugh, did a medical internship at Andrews AFB, Md., then served on active duty 1964-67, as a flight surgeon.

Lynch's husband, Homer M. Lynch, retired as a Special Forces lieutenant colonel in 1975, after 22 years of active duty.

Chapter President James E. Fultz wrote that the wives had "war stories" about having to keep the family car and washing machine running, while on their own, and making austere quarters into a comfortable home. Fultz said their tales evoked "laughter to feelings of tearful nostalgia."

Awards and Briefings

Chased by a Nor'easter that dumped snow in parts of their state, New York AFAers gathered in Syracuse on Oct. 29 for a quarterly meeting and annual awards presentation.

Sanford E. Way accepted the Outstanding Chapter of the Year award

as president of the **Genesee Valley Chapter**. Richard H. Waring, president of the **L. D. Bell-Niagara Frontier Chapter**, received honors for 60 years of AFA service.

Retired Maj. Gen. Marvin Jay Barry served as the gathering's keynote speaker. Before his retirement in 2006, he was the advisor, on individual mobilization augmentees, to the chief of the Air Force Reserve.

In addition to Barry, Col. Timothy J. Labarge, commander of the 109th Airlift Wing, Schenectady County Airport, spoke to the group. He described his unit's missions "to the poles," as State President Maxine Donnelly Rauch put it. With ski-equipped LC-130s, the 109th is the primary provider of airlift for the military and the National Science Foundation in the Arctic and Antarctic.

Up and Running

It didn't even have its charter, but that didn't stop a nascent Florida chapter from carrying out a defense forum featuring several flag officers.

The **Sarasota-Manatee Chapter** had no time to waste, given the urgency of its topic: "The Budget Crisis and its Impact on the Military."

On Nov. 12—just two days after submitting the application for the chapter's charter—AFA Board Chairman S.

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Some of the benefits of AFA's new Corporate Membership Program include:

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Sanford Schlitt took to the dais at New College in his hometown of Sarasota, as moderator for three hours of presentations and a panel discussion on the military budget.

Speakers included retired Gen. Arthur J. Lichte, former commander of Air Mobility Command; retired Army Gen. Leon E. Salomon, who headed Army Materiel Command until retiring in 1996; and retired Vice Adm. Lewis W. Crenshaw Jr., former deputy chief of naval operations for resources, requirements, and analysis.

Chapter President Michael Richardson reported that their comments were optimistic, although Crenshaw said the military in the past "used to get less of more," since growth was built into its budget, but will now get "less of less."

Richardson said that when organizing this event, "everywhere I went looking for support, ... I found an Air Force link." The local *Herald-Tribune's* marketing director came from an Air Force family; the newspaper donated four ads—worth \$7,000—that Richardson credited with helping attract the majority of the audience of 65 people.

The newspaper steered him to the venue, New College, its partner for community events. Richardson found that the scheduler for this liberal arts honors college was an Air Force retiree.

Schlitt pointed out that the symposium went from "concept to event in about a month." The chapter itself went from concept to first meeting—in October—in less than a year. It has 70 charter members and a potential 330 members.

USAF in an Army Museum

With memorabilia from World War II Army Gen. George S. Patton Jr. as a backdrop, representatives of the **Gen. Russell E. Dougherty Chapter** took part in Retiree Appreciation Days at Fort Knox, Ky., in October.

Chapter President Jack A. Giralico and Chapter Membership VP Harold G. McManaway staffed a booth for two days inside the General George Patton Museum of Leadership.

The facility showcases the sometimes controversial Patton, who led Seventh Army in Sicily and Third Army across France. Its collection includes famous artifacts such as the general's ivory-grip pistols and the 1938 Cadillac he was riding in when he received fatal injuries in a car crash in Germany in 1945.

Retiree Appreciation open houses and information fairs take place at installations nationwide. Fort Knox intends to serve not only those in the Bluegrass State but also retirees in Indiana, Ohio, Illinois, and West Virginia. Giralico wrote that 1,400 people registered for it.

Activities included ID card application processing, a windshield bus tour

of Fort Knox, flu shots and health care screening, briefings on Tricare programs and on the changes coming to the installation, and an evening banquet.

McManaway said the chapter created flyers to distribute. They covered AFA's role in legislation affecting the military, the Outstanding Airman of the Year program, and AFA scholarships and grants.

The Air Force retirees seem to get a "boost from seeing the AFA presence" in an Army setting, McManaway wrote. "We also had numerous moms and dads stop by to tell us about their Air Force sons and daughters."

More Chapter News

- In Minnesota, the **Gen. E. W. Rawl-**

ings Chapter's membership VP, Robert McGonigle, set up an AFA booth for a Retiree Appreciation Day held in an equally unusual location: a huge casino hotel boasting more than 4,000 slot machines and nearly 100 blackjack tables. The Twin Cities Retiree Appreciation Day has taken place at this site for at least the last six years. Some 600 visitors dropped in to the information fair, this year, where about 20 booths had displays.

■ **David C. Jones Chapter** members visited the North Dakota Veterans Home in Lisbon, N.D., on Veterans Day. Chapter President Ken C. Fox arranged the event. Ronald L. Garcia, North Central Region president; James W. Simons, state president; and members James Bowman and Bernard L. Harper



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Jr. toured the facility and joined the residents to watch a flag ceremony. The AFAers were then introduced to the audience, and Simons related a history of Veterans Day and spoke about today's Air Force. Garcia presented donations to the facility, and the AFA visitors then sat down to chat with the residents.

■ In Texas on Veterans Day, several members of the **Fort Worth Chapter** attended the annual wreath-laying and luncheon at Texas Christian University. Attending the event were Joseph M. Ramsey, chapter president; Thomas J. Kemp, veterans affairs VP; James T. Castleman, education VP; Timothy J. Malone, leadership VP; and Peter Polinsky, a TCU alumni. Guest speaker was test pilot Paul Metz.

■ The **Tidewater Chapter** helped the city of Virginia Beach, Va., carry out its Veterans Day parade by coordinating an Air Force presence. Chapter VP Allan G. Berg invited the Air National Guard's 203rd RED HORSE Squadron, AFJROTC cadets from two high schools, and a Civil Air Patrol squadron to take part. Chip Moran arranged for a color guard from JB Langley-Eustis, Va., to lead these units. Chapter members rode in a van decorated with AFA emblems and distributed 3,500 aircraft photos, donated by aerospace companies. Chapter President William M. Cuthriell Jr.'s

grandchildren, Keri and Mitchell Cuthriell, rode in the chapter's parade float.

■ Representing AFA in Maryland, **Baltimore Chapter** VP Robert Pelletier attended the Community College of the Air Force graduation at Fort George Meade, Md., in November. He presented AFA Pitsenbarger Awards to MSgt. Walter Haden, SSgt. Thomas Blackshear, and SSgt. Steven Vanderheiden. The fourth awardee, SrA. Sheree McFadden, was not present. Pitsenbarger Awards provide \$500 to selected active duty and reserve enlisted personnel who plan to pursue a bachelor's degree.

Charles G. Thomas, 1940-2011

Retired Col. Charles G. Thomas, an AFA national director emeritus, died Nov. 2 in Albuquerque, N.M. He was 71.

Born in 1940 in Manhattan, N.Y., he graduated from the Air Force Academy, Class of 1961. He flew more than 7,000 hours in different aircraft, his favorite being the C-141. His final military assignment was as wing commander, 1606th Air Base Wing, Kirtland AFB, N.M.

After retiring from the Air Force in 1988, he worked in state government in New Mexico and for 13 years at Sandia National Laboratories.

He held several AFA offices and had been a member of the Audit Committee and the Field Council.

reunions@afa.org

Reunions

AF Public Affairs Alumni Assn, including civilians. May 3-5 at the Hilton St. Louis Frontenac, St. Louis, MO. **Contact:** John Terino (703-239-2704) (johnterino@afpaaa.org).

7th Special Ops/Air Commando Sq, all years. May 17-20 at the Quality Inn Hotel in Fort Walton Beach, FL. **Contact:** Max Friedauer, 7th Air Commando Society, 10 Ridgelake Dr., Mary Esther, FL 32569 (850-243-1343) (max@7thsos.org).

77th Fighter Sq. Jan. 7 at Shaw AFB, SC. **Contact:** Michael Long (803-895-1328).

Seeking **B-17 crew, 2nd Bomb Group, 15th AF**, North Africa and Italy, for a reunion. **Contact:** Ron Morrissette (ronmorr1@verizon.net).

E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Unit Reunions," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

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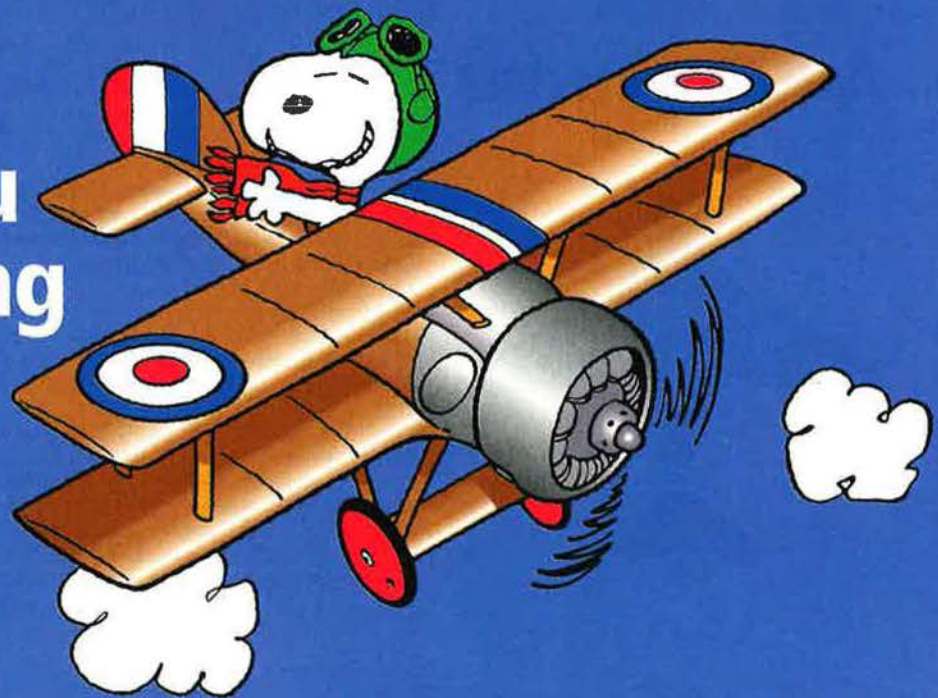


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A-6 Intruder



For the Navy and Marine Corps, the A-6 Intruder holds the title of "best attack aircraft ever." The Grumman aircraft put in more than 34 years of intense service in a wide variety of roles in many wars. It was extraordinarily successful, whether flying from US Navy carriers at sea or from aircraft bases on land. Form followed function in the Intruder, depriving it of beauty but endowing it with tremendous capability.

The striking success of Korean War-era attack aircraft, when combined with huge advances in electronics, prompted the Navy in the late 1950s to call for an all-weather, treetop-level, long-range subsonic attack airplane. Grumman won the competition with its twin-engine A2F-1, later the A-6A. The bulbous forward fuselage provided

room for the pilot and the navigator-bombardier in slightly staggered side-by-side seating, along with the massive electronic suite. A fixed refueling probe was mounted on the nose. The A-6, with five hardpoints, carried the heaviest bomb load of any carrier aircraft. It could carry nuclear weapons, too, and the Intruder's adaptability allowed it to undertake many other roles.

Navy and Marine Corps squadrons were flying the A-6 by 1963, and operations in Vietnam began in 1965. There, its heavy bomb load and low-level, all-weather capability made it invaluable. The A-6, however, was sent into the thickest of air defenses, and 84 were lost. The Intruder would go on to serve in virtually every US conflict, major or minor, until its retirement in 1997.

—Walter J. Boyne

This aircraft: USMC A-6E Intruder—BuNo #152908—as it looked in summer 1974 when part of VMA(AW)-224 at NAS Brunswick, Maine.



An Intruder comes in for a landing on the deck of USS Constellation.

In Brief

Designed, built by Grumman ★ first flight, April 19, 1960 ★ crew of two (pilot, bomb-nav) ★ two Pratt & Whitney J52 turbojet engines ★ number built 693 ★ **Specific to A-6E:** max speed 644 mph ★ cruise speed 474 mph ★ max range 3,245 mi ★ armament, AIM-9 air-to-air missiles ★ load, some 18,000 lb of bombs, missiles, rockets, mines ★ weight (max) 60,400 lb ★ span 53 ft ★ length 54 ft 9 in ★ height 16 ft 2 in.

Famous Fliers

Vietnam War: William Carr. **Notables:** Donald Boecker, Charles Bolden, Dan Brandenstein, Lyle Bull, Robert Cabana, J. K. Davis, Richard Dunleavy, Donald Eaton, William Fallon, William Fitch, Fredrick Hauck, Mark Kelly, John Lehman Jr., James Symonds. **Test Pilots:** Chuck Sewell, Robert Smyth. **Author:** Stephen Coonts.

Interesting Facts

Attracted design proposals from Bell, Boeing, Douglas, Grumman, Lockheed, Martin, North American, Vought ★ entered combat July 1, 1965, flying against Hanoi targets ★ nicknamed "Double Ugly," "Iron Tadpole," "Drumstick" ★ carried every type of US and NATO air-to-ground weapon ★ designed to have downward-swiveling jet nozzles for STOL, but never applied ★ fitted with wingtip-mounted speed brakes ★ featured in a 1986 Stephen Coonts novel, *Flight of the Intruder*, and 1994 sequel, *The Intruders* ★ appeared in 1991 John Milius film, "Flight of the Intruder."



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