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October 2010, Vol. 93, No. 10



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About the cover: Airmen ready an EC-130H for departure from the Operation Iraqi Freedom theater. See "A 'New Dawn' in Iraq," p. 46. L.SAF photo by Maj. Dale Greer.

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Arms Control, On a Schedule

IT TOOK the United States and the Soviet Union the better part of a decade to come to terms on the Intermediate-range Nuclear Forces (INF) Treaty, but when they did it was a blockbuster. Ronald Reagan and Mikhail Gorbachev agreed in December 1987 to eliminate an entire class of medium-range missiles and allow for the first-ever US inspections of Soviet nuclear forces.

INF was followed by the Strategic Arms Reduction Treaty signed in 1991 by Gorbachev and President George H. W. Bush. START built upon INF's inspection procedures, and (until it expired last December) gave the US valuable insight into Russian nuclear force levels and capabilities.

But after 21 years of on-site inspections, no US nuclear inspectors have had access to Russian nuclear facilities in nearly a year. Over time, this lack of knowledge could force the US into "worst case" planning assumptions about Russia's strategic forces and its capabilities and intent. That is not in America's best interest.

The Senate this fall will debate whether to ratify New START, which would restore US access to Russian nuclear sites. President Obama and Russian President Dmitry Medvedev signed New START in April, and the Senate Foreign Relations Committee passed it by a 14-to-four vote in September. The next step is a full Senate vote.

New START critics implore Senators not to rush to judgment or "rubber stamp" the treaty. The fact that the Administration has formally answered more than 900 questions from a Senate that has held more than 20 hearings should allay any concerns that legislators are rubber-stamping this treaty.

Critics have pointed to missile defenses and verification concerns as the two greatest weaknesses with the treaty. New START prohibits the US and Russia from converting existing ICBM or SLBM silos into missile defense launchers, for example.

As the critics tell it, this is a dangerous development that prevents the US from being able to adequately protect its citizens and allies. In reality, it is a non-issue.

The treaty does not restrict new missile defense programs or capabilities,

and the US has no interest in converting existing nuclear weapons silos into ground-based interceptor silos.

"What I would do is, if we had to expand the number of GBIs, is build a new missile field," Army Lt. Gen. Patrick J. O'Reilly, director of the Missile Defense Agency, told reporters in Washington, D.C. "It would be less expensive, faster, and easier to maintain." It costs about \$20 million less, per interceptor, to build

New START is far superior to the uncertainty and guesswork that accompany no agreement whatsoever.

a new GBI silo from scratch, compared to converting an existing ICBM silo.

US missile defenses are not even designed to stop a Russian attack—30 interceptors can do next to nothing against the Russian arsenal. What they will continue to do is offer protection against attack from rogue states such as North Korea or Iran.

The other principal concern is that New START lacks verification strength, so Russia will have the ability and incentive to cheat.

Regarding inspections, old START was negotiated with a massive Soviet weapons complex in mind. Under that agreement, 28 annual inspections were allowed at 70 sites. Under New START, there will be 18 inspections permitted in a much smaller Russian nuclear enterprise that now includes 35 sites. The number of visits per site is actually increasing.

Could Russia escape from treaty limits by fielding a rail-mobile ICBM? US officials note that Russia presently has no such system, and if it develops one it will still be an ICBM—and therefore accountable.

Air Force Gen. Kevin P. Chilton, head of US Strategic Command, says the US nuclear triad is a powerful deterrent against both cheating and attack. "We have a devastating and assured response that will continue to exist," Chilton said in September. In fact, the treaty allows the US to structure its forces as it sees fit under the overall caps and to shift nuclear systems to conventional missions.

Top US officials are of the unanimous opinion that New START's inspections and notifications (bolstered by always-advancing "national technical means") ensure the US will be aware of any Russian monkey business before serious military disadvantages accrue. In response, the US would have the ability to return warheads to its nuclear systems.

"Does it matter if the Russians cheat?" Chilton asked. "Of course it matters, and I would hope it matters to the Russians." Ultimately, compliance with the treaty is to their advantage as well.

A final complaint is that New START does nothing to rein in Russia's overwhelming advantage in "tactical" nuclear weapons. This is true, but the non-strategic nukes have never been included in strategic agreements, and the Administration has pledged to pursue this issue separately in the future.

The numbers of allowed weapons and launchers, Chilton said, were derived from strategic assessment, not a top-down mandate, and include the appropriate "hedge" for uncertainty.

Here, then, is what New START will accomplish: Consistent with the goal of every President since Reagan, it will help reduce US nuclear forces to the lowest level needed for national security. It takes the US and Russia to 1,550 deployed warheads, compared to START's 6,000 and today's 2,200 under SORT, the 2002 Strategic Offensive Reductions Treaty. America's triad of nuclear-capable B-2 and B-52 bombers, Minuteman III ICBMs, and Trident submarines will be protected and preserved.

New START is not perfect. It is, after all, a negotiated agreement. But it is far superior to the uncertainty and guesswork that accompany no agreement whatsoever.

Although there seems to be little appetite to have a vote before November's midterm elections, the Senate would be wise to act quickly on New START, either by ratifying it or voting to withhold approval until specific concerns are addressed. On the whole, the US is better off having access to Russia's nuclear bases, and there is no reason for New START negotiations to drag out like INF's did 30 years back. ■



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Lavelle

The sorry conclusion to the Lavelle story, presented to a limited audience in *Air Force Magazine* by General Casey in February 2007 [*"Lavelle, Nixon, and the White House Tapes," p. 86*] has now achieved full-blown public confirmation by the *Wall Street Journal*, the *New York Times*, the Office of the Secretary of Defense, and the President [*"Editorial: The Lavelle Syndrome," September, p. 4*].

We know, from the Nixon tapes, of the "profiles in courage" shown in this matter by Nixon, Kissinger, and Haig. Yet to be fully explained are the roles of the then-serving ambassador to South Vietnam, the Secretary of Defense, the Chairman of the JCS, the Secretary of the Air Force, the Chief of Staff of the Air Force, COMUSMACV, the director of the Joint Staff, and the USAF IG. The evidence suggests that many were aware of the truth of Lavelle's claim. The history of this affair will not be complete until the actions and motivations of these individuals are analyzed and reported.

We try to inculcate in service members a clear and strong sense of honorable conduct in the profession of arms. Is this an example that we want to use in our honor classes?

Brig. Gen. William L. Shields,
USAF (Ret.)
Tucson, Ariz.

I was delighted to read that President Obama corrected the records and restored the rank for General Lavelle. I do not know if I agree that Secretary [Michael W.] Wynne and Gen. [T. Michael] Moseley are part of the "Lavelle Syndrome" at work. You can't head up an organization that loses track of nuclear weapons without expecting to suffer consequences. Secretary Gates made a good call on those firings.

The worst case of injustice I saw in

my 28-year Air Force career was the punishing of Brig. Gen. Terry Schwalier for the Khobar Towers bombing. The person(s) who should have been fired were those who made the decision to build the dormitory in such a dangerous place. Who did we blame for the Oklahoma City bombing? We blamed the perpetrator, Timothy McVeigh. Why did we blame Schwalier for the Khobar bombing? He had implemented numerous initiatives to secure the security and safety of his troops. The terrorists who blew up Khobar Towers are the only ones responsible. Schwalier deserved promotion. What is so disappointing about the Schwalier situation is that his superiors should have stood behind and backed their on-scene commander. Schwalier was an outstanding officer. He had deservedly earned higher rank. I recommend that President Obama reopen Schwalier's case, correct the records, and restore his rank—while he still is alive.

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

Cyberwar

The article "Building Better Cyberwarriors," September [p. 50], is a fine article on how USAF is using modern technology to accomplish the mission.

Do you have a comment about a current article in the magazine? Write to "Letters," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. (E-mail: letters@afa.org.) Letters should be concise and timely. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Letters without name and city/base and state are not acceptable. Photographs cannot be used or returned.—THE EDITORS



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To educate the public about the critical role of aerospace power in the defense of our nation.

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Letters

However, in the second paragraph on p. 50, SrA. Desiree Lozano notes that in the old days, "if you were using checklists, [it meant] you didn't know how to do your job."

I served "in the old days," and retired in 1978 after serving 25 years. Be assured that we knew how to do our job, and yes, we used checklists. All aircrews used them for preflight, take-off, landing, postflight, etc., and I am sure they continue to do so. I served as an electrical technician and maintained B-36s, B-47s, B-52s, KC-97s, KC-135s, along with a host of base support and other transient aircraft. I was also an electrical tech on the Atlas F missile. In all of these assignments, the use of checklists was mandatory. The bombers and the missiles on alert held nuclear weapons, and the use of checklists was absolutely essential. Woe to the maintenance technician who didn't use the checklist during an ORI or other inspection. It meant an automatic failure for that tech, and it was a mark against his section. Please don't impugn those of us who served "in the old days." We used checklists and did our jobs well. I look back with pride, knowing the B-36 never dropped a weapon in anger. That is successful mission accomplishment. Yes, we knew how to do our job in the old days.

SMSGt. Maurice R. Garifo,
USAF (Ret.)
Tucson, Ariz.

US in Uzbekistan

The feature article "Kicked out of K2" in the September 2010 issue of *Air Force Magazine* highlights a systemic and chronic problem in the way the US relates to foreign governments: muddling military needs with a vague foreign policy goal of a better world [p. 88].

The US needed bases in Uzbekistan. Securing those bases should have been a simple quid pro quo arrangement: You (Uzbekistan) give us something we want (basing rights), and we give you something you want (money, hardware, etc.). Instead, we allowed the State Department to impose unrealistic democratization, human rights, and freedom of the press conditions on a society that was actively resistant to such measures. The outcome should have been a surprise to no one.

Such behavior by the US emboldens elements within a foreign country to agitate for change. Often, these elements expect some substantive help from the US, which never comes (remember the Kurds in Iraq?). The result, again, is predictable, with the ruling oligarchy cracking down forcefully on the agitators.

Most of the world's countries are ruled by nondemocratic oligarchies maintained in place by force. Calling Islam Karimov a "president" makes him no less a dictator. It is long past time for the US to recognize that rulers have only one goal: to stay in power by whatever means they find necessary. Conditions internal to another country that do not affect US interests should be of no concern to the US.

If we had accepted Karimov for the man he is, dealt with him in concert with that acceptance, and recognized we were not going to change his world view, we would still have bases in Uzbekistan.

Lt. Col. Richard F. Colarco,
USAF (Ret.)
Colorado Springs, Colo.

Ancient Nukes

"The Weird Nukes of Yesteryear" by Norman Polmar and Robert S. Norris recalls an era when military doctrine had not yet been moderated to today's standards [September, p. 94]. In the early 1960s, the Davy Crockett was an attempt to provide the Army with survivability in the absence of guaranteed air superiority and close air support. Should our airpower be diminished, such solutions may again have to be explored.

The coverage of the Davy Crockett nuclear recoilless rifle brought to mind my service in Korea (ROK) in 1964. I was platoon leader, 3rd Platoon, A Company, 2nd Battalion, 5th Cavalry, 1st Cavalry Division. Our platoon was tasked with providing security for a Davy Crockett field exercise south of the Imjin River. I was issued a film strip and glass styrette to measure radiation. I remember well setting up security and eating C rations next to the bulbous warhead.

The title "Weird Nukes" is appropriate. Years ago, at a VA facility, I was asked to recount any exposure to nuclear material. When I described the Davy Crockett, the interviewer rolled his eyes, and patronizingly ended the session. No one was ready to believe that the Army had a nuclear round with a range of one mile. Not to mention that officers were to hold up their thumb to measure the mushroom cloud, and report back the "thumb widths" so that yield could be ascertained.

An interesting fact about the tripod-mounted Davy Crockett: The tube slung under the nuclear warhead is a .50-caliber rifle barrel. Fifty-caliber tracer rounds were to be used as spotting rounds, having a similar trajectory and impact as the nuclear round. (This was exactly the same design and meth-

odology as the 106 mm recoilless rifle, conventional jeep-mounted anti-tank weapon.) The .50-caliber round under the Davy Crockett cleared the major round by an inch or two.

The authors end their article by describing these "weird" nukes as impractical and absurd. In our time, a pair of conventionally armed F-15Es can do the job better than the Davy Crockett. The most weird, impractical, and absurd action is to abandon our dedication to tactical airpower. The smaller the Air Force becomes, the sooner the nuclear option has to be employed, regardless of how "absurd."

I've been reading every issue of *Air Force Magazine* for over 20 years. I never thought I'd see the Davy Crockett and the old Army fatigues of 1964.

Frank Goldstein
Morristown, N.J.

The Decisiveness of Airpower

I enjoyed Phillip S. Meilinger's article, "A Short History of 'Decisiveness,'" in your September issue [p. 98]. I wish to quarrel, however, with his paragraphs covering the Battle of Britain (1940) and the Battle of Crete (1941), where he says, "If Germany had achieved air superiority over the English Channel, Britain could not have prevented an invasion. ... This would have inevitably led to British defeat." He cites Royal Navy losses in the Battle of Crete, by implication further buttressing his argument concerning the Battle of Britain.

This is, indeed, the conventional wisdom, but it has been effectively debunked by a number of studies including, among others, Derek Robinson's *Invasion, 1940*, and my own "The Royal Navy in the Battle of Britain," in *The Historian*, winter 1992. We have argued that:

(1) By September 1940, the earliest month in which the Germans could have launched their seaborne invasion (Operation Sea Lion), the British Army was no longer a pushover. It would have taken the Germans many weeks to land and build up their beachheads sufficiently to defeat the British Army.

(2) During those weeks, the Royal Navy, operating mostly at night, would easily have destroyed the Germans' troop and supply convoys and their pitiful German naval escorts, and bombarded their ports of embarkation and the beachheads themselves. The Royal Navy had an awesome superiority in minelayers, minesweepers, gunboats, destroyers, and cruisers, very few of which would have gotten sunk by the Luftwaffe, since the latter lacked equipment and training in attacking fast-moving warships and boats in the dark. This is proven by the fact that, during the summer of 1940, the Royal Navy's anti-invasion ships and

boats carried out many operations in the nighttime channel with few casualties. Even in the daytime, the Luftwaffe failed to score heavily against Royal Navy minelayers, minesweepers, and other anti-invasion craft that summer; again, the Luftwaffe simply lacked the equipment, training, and experience to fight fast-moving ships and boats, even in daylight. (Remember that, at Dunkirk, the Royal Navy's ships and boats had to come to complete stops at a predictable place—that is, off the beach, which explains their heavy losses there—but suffered only in the daylight.)

All of this is confirmed by the Battle of Crete, where the Royal Navy, operating at night, destroyed a German-Italian seaborne invasion force, thus forcing the Germans to stage a risky and costly airborne invasion. If the British Army on Crete had held out for weeks, the Germans could not have supported their airborne force by sea in the face of Royal Navy nighttime operations.

Of course, we celebrate the victory of Britain's first line of defense (the RAF), but that is not to say that Britain lacked a viable second line (the Royal Navy) and even a third line (the Army), the latter giving the RN weeks in which to destroy Sea Lion. The Luftwaffe did achieve air superiority over the channel (though not over southern England), but its "victory" was really irrelevant to its (unachievable) military objective—the overwhelming of the Royal Navy—and irrelevant to its political objective, the intimidation of Britain's Parliament and people, meant to bring about the fall of Churchill's cabinet and his replacement by (the Germans hoped) an appeaser cabinet. Preventing the Luftwaffe from discrediting Churchill was the RAF's major victory, not preventing Sea Lion.

Hitler understood all this. He would not likely have launched Sea Lion unless he were convinced it would be a "sure thing," something he could never have counted on (unless Parliament and people panicked), no matter how much air superiority the Luftwaffe had achieved over the channel.

Karl G. Larew
New Park, Pa.

Classics

OK, I'm an airplane nut and always will be, and that's probably why I went into the Air Force, and I like the guys and gals in the Air Force Association. I read just about anything I can get my hands on, legally, when it comes to aircraft, and one of the best of the best is our own *Air Force Magazine*. When it arrives, I have to stop whatever I'm doing and read it from cover to cover, and usually twice.

This issue has what I think is an inadvertent error. Check out "Airpower

Classics," which has a superb article about the A-4 Skyhawk [September, p. 128]. What's my beef? Take a careful review of the entry for "Famous Fliers." Who's missing? Who is it that is among those heroes who were interned at the Hanoi Hilton? Paul Galanti, of course.

David A. Ellis
Fredericksburg, Va.

Wild Blue

I was interested in your article "Saved by the Wild Blue Yonder" [September, p. 102].

I was a "flying cadet," enlisting in April 1941. I was sworn in at Fort Harrison on Saturday and a flying student on Monday. My primary was at Parks Air College, East St. Louis, Ill. My basic was at Randolph Field ("the West Point of the Air"). My advanced was at Foster Field, Victoria, Tex., where I received my wings Dec. 12, 1941, from fighter training.

I never heard the song "Off We Go, Into the Wild Blue Yonder" the entire time that I was a cadet. The song that we sang was "Into the air, Army Air Corps."

Robert S. Sternberger
Indianapolis

When it comes to the Air Force Song, we could easily have been singing the "Air Force Blue." When I joined the Air Force in 1960, we heard it a lot and I thought it was probably going to be the new Air Force song, but it was not to be. For those who have never heard it, Mitch Miller did a great rendition of it.

So while our Air Force Song as we all know it is a great song, there was at least one other one out there that could have been our the Air Force Song, too. I have read that "Air Force Blue" is still popular and is performed regularly by the USAF band as part of their program.

MSgt. William A. Coup,
USAF (Ret.)
Hopkins, S.C.

I read with interest David A. Lande's account of the origins of the Air Force Song. One interesting factoid not mentioned is that the song is copyrighted. Robert Crawford transferred the copyrights to Carl Fischer, Inc., owing to a lack of Air Corps funds to publicize the song. Crawford granted the Air Force a perpetual exemption from paying royalties, but the song will not be released into the public domain until 2044. I discovered this bump in the road while researching service song medleys for a large entertainment producer. I also learned at that time that the Coast Guard Song is similarly copyrighted. The Army, Navy, and Marine Corps Songs are in the public domain.

Col. Robert W. Swaney,
USAF (Ret.)
Newport News, Va.

Space management overhaul; Executive agent limitations; Fighter reality check

ORGANIZE YOUR SPACE

Following an eight-month review, Air Force Secretary Michael B. Donley has directed a sweeping reorganization of the service's headquarters space management structure, consolidating functions and designating Air Force Undersecretary Erin C. Conaton as the focal point for space matters.

The Air Force is also negotiating with the Defense Department about its status as executive agent for space. The review found that although it technically has EA status, the Air Force lacks "the authority necessary to address and resolve space issues within DOD" and wants to clarify just how far its authority goes.

The service is hoping to finally resolve uncertainty about its executive agent status, which has persisted since 2005, when prolonged vacancies in top USAF positions saw its space management functions pulled back by the Office of the Secretary of Defense.

In a late August memo to senior USAF leadership, Donley said the restructuring will "posture us to accommodate any future decisions on the roles and functions of the EA for space." Donley had previously expressed his wish that USAF be given back full EA authorities to direct defense space activities.

Donley's order contained nine broad actions to streamline USAF's myriad headquarters efforts on space policy, acquisition, and operations. Conaton was named as the senior USAF official for space, having authority over all space matters involving "planning, policy, strategy, international relations, space interagency relations" and will be the main point of contact with the Office of the Secretary of Defense on space matters.

However, the assistant secretary of the Air Force for acquisition will be in charge of space procurement issues.

Moreover, although not mentioned in Donley's memo or the review, Donley—not Conaton—will remain the individual with executive agent authority. In the past, Air Force Secretaries have delegated this authority to their undersecretaries. Donley gave his HQ space enterprise until the start of September to implement his directives.

The other changes largely reaffirm the existing headquarters space functions but streamline their reporting chains. One of them creates an Air Force Space Board, chaired by Conaton and Gen. Carrol H. Chandler, the vice chief of staff. The board will integrate USAF's space enterprise efforts and coordinate with the other military branches in the space domain.

The review was based on interviews with 70 key space leaders who have served at various levels in USAF, DOD, and other agencies with a related space function. It was prepared by Richard W. McKinney, Air Force deputy undersecretary for space programs. In a report to Donley, McKinney said the space leaders interviewed considered the Air Force's often disconnected space oversight efforts to be "confusing" and ripe for streamlining.

However, "those interviewed were near unanimous in saying, 'Don't change what is working well,' especially in

the operational arena," McKinney said. Those things included the integration of space capabilities in joint activity at all levels; development of 14th Air Force "operational expertise"; the training of space professionals; cooperation with US STRATCOM; space launch; and on-orbit operations.

Donley's directive was focused solely on headquarters activities and didn't address any changes in field organizations such as Air Force Space Command or the Space and Missile Systems Center in California, where most

of USAF's space system development activities are handled.

McKinney posed two questions in his review: "Does the Department of Defense want to have an executive agent for space?" and how could DOD "better integrate the large number of space governance organizations?" Answering the second question, McKinney suggested that DOD set up its own Space Council, comparable in scope and authority to the Deputy's Advisory Working Group, the powerful joint board of service vice chiefs charged with deconflicting DOD efforts. Creating a Space Council would allow OSD to consolidate or eliminate many of its space committees that don't easily fit together, or with other space organizations, McKinney said.

PIECING IT TOGETHER

Within the Air Force headquarters, however, space responsibilities are "fragmented," McKinney said. The arrangement made sense seven years ago when USAF was made executive agent and had wide and definitive authority over the overall DOD space enterprise. However, since much of that authority was taken back by the DOD leadership, "this organizational construct is no longer effective or efficient," he wrote.

The Air Force was named executive agent for space by Defense Secretary Donald H. Rumsfeld in 2003. The move was based on recommendations from a panel Rumsfeld himself had chaired immediately before taking over at the Pentagon. It was charged with suggesting ways to more efficiently and effectively align the bewildering array of space activities among the four armed services and defense agencies.

Rumsfeld named the Air Force and its Secretary the executive agent for space, a title and authority that was



United Launch Alliance photo

Space is coming together.

Overwhelm The Threat



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then delegated to the undersecretary. To further consolidate and rationalize military space, the undersecretary was given a second hat as head of the National Reconnaissance Office, a heavy user of USAF space assets and expertise, and a partner in developing sensitive space systems.

In 2005, though, mounting budget overruns and schedule delays with key USAF space projects made headlines. Then-Air Force Secretary James G. Roche left in January of that year, and his replacement, Michael W. Wynne, wasn't confirmed until nine months later. Peter B. Teets, the undersecretary-acting Secretary-head of the NRO, left office two months after Roche and was not replaced for the rest of the Bush Administration. (Conaton was not installed as the undersecretary until a year after Obama was in office.)

In the 2005 absence of confirmed Air Force leaders—and with cost overruns continuing to draw congressional ire—OSD took back milestone authority for space from the Air Force. That meant OSD, not Air Force, would have the authority to approve development, advancement, or production of any space system and deal with Congress as to the overall space picture for the Pentagon.

The Air Force said that not having milestone authority hasn't rendered its executive agent status moot. A service spokesman said it has been doing overall DOD space planning since 2003, develops the annual National Security Space Plan for all DOD components, and provides oversight for DOD's Operationally Responsive Space Office.

However, USAF gave up the NRO job in 2009, when Bruce Carlson, a retired USAF general and former head of Air Force Materiel Command, took command of the agency. Donley, in his memo, said the undersecretary and NRO positions were deemed too big a job for one person.

In his report, McKinney recommended that the Air Force establish "a very visible and effective headquarters focal point for space in Washington, D.C.," the better to coordinate with OSD, the other services, and other space-using federal agencies.

MOVING THE FIGHTER GOALPOSTS

The Air Force has revised its planned inventory of fighters downward several times in the last few years, but the Government Accountability Office, in a recent report, says USAF won't even hit its reduced fighter level goals.

The report, "Tactical Aircraft: DOD's Ability To Meet Future Requirements Is Uncertain, With Key Analyses Needed To Inform Upcoming Investment Decisions," was released in August. It notes that the Air Force plans to maintain a fighter inventory of 2,000 fighters for the foreseeable future—down from 2,500 in 2002 and 2,250 last year—but will actually drop below that level in 2012 and continue declining to a plateau of about 1,800 aircraft in 2030, under best-case conditions.

The new F-35 fighter won't be delivered fast enough to keep pace with the retirement of old F-16s, the GAO said. Even if the Air Force were to hold to a production rate of 80 F-35s a year, though—a rate GAO said is "optimistic"—it would not be able to sustain its desired numbers, as the oldest fighters age beyond their life expectancy and it becomes uneconomical to extend their service lives.

Moreover, "the services have not fully reconsidered tactical aircraft requirements in light of recent changes in strategic planning and threat assessments," which probably put the needed numbers of fighters higher than the services have pegged them: 2,000 for the Air Force, 820 for the Navy, and 420 for the Marine Corps.

The Air Force and Navy-Marine Corps received marching orders in the Quadrennial Defense Review to maintain their force structure for the coming 15 years. However, delays in the F-35, the fact that no new fighters are on the drawing board,



Loathed Martin photo by Tom Reynolds

Best case: 1,800 fighters in 2030.

and uncertainties about the role to be played by remotely piloted aircraft make it almost impossible to suggest what the services ought to do about the looming shortage, GAO reported. The Pentagon needs to do a "joint comprehensive analysis that compares and contrasts the costs and benefits of various Air Force and Navy options for addressing inventory shortfalls," according to the report.

The GAO assumed that the new F-22 inventory will remain fixed at about 186 aircraft through 2030. Also lasting through that year, at about 310 aircraft, is the fleet of A-10s, which are undergoing a structural and equipment upgrade—including new wings—that will extend their lives. The fleets of F-15C/Ds and F-15Es will diminish slowly from a combined 500 or so airplanes through the end of the 2010s, then rapidly age out in the 2020s. The F-16 fleet will hold steady at about 900 aircraft for a few years, then begin a steady retirement of about 100 a year, until the type vanishes in about 2031.

The GAO noted that the expected USAF shortfall isn't as bad as once was thought.

"At one point, the shortfall was expected to be as large as 800 aircraft," when the Air Force was expecting to produce only 48 F-35s a year—something that still may happen if procurement accounts are slashed further. The shortfall was reduced in part by the Air Force's dialing down its planned inventories by 250 aircraft. Last year, the Air Force elected to retire 250 aircraft early, with the idea of applying the savings toward buying F-35s and paying for upgrades to the remaining legacy aircraft.

The Air Force F-35 and F-16 inventories, according to the service, will be roughly equal in 2021; the GAO is skeptical of that assertion.

"The Air Force has established a [new] servicewide method of calculating aircraft service life," the GAO noted. "This new calculation accounts for both the number of flight hours and the severity of flight conditions, a calculation that the Air Force believes will improve both fleet management and force planning by providing higher quality information regarding aircraft structural life."

Among its recommendations—mostly having to do with obtaining more accurate data on how long aircraft will last and how many are required to fulfill national strategy—the GAO suggested that the Pentagon expand its Aircraft Investment Plan, the first of which was released with the Fiscal 2011 budget request.

In addition to mapping out simply how many aircraft the Pentagon will buy, the GAO suggested the Pentagon also note what structural or capability improvements or service life extensions are planned for existing aircraft. The Pentagon responded that such reporting won't be included in future editions of the Aircraft Investment Plan because Congress didn't ask for it. ■

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Airman Dies in Afghanistan

An Air Force Special Operations Command combat controller with the 23rd Special Tactics Squadron died Sept. 16 in Afghanistan. SrA. Daniel R. Sanchez, 23, of El Paso, Tex., died at a medical facility in Tarin Kwot, Afghanistan, after being wounded by enemy fire during combat operations in Oruzgan province.

Maj. Chris Larkin, 23rd STS commander, said in a Sept. 17 statement, "Danny was a fine airman and a valuable member of our close community."

Eglin Airman Killed in Iraq

The Department of Defense confirmed the death of an Eglin AFB, Fla., airman Sept. 16. SrA. James A. Hansen, 25, died Sept. 15 of wounds received during a controlled detonation at JB Balad, Iraq. Hansen was an airfield management operations coordinator at Eglin.

Lt. Col. David F. Radomski, commander of the 46th OSS, said Hansen had a positive impact on everyone who worked with him. "Our thoughts and prayers are with his family and friends. He will be sorely missed."

USAF, Navy To Collaborate on RPVs

The Air Force and Navy announced the first meeting of a new joint working group for their respective RQ-4 Global Hawk and MQ-4C Broad Area Maritime Surveillance (BAMS) remotely piloted vehicles. The meeting was from Aug. 3 to 5 at Beale AFB, Calif., where the two services discussed the development of joint operations and training for the two programs.

In addition to discussions about activities with the two fleets, Navy officials observed how Beale's 1st Reconnaissance Squadron trains future Global Hawk pilots, and how the 12th RS employs the aircraft in theater. The Navy wanted to see how the Air Force conducts its RQ-4 operations and how to best fit the BAMS program alongside to save money, said Cmdr. Wes Naylor, BAMS program manager.

The working group is one of the initiatives to emerge from the memorandum of agreement the two services signed

in June to seek synergies in operating the Global Hawk-BAMS fleets. The goal is for each branch to be able to fly the other's aircraft and also to potentially form joint RQ-4 Global Hawk and BAMS squadrons.

C-5 Moves Anti-matter Detector

A C-5M from Dover AFB, Del., flew an enormous \$2 billion anti-matter detector from Geneva, Switzerland, to the Kennedy Space Center in Florida on Aug. 26, where the device will be transported to the International Space Station aboard the final space shuttle flight next February.

The 8.3-ton Alpha Magnetic Spectrometer, developed by the European Organization for Nuclear Research and a coalition of scientists from 16 countries, NASA, and the US Department of Energy, has been under development for 16 years. When scientists discovered the AMS wouldn't fit in a 747 freighter, they specifically put in a request for the C-5M, USAF's modernized and upgraded Super Galaxy featuring new engines and avionics. The airlifter arrived in Geneva after delivering supplies to Afghanistan and Iraq. The aircraft's commander, Capt. Matt Matis, said the mission was a great opportunity to showcase the aircraft's capabilities.

The AMS will dock with the ISS this coming February to gather evidence of charged particles such as anti-matter to help physicists understand the composition of the universe, according to Nobel Laureate Samuel C. C. Ting, the experiment's leader, from MIT.

Kehler to Take Over STRATCOM

Gen. Kevin P. Chilton, who has led US Strategic Command since October 2007, will retire from active duty after 34 years, the Air Force announced Sept. 2. President Obama nominated Gen. C. Robert Kehler to succeed him at STRATCOM. Kehler has been leading Air Force Space Command since October 2007. Kehler previously served as STRATCOM's deputy commander for two-and-a-half years.

Chilton is a command astronaut pilot with more than 5,000 flight hours. He

USAF photo by Dennis Rogers



graduated from the Air Force Academy in 1976, entering undergraduate pilot training in May 1977. He flew assignments in the RF-4C and F-15 and tested weapons in the F-4 and F-15. Chilton served 11 years at NASA, flying on three space shuttle missions.

Raytheon Wins SDB II Contract

The Air Force selected Raytheon on Aug. 9 to supply the Small Diameter Bomb Increment 2 system, and awarded the company a \$451 million contract to

begin engineering and manufacturing development of the weapon. Raytheon beat a Boeing-Lockheed Martin team vying to build the new munition. SDB II is an air-launched precision strike standoff weapon that would improve on the first generation of SDBs by being able to hit moving and fixed targets in all weather conditions.

The design Raytheon submitted is designated the GBU-53B and features a seeker with millimeter-wave radar, uncooled imaging infrared, and semi-

active laser modes. Bomb deliveries are expected to begin in 2013. Air Force F-15Es and Marine Corps and Navy F-35s will be the initial aircraft to carry SDB IIs.

Bradley Airport Gets New Center

Construction began Aug. 5 on a new air and space operations center at Bradley Airport in East Granby, Conn. It will be managed by the 103rd Airlift Wing.

Responding to decisions in the 2005 BRAC round, the Air Guard wing is adding the facility for its new AOC, as well as



09.11.2010

Air Force Academy cadets rush to keep a giant US flag aloft on the academy's football field during a halftime memorial ceremony honoring the victims of the terrorist attacks of Sept. 11, 2001. The Cadet Drum and Bugle Corps performed as the flag was unfurled. New York Police Department detective Steve Hayden and FDNY firefighter Kenny Haskell, responders during the World Trade Center attack, were honorary captains for the game.



Welcome to the Fleet: Ground troops watch as a C-27 Spartan conducts a nearby air-drop operation in Afghanistan. The rugged C-27's short takeoff and landing capabilities make the Spartan ideal for operations in Afghanistan's treacherous terrain.

offices, conference space, and training areas. The wing's 103rd Air and Space Operations Group will run the AOC, which is to reach initial operational capability by next spring.

In March, the base began expanding the wing's facility for repairing engines for A-10 ground attack aircraft as part of another BRAC-directed move.

C-130J Associate Unit Established

On Aug. 6 at Keesler AFB, Miss., the Air Force reactivated the 345th Airlift Squadron, as an active associate unit to Air Force Reserve Command's 403rd Wing, which operates C-130Js at the base.

The arrangement will put 345th AS personnel alongside their Reserve counterparts in Keesler's 815th AS and 403rd Maintenance Group. They will fly eight AFRC C-130Js. Eventually the unit will operate 10 J models. The 345th AS is organized under the 19th Airlift Wing at Little Rock AFB, Ark., and is now the third active associate squadron assigned to the wing.

GPS Satellite Goes to AFSPC

The 2nd Space Operations Squadron at Schriever AFB, Colo., took command of GPS IIF-1 on Aug. 25, the Air Force's first Global Positioning System Block IIF satellite. The satellite entered service on Aug. 30, joining 30 other operational satellites in the GPS constellation.

The satellite operators assumed responsibility for the spacecraft from airmen at Los Angeles AFB, Calif., who oversaw

operations during its on-orbit checkout after the May 27 launch. In early August, the Air Force announced the IIF-1 had reached its designated operational orbital station.

Boeing is building 12 Block IIF satellites for the Air Force. They feature a more robust military signal, improved accuracy, and a new civil signal.

Airmen Train With Polish Unit

About 50 airmen from Ramstein AB,

Germany, trained with Polish military personnel at Powidz AB, Poland, from Aug. 13 to 19, working on training requirements for C-130 Hercules operations.

Members of Ramstein's 86th Airlift Wing and 435th Contingency Response Group conducted parachute jump drills, night flying practice, and related activities with airmen of the Polish Air Force's 3rd Air Wing and Polish Operational Mobile Reaction Group. The 86th AW flies C-130Js, while the Polish 3rd AW flies refurbished C-130Es. Ramstein aircrews fulfilled their night flying requirements as well, as there were fewer restrictions in the Polish airspace.

Under the banner of Operation Screaming Eagle, the exercises strengthened bonds and built on the partnership the two C-130 units formalized in June when they became sister wings.

Exercise Pushes Tools for Combat

Airmen with the 480th Intelligence-Surveillance-Reconnaissance Wing at Langley AFB, Va., collaborated with members of the Army, Navy, Marines Corps, and the armed services of several allies during Empire Challenge 10, an annual ISR demonstration and exercise designed to improve interoperability and push proven new technology to help troops in combat.

The demonstration, which ran from July 26 to Aug. 13, tested out more than 30 new capabilities with the goal of delivering them to commanders in Afghanistan. "You can go out on a limb and take risks during an exercise that you wouldn't dare try in a real-world operation," said 1st Lt. Josh Cutino,


Conaton Becomes Lead for USAF Space

Air Force Secretary Michael B. Donley in August designated the Air Force undersecretary, currently Erin C. Conaton, as the senior Air Force official for space matters at the headquarters level. This came after an extensive review of headquarters space functions.

The Air Force undersecretary's office is now the focal point for planning, policy, strategy, international relations, interagency relations, and working with the Office of the Secretary of Defense on all space matters, Donley said in a memo dated Aug. 25. The lone exception is space acquisition oversight, which shifts from the undersecretary's office to the purview of the Air Force's assistant secretary for acquisition. The move consolidates all service acquisition functions—space and non-space—under one office.

Donley's memo outlined Air Force headquarters-level realignments to streamline space oversight, following the completion of a space review he ordered last December. The review discovered space functions were fragmented, leading to confusion over roles, responsibilities, and relationships.

Another result of the space review is the establishment of an Air Force Space Board, per Donley's memo. "This board will serve as the overarching forum to integrate acquisition, international affairs, plans, requirements, operations, and training efforts related to space," he wrote. The Air Force undersecretary will co-chair the board, along with the USAF vice chief of staff. The head of Air Force Space Command and other senior Air Staff and USAF secretariat officials will sit on the board as well.



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mission operations commander with Langley's 30th Intelligence Squadron. Airmen used the Distributed Common Ground System as the tool to integrate technologies during the exercise. DCGS is a worldwide network of hubs, which analysts use to share and exploit imagery and intelligence and disseminate information to troops in combat.

Viper Destroyed for Drone Test

Air Force weapons testers at Eglin AFB, Fla., blew apart an F-16 fighter on the base's range Aug. 19 to test the flight termination system to be installed on modified QF-16 target drones, USAF's next generation aerial target aircraft.

Up to 126 early model F-16s will be converted to the QF-16 designation as remotely piloted target drones by Boeing. They will be used to test performance of new air-to-air and surface-to-air weapons. The range test in August was one step toward satisfying range

Gates Puts JFCOM On Chopping Block

As part of his push to scale back overhead and reduce inefficiencies in the Pentagon's budget, Secretary of Defense Robert M. Gates is recommending the closure of US Joint Forces Command in Norfolk, Va.

"Training joint forces, generating joint doctrine, and experimenting with that doctrine are all valuable tasks," he said. "However, they do not necessarily require a separate four-star combatant command." Gates plans to assign JFCOM's functions to other organizations, including the Joint Staff. The Defense Business Board which advises Gates suggested the idea in July, noting it considered the command too bloated with contractors and redundancies.

Among Gates' other initiatives are the elimination of the office of the assistant secretary of defense for networks and information integration. These changes would take effect in Fiscal 2012, if Congress allows them. Not long after the announcement, several members of Congress pushed back—particularly the Virginia delegation. In late August, the Senate Armed Services Committee announced it would hold a hearing in September on the planned closure. Sen. Jim Webb (D-Va.) called the White House's and OSD leadership's failure to consult Congress on the recommendations "deeply troubling," and urged Gates to be more forthcoming with additional details regarding the planned closure.

USAF photos by Samuel King Jr.



Boom Goes the Dynamite: An F-16 bursts apart in an explosion on the range at Eglin AFB, Fla. The controlled blast was a static test of the flight termination system to be installed on the future QF-16, a supersonic, reusable, full-scale aerial target drone to be modified from an F-16. Under evaluation was the system's ability to immediately and fully terminate a flight. The test also helped determine a "debris footprint" for safety purposes.

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USAF Supports Iraqi Freedom Drawdown

On Aug. 19, the 4th Stryker Brigade, 2nd Infantry Division, from JB Lewis-McChord, Wash., crossed the Iraq-Kuwait border, the last dedicated combat brigade in Iraq to draw down. Overhead, airmen provided an armed overwatch, keeping a protective eye on the movement of soldiers across more than 300 miles of desert. Manned fighters surveyed and protected the route, while joint airborne battle staff personnel flying aboard a C-130 helped keep communications linked up. The withdrawal came just days before Operation Iraqi Freedom formally ended.

Sept. 1 saw the US mission in Iraq acquire a new handle: Operation New Dawn. With Operation New Dawn, the Air Force will have a smaller footprint in Iraq as it is primarily responsible for training and advising the rebuilding Iraqi Air Force. The force had only 1,500 airmen and 28 aircraft two years ago, but as of late August had 7,000 airmen and more than 100 aircraft.

The IqAF will grow to more than 10,000 members by 2012, according to USAF officials. Iraqi airmen are already beginning to integrate onto bases formerly dominated by US and coalition forces, such as Joint Base Balad, Ali Base, and Sather Air Base in Baghdad.

Roughly 6,000 airmen will remain in Iraq, said Maj. Gen. Joseph Reynes Jr., director of Air Component Coordination Element-US Forces Iraq, and their missions will remain largely the same: providing intelligence-surveillance-reconnaissance, cargo and passenger airlift support, and armed overwatch of Iraqi forces in case strikes are needed. The mission will be demanding and complicated, he added, but airmen will work to train Iraqi forces throughout the country so they can take over the mission completely by the end of 2011.

safety requirements for the new drones, said Kevin Diggs, the QF-16 test and evaluation lead.

The QF-16s are scheduled to enter service around 2014 and will replace the Vietnam-era QF-4s currently used by the Air Force.

GPS Block III Ready for Production

Air Force and industry officials completed the critical design review of the Global Positioning System Block III satellite about two months ahead of time, prime contractor Lockheed Martin announced Aug. 20.

The next generation satellite system is ready to enter the production phase after its design was scrutinized for four days at Lockheed's Newtown, Pa., facility by company officials and more than 350 members of Air Force Space Command, DOD, and other federal agencies.

The Block III satellites guarantee signals three times more accurate than current GPS spacecraft and provide three times more power to military users, said Col. Bernard J. Gruber, GPS wing commander at Los Angeles AFB, Calif. The new Block III satellites also will feature improved timing and anti-jamming capabilities. Up to 12 of the GPS Block IIIA satellites will be produced under the current contract. The first will be ready for launch by 2014, according to Lockheed officials.

ANG Hosts NATO Exercise

The Wisconsin Air National Guard

hosted the first-ever international training exercise in the US for NATO forward air controllers. Called Ramstein Rover 2010, the exercise ran from Aug. 21 to Sept. 3 at Volk Field ANGB's Combat Readiness Training Center in Madison and other nearby facilities. The training offered realistic scenarios to help alliance FACs prepare for deployments to Afghanistan.

About 40 NATO personnel participated from Belgium, Britain, Canada, the Czech Republic, Estonia, Germany,

Greece, Italy, Latvia, Lithuania, Poland, and Slovenia. Fifteen FAC instructors coached them, and A-10s, F-16s, B-1s, KC-135s, remotely piloted vehicles, and helicopters supported the exercise. Col. Rob Redanz, the exercise director, said the scenarios offered valuable opportunities for air and land integration in situations the FACs would face down range.

ABL Missile Test Canceled

The Missile Defense Agency terminated its planned Airborne Laser test bed shutdown experiment off the California coast on Sept. 1, when corrupted beam control software steered the laser off center. It was to have been the second shutdown test. Originally scheduled for Aug. 17, the test was delayed several times to fix other problems. An Aug. 24 test was scrapped due to difficulties with calibration of the tracking beam, MDA officials said. MDA planned to reschedule the test for mid-October.

MDA Director Army Lt. Gen. Patrick J. O'Reilly had said the ALTB's second shutdown test would have attempted to knock down a Scud-type medium ballistic missile from twice the distance of the initial test in February (which hit a missile from a distance of more than 50 miles over the Pacific).

USAF Studies Consolidated Training

The Air Force announced Aug. 16 it is considering the creation of a training campus at Hurlburt Field, Fla., that would consolidate its command and control instruction across the force. Training in one location would leverage cross functional expertise and provide a



Tip to Tail: Maintainers perform an isochronal inspection on a C-130J Super Hercules at Ramstein AB, Germany. The inspections are in-depth looks at—and into—every aspect of the aircraft. They last 10 days, are performed every 420 days, and take about 60 airmen from many career fields to perform.

USAF photo by TSgt. Wayne Clark



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Operation Enduring Freedom—Afghanistan

Casualties

By Sept. 21, a total of 1,279 Americans had died in Operation Enduring Freedom. The total includes 1,277 troops and two Department of Defense civilians. Of these deaths, 980 were killed in action with the enemy, while 299 died in noncombat incidents.

There have been 8,041 troops wounded in action during OEF. This number includes 3,762 who were wounded and returned to duty within 72 hours and 4,279 who were unable to return to duty quickly.

Operation Everest Sets New Standards for Theater Airdrops

Members of the 816th Expeditionary Airlift Squadron set a high mark for C-17 airlift operations in Southwest Asia in early August, when the squadron dropped 1.2 million pounds to 22 different drop zones in Afghanistan and elsewhere in theater. This included fuel, water, food, and additional supplies at several forward operating bases over the course of one week.

Dubbed Operation Everest, the airlift was an effort to fully exercise the C-17 airdrop capability in Southwest Asia, said Lt. Col. Stephen Ritter, the 816th EAS commander. The idea for the operation was inspired by efforts such as the "Hump" missions over the Himalayas in World War II and the Berlin Airlift, where squadrons would push up tempos. The normal operations tempo would go up after a big push, due to efficiencies uncovered, Ritter noted.

The missions added up to 837 bundles dropped, a new record for C-17 drops in one week, and helped demonstrate to US Air Forces Central planners how airlift assets could put mass out into drop zones with fewer people. Among accomplishments during the operation were three airdrops in one day using one aircraft and two crews, as well as three airdrops in one day with one aircraft and crew.

Bagram Gets Larger Fuel Bladder To Meet Demands

To meet the demands of increasing air operations at the base, airmen with the 455th Expeditionary Logistics Readiness Squadron and other units set up a new 200,000 gallon-fuel bladder at Bagram Airfield, Afghanistan—effectively doubling the fuel storage capacity at the busy coalition air hub.

Since there are no fixed facilities at Bagram for fuel, the bladders allow the US and allies to store large amounts of fuel close to the aircraft that need it, said SMSgt. Arnaldo Rodriguez-Matos, fuels superintendent for the 455th ELRS. Approximately 30 airmen set up the 4,300-pound bladder in a plastic-lined dike where it will house fuel for transient and deployed aircraft.

dedicated venue, said Maj. Gen. Stanley T. Kresge, commander of the Air Force Warfare Center at Nellis AFB, Nev.

The integrated campus would include formal C2 training for component numbered air forces, air and space operations centers, and staff forces. Hurlburt is already home to Air Combat Command's 505th Command and Control Wing. ACC officials have tasked Kresge's organization with overseeing a study to explore the viability of the campus, and expect the results to be complete for a senior-level decision in January.

F-35 Sensor Makes Test Bed Flight

The modern Electro-optical Targeting System sensor under development for the F-35 Joint Strike Fighter made its first flight aboard a surrogate test aircraft, Lockheed Martin announced Aug. 16.

The sensor, known as EOTS, flew on the F-35's cooperative test bed aircraft, a modified 737 known as CATBird, and provided the first opportunity to test and evaluate how it integrates into the F-35's sensor architecture, Lockheed officials said. Test flights on CATBird represent the final step prior to EOTS integration on BF-4, the F-35 test aircraft equipped with a full suite of mission systems.

EOTS will provide pilots with high-resolution imagery, automatic target tracking, and laser designation, all at standoff ranges.

GAO To Expedite Protest Ruling

The Government Accountability Office will issue its ruling on US Aerospace's KC-X tanker protest in early October, about a month earlier than required by law, the agency confirmed in August. According to the GAO, the decision on US Aerospace's complaint against the Air Force is expected by Oct. 6, which is 35 days sooner than the Nov. 10 deadline.

US Aerospace lodged a protest on Aug. 2, after learning the Air Force considered its proposal ineligible for arriving after the KC-X contract deadline. The company disputes the point, contending their proposal had arrived at Wright-Patterson AFB, Ohio, before the deadline of 2 p.m. on July 9. Pentagon officials have maintained they would announce the winning KC-X contractor sometime this fall—likely after the midterm November elections.

The Air Force is already evaluating tanker bids by Boeing and EADS North America.

Predator Unit Breaks 50,000 Hours

Reflecting the rapid growth of the remotely piloted aircraft mission, the first Air National Guard unit assigned to operate MQ-1 Predators surpassed 50,000 total flying hours with them,

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Senior Staff Changes

RETIREMENTS: Lt. Gen. David A. **Deptula**, Maj. Gen. Paul A. **Dettmer**, Maj. Gen. David M. **Edgington**, Maj. Gen. Maurice H. **Forsyth**, Maj. Gen. Frederick F. **Roggero**, Brig. Gen. Peter F. **Hoene**.

NOMINATIONS: **To be General:** Philip M. **Breedlove**, William L. **Shelton**. **To be Lieutenant General:** Stanley T. **Kresge**. **To be Major General:** Otis G. **Mannon**.

CHANGES: Maj. Gen. Brooks L. **Bash**, from Dir., Ops., AMC, Scott AFB, Ill., to Vice Cmdr., PACAF, JB Pearl Harbor-Hickam, Hawaii ... Lt. Gen. (sel.) Stanley T. **Kresge**, from Cmdr., USAF Warfare Ctr., ACC, Nellis AFB, Nev., to Cmdr., 13th AF, PACAF, JB Pearl Harbor-Hickam, Hawaii ... Maj. Gen. (sel.) Otis G. **Mannon**, from Spec. Asst. to the Cmdr., AFSOC, Hurlburt Field, Fla., to Vice Cmdr., AFSOC, Hurlburt Field, Fla. ... Brig. Gen. Frederick H. **Martin**, from Spec. Asst. to the Cmdr., AMC, Scott AFB, Ill., to Dir., Ops., AMC, Scott AFB, Ill. ... Maj. Gen. Robin **Rand**, from Dir., LL, OSAF, Pentagon, to Spec. Asst. to the Vice C/S, USAF, Pentagon ... Maj. Gen. (sel.) Lori J. **Robinson**, from Dep. Dir., Force Application & Spt., Jt. Staff, Pentagon, to Dir., LL, OSAF, Pentagon.

COMMAND CHIEF MASTER SERGEANT CHANGE: CMSgt. David W. **Williamson**, to Command Chief Master Sergeant, USAFE, Ramstein AB, Germany.

SENIOR EXECUTIVE SERVICE RETIREMENTS: Alan K. **Bentley**, Dennis M. **Firman**.

SES CHANGES: William H. **Booth Sr.**, to Dep. Asst. SECAF, Force Mgmt. & Integration, Office of the Asst. SECAF, Manpower & Reserve Affairs, Pentagon ... Michael S. **Elliott**, to Dep. Dir., Strat. Stability, Jt. Staff, Pentagon ... Lorna B. **Estep**, to Dep. Dir., Log., AFMC, Wright-Patterson AFB, Ohio ... Edmundo A. **Gonzales**, to Sr. Advisor to the Asst. SECAF, Manpower & Reserve Affairs, Office of the Asst. SECAF, Pentagon ... Ross E. **Marshall**, to Exec. Dir., Oklahoma City ALC, AFMC, Tinker AFB, Okla. ... Susan J. **Thornton**, to Dir., Engineering & Tech. Mgmt., ESC, AFMC, Hanscom AFB, Mass. ■

less than four years into its tenure of operating the RPAs.

The ANG's 163rd Reconnaissance Wing at March ARB, Calif., surpassed the milestone during a routine mission supporting operations in Southwest Asia on Aug. 7, the wing announced. To put the milestone in perspective, the wing used to fly KC-135 tankers about 3,000 hours annually, said Col. Randall Ball, the 163rd RW commander. The wing switched from Stratotankers to Predators in November 2006, part of the 2005 BRAC restructuring.

Air Guardsmen use ground stations at March to control Predators flying in Afghanistan, and the 50,000-hour mark

includes nearly 1,400 hours accumulated by the wing's Predator schoolhouse.

Pilot Error Led to E-4B Damage

The pilot of an E-4B aircraft excessively increased the pitch angle while landing at night at Offutt AFB, Neb., which damaged the aircraft's tail when it struck the runway, according to the results of an Air Combat Command accident investigation board released Aug. 20.

The tail and lower fuselage sustained about \$3.1 million in damage, but the crew and pilots were not injured in the May mishap. The AIB identified several factors that contributed to the accident, including pilot misperception of condi-

tions and procedural errors such as overcontrolling the input to the yoke of the aircraft.

E-4B National Airborne Operations Center aircraft serve as airborne command and control platforms for the President and DOD leadership during national emergencies.

Scientist Praises Smaller ABL

The Airborne Laser Test Bed is a "remarkable physics experiment," said Zachary J. Lemnios, director of defense research and engineering at the Department of Defense, in a meeting with reporters in Washington, D.C., on Aug. 19, but the Pentagon is pursuing smaller lasers which would fit onto smaller platforms he called more feasible for real-world use.

Lemnios, the Pentagon's top scientist, told reporters research into high kilowatt solid-state lasers will advance significantly over the coming months, as the Air Force and the Defense Advanced Research Projects Agency are funding a number of projects using the ALTB to validate other high-powered laser concepts.

Donley Sees Progress on Housing

Air Force Secretary Michael B. Donley said in a Sept. 1 speech the service will have built or renovated more than 23,000 privatized homes by the end of Fiscal 2010. The 23,000 number counts all the homes built or renovated since 1998.

The Air Force's cooperation with private developers has been a "quiet, but

Ace in the Hole: Air Force Academy cadet Jeremiah Baxter pulls the lure as Ace, a black Gyr-Saker falcon, makes a pass at it. Baxter is the cadet-in-charge for the academy falconry team, which performs demonstrations at halftime during football games.



USAF photo by SSgt. Bennie J. Davis III



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Backwash: An F-15 takes off from Andersen AFB, Guam, while two E-3 AWACS aircraft wait on the ramp. USAF bombers, fighters, tankers, and ISR aircraft are at the base participating in *Valliant Shield*, a joint service exercise. More than 100 aircraft flew from Andersen to conduct sorties in various Pacific region exercise scenarios.

successful," partnership, Donley said, allowing the service to leverage taxpayer dollars to provide homes at lower cost to thousands of airmen who might otherwise have waited years longer for them. In August, 97 junior enlisted airmen and their families moved into new homes at Barksdale AFB, La., built by private developer Pinnacle.

Development Initiatives Approved

The Air Force's Force Management and Development Council approved an initiative in August that transforms the way the service prepares its senior enlisted leaders, giving enlisted leaders more say in identifying airmen for the right jobs and developing and managing enlisted talent within their respective career fields.

Within the service's specialty codes, senior noncommissioned officers will be directed into critical positions, based on training, education, and experience, according to a USAF statement announcing the change. Staff sergeants, for example, will have to attend the NCO academy before pinning on their next chevron. This is designed to give them leadership skills earlier in their careers. To make this possible, the Air Force will expand NCOA capacity by 16 classrooms, and a site location task force will determine which of the existing locations of the academy will be expanded in the near future.

Lakenheath Takes On Baltic Mission

An expeditionary contingent of F-15s and airmen from the 493rd Fighter Squadron at RAF Lakenheath, England, assumed responsibility for NATO's Baltic air policing mission Sept. 1.

The deployment will last four months, during which 125 airmen and their F-15s—now the 493rd Expeditionary Fighter Squadron—will operate out of

Lithuania AB, Lithuania, securing the airspace of Estonia, Latvia, and Lithuania. The 493rd EFS replaces a Polish Air Force unit in the policing mission. The deployment marks the third time since 2004 the US Air Force has had the rotational Baltic defense mission, and the second time for the 493rd's F-15s.

Troops Retain Combat Pay in Iraq

The end of formal combat operations in Iraq under Operation New Dawn does not mean the end of combat pay for airmen and other military personnel still operating in the country, according to the Department of Defense.

According to DOD statements, troops deployed to Iraq are eligible for hostile fire-imminent danger pay, hardship duty pay, and incidental expenses. Pay for enlisted troops will still be tax exempt, while pay for officers remains tax exempt up to \$7,611.30 a month, as was the

case during Operation Iraqi Freedom. These payments compensate military members for arduous conditions and additional burdens and dangers associated with being deployed to a combat zone, a DOD spokeswoman said. Iraq and the Arabian Peninsula were designated combat zones in January 1991.

World War II Airmen Identified

The remains of two airmen missing in action from World War II were identified and returned to their families for burial with full honors, the Pentagon's Prisoner of War/Missing Personnel Office announced.

US Army Air Forces 1st Lt. Ray F. Fletcher, of Westborough, Mass., was buried Aug. 20 in Burlington, Vt.

On May 10, 1944, Fletcher and four others on board a B-25 Mitchell bomber took off from Ajaccio, Corsica, on a courier mission to Ghisonaccia, Corsica. They failed to reach the destination and were reported missing three days later. Two days afterward, French police found aircraft wreckage on the island's Mount Cagna.



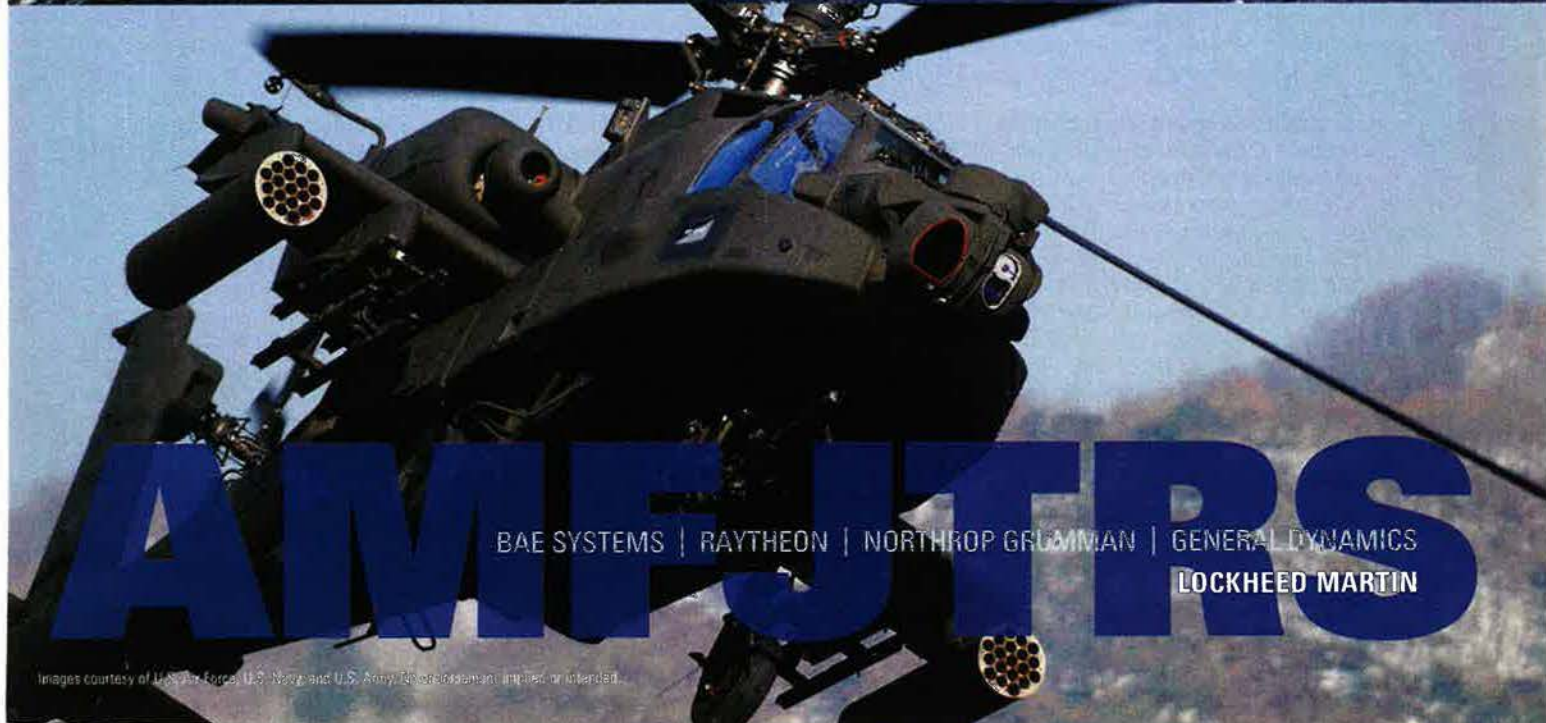
Delivering the Goods: Airmen unload a CH-47 Chinook helicopter part from a C-17 at Chakala AB, Pakistan. The helicopter will be used to support flood relief efforts. Just 36 hours into the flooding, C-17s and C-130s were flying aid flights, delivery hundreds of thousands of halal meals to Pakistan. Airmen delivered millions of pounds of relief aid, and officials say the US military will continue to provide aid for as long as it is requested by the Pakistani government.



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USAF photo by Joe Oliva



Vaporized: An F-16 creates a "cone" of condensation as it nears Mach 1 during a flyby at an open house at the Air National Guard's Volk Field ANGB, Wis. The cone appears as jet aircraft experience a sudden drop in pressure at high speed.

The US Army visited the crash site later that year, reporting that remains were not recoverable. Not until 1989 did Corsican authorities notify the Army they had found wreckage of a World War II-era aircraft and turned over remains collected at the mountainous location. In 2005, a DOD Joint Prisoners of War, Missing in Action Accounting Command

team excavated the site and recovered additional remains and crew equipment. DOD scientists used DNA to help identify Fletcher's remains.

DOD also announced the identification of Sgt. John P. Bonnassiolle. He was a crewman in a B-24J bomber that went down over Germany in 1944. The remains were identified and then returned

to his family. Bonnassiolle, a native of Oakland, Calif., was buried Aug. 10 in San Francisco with full military honors.

Bonnassiolle was one of 10 airmen lost on April 29, 1944, when their bomber crashed near the town of East Meitze, Germany, north of Hanover during a bombing raid directed against Berlin. Excavation of the site by a German citizen in 2003 led DOD to uncover remains and crew-related equipment, including identification tags.

Gen. T. Ross Milton (1915-2010)

Retired Gen. T. Ross Milton, leader of the second bombing raid on Schweinfurt, Germany, in October 1943, and of the first successful daylight strike on Berlin five months later, died Aug. 24 in Oro Valley, Ariz. He was 94.

Born in 1915 in Hawaii to an Army family, he graduated from West Point in 1940. After completing pilot training, he flew in Eighth Air Force in World War II, participating in some of the Eighth's most storied operations. After the war, he served as chief of staff for the Combined Airlift Task Force for the Berlin Airlift from 1948 to 1949; commander of the 41st Air Division and 13th Air Force; and USAF inspector general and comptroller. He retired from the Air Force in 1974, and became a longtime contributor to *Air Force Magazine*. ■

News Notes

■ Thirteenth Air Force concluded a civil engineering summit at JB Pearl Harbor-Hickam, Hawaii, on Aug. 22 for midlevel officers from 14 Asia-Pacific partner nations, from Bangladesh and Cambodia to India, Indonesia, Malaysia, and others. The exchange enhanced regional partnerships and interoperability among the nations. Training focused on areas such as emergency management preparation, disaster response, and fire prevention.

■ Air Combat Command released the draft environmental impact statement for a proposed expansion of the Powder River Training Complex over portions of Montana, North Dakota, South Dakota, and Wyoming. The Air Force wants to modify the airspace to enable B-1s from Ellsworth AFB, S.D., and B-52s from Minot AFB, N.D., to train more realistically. This includes establishing new low-altitude airspace and high-altitude training areas. Some civil traffic would be affected, according to the document.

■ More than 250 airmen and a contingent of F-16s from Aviano AB, Italy, completed a two-week visit at Kallax AB, Sweden, in August, where they trained with Swedish airmen and Gripen fighters. During the deployment, beginning

July 30, airmen from Aviano's 555th Fighter Squadron and 31st Aircraft Maintenance Squadron worked with counterparts of the Swedish Norrbotten Wing, conducting air-to-air and air-to-ground flying missions at the Vidsel Test Range.

■ Lt. Gen. Donald C. Wurster, commander of Air Force Special Operations Command, topped the list of 2010 selectees for the Air Commando Hall of Fame, announced Aug. 13. Others selected for induction were Col. Richard F. Brauer Jr., Col. James B. Connors, Col. Kenneth H. Poole, Col. Walter K. Schmidt, CMSgt. Michael J. Ramos, CMSgt. A. Eugene Adcock, and CMSgt. Nicolas S. Kiraly, all retired. The final two selectees, both deceased, were Col. Russell E. Rakip and Maj. William Grosvenor Jr.

■ Student pilot error caused the crash of an ANG MQ-1B Predator remotely piloted aircraft during a training mission April 20 over Southern California, ACC investigators determined in a report released Aug. 20. The pilot failed to recognize the Predator's speed was too low during final approach, causing a stall and hard landing at an airport in Victorville, Calif. Upon impact, the

Predator broke apart, resulting in its total loss and the loss of the inert Hellfire training missile on its wing.

■ The Air Force's enlisted heritage museum at Lackland AFB, Tex., reopened Aug. 12 after a nine-month renovation. The facility was also renamed the USAF Airman Heritage Museum, replacing the old History and Traditions Museum. The museum now features interactive technology, improved lighting, and 31 total exhibits.

■ Boeing has begun production of the seventh Wideband Global SATCOM spacecraft, WGS-7, under a \$187 million contract, the Air Force announced Aug. 19. The contract covers the items needed to begin the satellite's production, according to the contract announcement. WGS-7 is expected to be in the Block II configuration, satellites that provide military communications to US and allied forces around the world. Three WGS spacecraft are already on orbit.

■ Members of the 374th Airlift Wing at Yokota AB, Japan, welcomed a group of Japanese, including World War II Imperial Army veterans, to the base as part of events to mark the 70th anniversary of the installation, known during the war as Tama Army Airfield. ■

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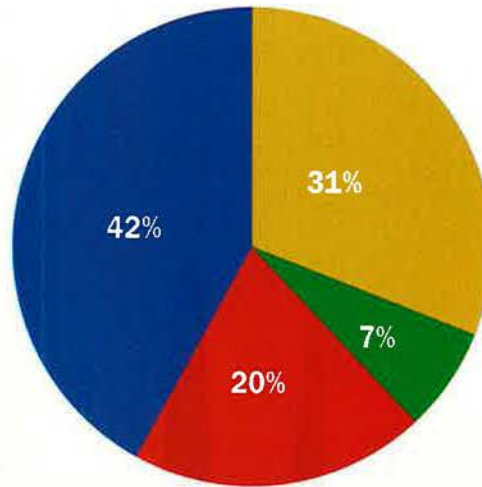
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Snapshots of a Big Defense Squeeze

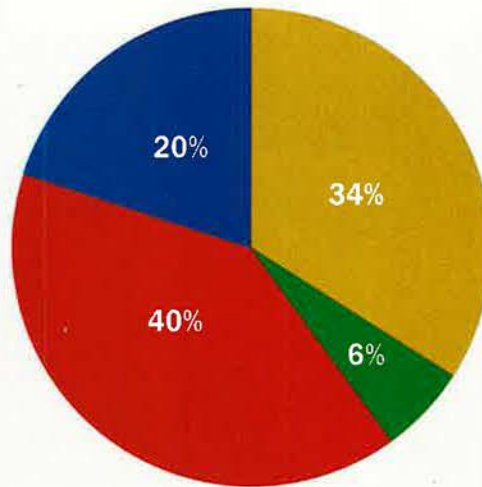
Defense isn't causing the deficit. Over the past 40 years, federal spending on entitlements—Social Security, Medicare, and Medicaid, principally—has turned into an addiction, with no relief in sight. As these charts show, the federal budget has grown from about \$1 trillion in 1970 to \$3.5 trillion today, on its way to \$12.3 trillion in 2040 (constant 2009 dollars). However, the composition of spending has undergone radical change. The entitlement bite has grown from 20 percent to 40 percent, headed toward 52 percent of all federal spending. Meanwhile, the defense share has dropped from 42 percent to 20 percent, on its way to an 11 percent share. Entitlements are now, and will continue to be, the greatest generator of deficits, and with them huge increases in net interest on the national debt. Can anyone tell us why military spending is tagged as the bad guy?

- Defense
- Other
- Net Interest
- Social Security
Medicare
Medicaid

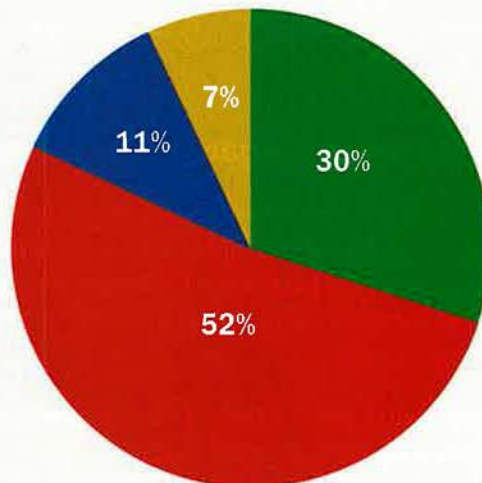
1970
\$0.9 Trillion



2010
\$3.5 Trillion



2040
\$12.3 Trillion



Source: Defense Business Board, "Reducing Overhead and Improving Business Operations—Initial Observations," July 22, 2010. DBB's data derived from OMB, "A New Era of Responsibility: The 2011 Budget," February 2010; and CBO, "Preliminary Analysis of the President's Budget," March 2010.

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New procedures are designed to deliver better equipment, with fewer delays and cost surprises.

Northrop Grumman photo

The Acquisition Course Correction

By John A. Tirpak, Executive Editor

Burned by a series of high-profile failures, the Air Force has overhauled its acquisition system. New rules and procedures are designed to produce better equipment over the long term, reduce delays and cost overruns, and restore the Air Force's contracting credibility.

The new system will do little to speed up today's glacial procurement process or fix troubled programs that are already well under way, however.

Air Force acquisition reached its darkest hour two years ago, when the KC-X tanker replacement program and "CSAR-X" rescue helicopter project both collapsed under prolonged contractor

protests and litigation. The Government Accountability Office found that the Air Force wasn't applying its own rules, and had been unclear or inconsistent in what it told its contractors. As delays or overruns on other big-ticket projects—satellites and aircraft upgrades in particular—piled up, it became obvious that a housecleaning was in order.

In 2009, USAF rolled out an acquisition improvement plan. It was "the fallout of assessments made following the KC-X source selection," said Lt. Gen. Mark D. Shackelford, USAF's top uniformed acquisition officer. The KC-X program was awarded to a Northrop Grumman-led team in 2008, but Boeing successfully



Boeing illustration

appealed the decision, forcing the Defense Department to try again.

Now a year into its implementation, the acquisition improvement plan distilled 33 Center for Naval Analyses recommendations into five major initiatives. CNA was brought in to take an independent look at the Air Force's procurement setup, and the initiatives deal with the overall problem of what Shackelford called "unmet expectations" in cost, performance, and schedule.

The first major test case for the new acquisition scheme was the Small Diameter Bomb II program, Shackelford said. Raytheon was selected to build the bomb in August, defeating a team of Boeing (which had developed the earlier version of the SDB) and Lockheed Martin. There were no protests of the Air Force's choice.

"We should watch SDB II over the coming years and see how well it executes," Shackelford said, because the new acquisition rules are in place early enough to make a difference. "Optimistically, they will execute very, very well, and we will get some validation that doing this type of expectation management and risk assessment prior to Milestone B is a fruitful way of getting there."

The new acquisition scheme adds many new requirements, obligations, and checks—layers of effort that would seem to slow the process down.

Lt. Gen. David A. Deptula, recently retired as deputy chief of staff for intelligence-surveillance-reconnaissance, said in August that he asked his staff how long it would take to field a new remotely piloted aircraft from scratch, if the requirements were well-understood today.

"And the answer was, around 2020 to 2021. Folks, we cannot afford that long a process in this era," Deptula said. "We need to be able to operate much quicker, and inside our adversary's decision loop."

Shackelford concedes that "increasing velocity is going to be a challenge." He said in large projects, the block approach, "taking somewhat smaller bites," will help, but "it's also a function of the processes that we have and the oversight" requirements. Some of those "are driven by statute, so they're not easily changed," and almost all are about reducing risk, which takes time.

Mark J. Lewis, former chief scientist of the Air Force, said that the imperative to drive down risk seems at odds with the idea of experimentation, "which is how you get to new things."

For the KC-X contract, EADS' offering is based on the A330 Multirole Tanker Transport, left. Boeing's NewGen Tanker is shown in an artist's conception, below.

Lewis said he's worried that the acquisition culture has become so intolerant of an apparent failure that "you're not allowed to try things out and sometimes have a failure, or intentionally have a failure and learn things from that, and move on."

To that, Shackelford said it's "a very valid observation" that there is an expectation of "success on the first try" in most programs, even experimental ones. Any failure has "some potential to generate a great deal of attention. That's a sign of the times."

However, he said, that there's "room to go out and experiment" in the science and technology world, which wrings out potential systems long before they get to the point of transitioning to an operational system.

It's a "hard sell" to industry, though, for the Air Force to get a contractor to invest in a demonstration that may not lead to an operational capability, production of which would justify the contractor's investment.

Making the Case

Air Force Materiel Command is striving to make a closer connection between its science and technology funding and operational systems.

"It's difficult to make the case for spending money on something that does not have a definitive purpose," Shackelford admitted.

Even joint capability technology demonstrations, such as those that eventually led to the Global Hawk, Predator, and Reaper remotely piloted aircraft, "are being scrutinized very carefully right now because of the fear and trepidation of what it's actually going to cost us when we have to go build those things for real."

Despite the recent difficulties, however, Shackelford said USAF's acquisition process was not "fundamentally broken."

The Air Force "had two sustained protests in 2008 and we had one in 2009, and that's out of, in each of those years, ... something like 160,000 competitive transactions," he said. "So our process works," although some areas clearly still need attention.

The next two big tests of the revised acquisition system will be the KC-X, due to produce a winner in the fall, and the common vertical lift support platform, a descendant of the failed CSAR-X heli-





USAF leaders believe there's still time to benefit from new acquisition policies on the F-35 fighter, shown in flight test.

copter project. Both will put a spotlight on the Air Force's efforts to bounce back from its acquisition troubles of the last decade.

The new processes take effect in a constrained environment. Shackelford sees "fewer new starts" in the near future, due to the constraints of flat budgets, and many of those will begin at "Milestone C"—commercially derived systems modified for military use.

The Pentagon would like to apply, whenever and wherever possible, fixed-price contracting methods to major acquisitions. Shackelford was asked how this will work in the KC-X, where both contractors are offering largely new designs based on existing aircraft.

Fixed-price contracting was tried with poor results in the 1980s, he noted. However, he said, "I would suggest to you that now the context is a bit different," and the risk of the KC-X competition is well understood.

"We have a competent workforce that we are growing" and the right leadership is in place, Shackelford said. "Over the next one or two years, we should start to see improvements. Acquisition moves at a glacial pace, so it will take us a while to see very positive change."

First among the five acquisition reform initiatives is "revitalizing the acquisition workforce," said Shackelford. During the 1990s and early 2000s, the Air Force cut back on its procurement specialists, hoping that industry would fill the void in an effort to be efficient and provide best value products. It didn't work out that way.

"We had hurt our workforce ... and lost a lot of skills," Shackelford said.

Now, the Air Force intends to hire about 7,000 people by about 2015 to bolster its

acquisition corps. Many will be brought on as interns and journeymen, and then cultivated to become program managers and specialists in other fields.

"Those people are targeted to specific skills: program management, systems engineering, cost estimating, contracting," Shackelford explained.

"We're well down the path of hiring. We hired something over 2,000 people last year."

Of the 7,000 people, 5,353 will be civilians.

Defense Secretary Robert M. Gates reached similar conclusions about Pentagon acquisition overall, and called for

the hiring of some 20,000 additional procurement specialists, departmentwide.

"We had already been working on this for quite some time when he brought forth that decision," Shackelford noted. "Of the 20,000 in his mandate, the Air Force share was 4,865," so the service will exceed Gates' directive by about 44 percent.

Beyond just bringing on the bodies, the Air Force is establishing skills courses to ensure that the new procurement specialists know what they're doing—when they arrive, and as they advance.

Retired Gen. Gregory S. Martin, former head of Air Force Materiel Command, said the Air Force should establish a career track wherein some acquisition specialists spend time in a variety of programs at various stages of progress, so that they can build skills in cost estimating, writing requests for proposals, negotiations, and related abilities.

"They would have to pass 'check rides' in each skill area," Martin explained, so eventually, they would have built measurable abilities for every phase of an acquisition program, and have competence on program management, cradle to grave.

Such an approach is "in its infancy," Shackelford said. AFMC is building a "competency tracking and measurement approach" that will document the experience that specialists acquire, so USAF can draw on their expertise when needed.



The RQ-4 Global Hawk (here, in test flight) started out as an experiment but has been improved steadily using the block upgrade approach.



perturb the program after you start it.”

But even before that, requirements changes will be headed off, first by insinuating acquisition pros into the requirements process early, to let operators know “the realm of the possible” and “avoiding ‘unobtainium,’” Shackelford noted.

Requirements must also be certified as achievable, testable, and able to be produced by the workforce, he said.

Operators always want as much capability as possible right off the bat, but USAF has adopted a block upgrade approach. The goal is for the first iteration of a system to generally achieve 80 percent of the capability sought in the final requirement. Using

The block approach also addresses the need to stay ahead of technology and insert new capabilities in an orderly way. Design freezes no longer mean that a system is consigned to obsolescence in 18 months when a new processor comes out.

Close cooperation between acquisition people and operators will ensure that “what we’re going to put on contract is what they actually want,” Shackelford said.

The third initiative is budget stability. Cutting a program’s budget even a small amount can force dramatic changes in the scope of work, schedule, and deliverables. Now, if the Air Force signs up for a program, the “corporate” process demands that the program be funded at the agreed levels.

The new system puts the Air Force’s acquisition executive into the top-most level of the budgeting process, too.

To further enhance budget stability, more stringent cost estimates will be made, and the Air Force will demand a

“At this point, what we’re doing is tracking and giving credit for involvement in the source selection,” Shackelford said. Previously, “we could not have gone to any database and told you who has that experience.”

The system is still being built, but it will be policy right from the beginning of the careers of the new hires.

The Block Approach

The second initiative has to do with requirements. Historically, programs have gone off the rails when requirements changed midprogram, requiring costly and time-consuming redesigns that broke budgets and ruined deployment timetables. The resulting headlines often caused Congress to heap a load of additional oversight and reporting mandates on such programs that only added complexity and cost.

As time went on, operators would demand more capabilities that would in turn begin the vicious circle anew.

“‘Requirements creep’ is the traditional term,” Shackelford said.

The response, he said, has been to stabilize requirements. In earlier decades, it was said, a second lieutenant could add requirements to a program, but not even a four-star general could then get them deleted.

Now, “once we start the program, changing the requirements ... invokes four-star” intervention, Shackelford noted. “We do as little [as possible] to



Lt. Gen. Mark Shackelford (top) thinks there’s a place for fixed-price contracting when the product to be purchased is “well-understood.” Above, new Air Force contracting specialists are sworn in at a July 2009 ceremony.

block upgrades, it is possible to “freeze” a design for a given block—thus avoiding disruptive requirements changes—because further upgrades will come along in the next version.

“We have an obligation to go back” to the operator and explain which capabilities he wants “that are not mature enough or have too much risk to deliver in the first block,” said Shackelford. The cost of delivering the last percentages of desired performance can often add huge amounts to a program’s cost if these capabilities are demanded up-front.

higher level of confidence that a program is ready to proceed.

The fourth initiative has to do with the quality of the source selection process overall, and here, the Air Force had an object lesson in what not to do, in the form of the KC-X.

The new rules mandate that the Air Force will “execute the source selection exactly the way we said we would ... in the request for proposal.” Rules and requirements will not be allowed to change midprocess, Shackelford noted, and there will be exhaustive documentation of every



activity and action “at such a level that we are absolutely certain we can defend our decision if it’s challenged.”

Gates and his senior acquisition executives have said that when a winner is chosen in the rerun of the KC-X contest, they want the choice to be as protest-proof as possible.

Shackelford demurred when asked if this approach is simply intense re-arranging, preferring to describe it as being rigorous.

At least five times in a source selection, he said, an independent team of experts will “descend” on the enterprise to review its actions and correct any deficiencies they find.

Over time, he believes this approach will result in an embedded culture of quality and “due diligence” in the acquisition force.

Each of AFMC’s acquisition centers is “putting together a standing body of people from which they draw [to] do the source selection,” to ensure a high experience level.

The fifth and last initiative has to do with “proper alignment” of authority and responsibility, Shackelford said. In programs that have done poorly, managers often did not have the authority to manage as they saw fit, sometimes forced to make changes dictated by people outside the process and unaware of all considerations.

The first step the Air Force took was to expand its program executive officers from six to 17. The PEOs have broad responsibility but also authority over their programs. Big projects such as the F-35 or the KC-X will have a single general officer as the PEO, but others will have a portfolio of programs under



The Small Diameter Bomb Increment 2 (top, loaded onto an F-15, and shown in test above) was USAF’s first major contract award under the new acquisition policies.

their jurisdiction. The ranks of the PEOs now include Senior Executive Service tier one officials and three colonels.

A Technological Surprise

At the same time, AFMC and Air Force Space Command acquisition organizations have been restructured. Six years ago, to make them more like the rest of the Air Force, the organizations were organized into wings, groups, and squadrons. Now, “we’ve reversed that and gone back to directorates, divisions, and branches,” Shackelford said.

Gen. Donald J. Hoffman, AFMC commander, has said the change was driven by the fact that the Air Force wing structure was ill-suited to the mostly civilian enterprise, and that in one case, due to the way responsibilities were divided, AFMC ended up with a one-person squadron.

The restructuring took away some organizational functions they “could stand not to have,” allowing units to focus strictly on their acquisition duties, Shackelford said.

The Weapons System Acquisition Reform Act of 2009 imposed some other

obligations on the Air Force’s system, Shackelford noted. He pointed out that the law requires the Air Force to do competitive prototyping of a system before it can enter Milestone B.

“It doesn’t necessarily have to be a full-up weapon system,” he said, but the prototyping will serve to further reduce risk.

The law also echoes the Air Force’s own rules about programs not entering full-scale development until a preliminary design’s maturity had been established, “which is actually a very good idea,” he said.

Given that requirements will not be changed once a program or phase is under contract, what happens in the

case of a technological surprise? What should the Air Force do if an adversary suddenly deploys a capability that can challenge a system in development?

“It would really depend on what the details of the adversary change might be and what level of invasiveness it would be for us to change the system,” Shackelford noted.

“We’re trying to minimize ... the government-directed changes, but realize sometimes we’re going to have to do that.”

For this reason, though, Shackelford said programs that are well-established probably will not benefit from the new acquisition scheme.

“It’s very difficult, because you’ve already got a contract mechanism in place” built on “a different set of philosophies,” he said. “And it’s prohibitive to crack open a contract midstream and make these kind of changes.”

For the future, though, Shackelford is optimistic the Air Force is recapturing its acquisition competency and ability to “do the job well.” If he is correct, the nation will benefit from better systems with more predictable costs. ■

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Short Term, Long Term

"In the short term, we will continue to see greater demand for Air Force capabilities in relatively uncontested environments. In the future, however, we are more likely to encounter the global proliferation of precision weapons, coupled with an increasing requirement for long-range strike and intelligence, surveillance, and reconnaissance (ISR) in areas guarded by increasingly capable, agile defenses."—**Gen. Norton A. Schwartz, USAF Chief of Staff, CSAF's Vector, July 4.**

Reserve Force Bargain

"Trading away highly experienced reserve component personnel to invest in (active duty personnel and operations) is a suboptimal choice. ... Reserve forces are ready, available, and accessible to fulfill operational requirements. ... They can be sustained at significantly lower cost than full-time active forces."—**Lt. Gen. Charles E. Stenner Jr., commander, Air Force Reserve Command, Macon Telegraph, Aug. 3.**

The Water Is Rising

"All I know is that there's a lot more water out there."—**Adm. Gary Roughead, Chief of Naval Operations, on reports of rising ocean levels, Boston Globe, July 7.**

Some Call It Duplication

"One man's duplication is another man's competitive analysis."—**Retired Air Force Lt. Gen. James R. Clapper Jr., hearing on nomination to be director of national intelligence, Washington Post, July 21.**

Ready in Korea

"The United States of America and its airpower will be there, and its naval power will be there, should we need to deter and, or, defeat North Korea."—**USAF Lt. Gen. Jeffrey A. Remington, deputy commander of US Forces Korea, Stars and Stripes, July 26.**

Go Ahead and Cheat

"Because the United States will retain a diverse triad of strategic forces, any Russian cheating under the treaty would have little effect on the assured second-strike capabilities of US strate-

gic forces."—**James N. Miller, the Pentagon's leading authority on nuclear arms, Associated Press, July 21.**

Time To Leave

"I do not think we should be spending money to have troops in Germany 65 years after World War II. We have a terrible deficit and we have to cut back. NATO was a wonderful concept. But 61 years later, I think it's time to say our Western European allies should be on their own. We'll cooperate with them, but we shouldn't be subsidizing their defense."—**Rep. Barney Frank (D-Mass.), leading House effort to cut US defense spending, Stars and Stripes, July 22.**

Unresponsive

"Iran doesn't seem to be paying much attention to the sanctions. We engage. They continue to move forward. We vote for sanctions. They continue to move forward. We try to deter, to dissuade. They continue to move forward."—**Michael V. Hayden, retired Air Force general and director of the CIA from 2006 to 2009, CNN, "State of the Union," July 25.**

Don't Depend on Them

"In contested airspace—a more plausible scenario for future conflicts—today's UAS [unmanned aerial systems] would be extremely vulnerable."—**Gen. Roger A. Brady, outgoing commander of US Air Forces in Europe, Air Force Times, Aug. 9.**

We're Innocent, He Ascertained

"None of the information released by WikiLeaks has ever led to physical injury of any person so far as can be ascertained, and we try hard to ascertain that fact."—**Julian Assange, founder of WikiLeaks, on open posting on his website of 76,000 classified documents related to the war in Afghanistan, Washington Post interview, July 28.**

Blood on Their Hands

"Mr. Assange can say whatever he likes about the greater good he thinks he and his source are doing, but the truth is they might already have on their hands the blood of some young soldier or that of an Afghan family."—**Adm. Michael G. Mullen, Chairman**

of the Joint Chiefs of Staff, Pentagon news briefing, July 29.

CIA Covert Option

"The US military will not achieve anything resembling victory in Afghanistan, no matter how noble the objective and heroic the effort. It's time to face this reality. We should start by developing a new covert action plan to be implemented by the Central Intelligence Agency. The strategy should focus on forging the kinds of relationships necessary to keep Afghanistan from re-emerging as al Qaeda's staging ground once our forces depart, and also on continuing the hunt for Osama bin Laden."—**Jack Devine, former CIA deputy director of operations and head of CIA Afghan Task Force 1986-87, Wall Street Journal, July 29.**

Minor Detail

"We think the statement is very clear. It puts forth the factual foundation and it expresses the council's judgment that the attack on the ship is to be condemned and that no further attacks against the Republic of Korea should be contemplated."—**Susan E. Rice, US ambassador to the UN, on Security Council draft resolution about the sinking of South Korean ship that did not mention it was done by North Korea, New York Times, July 9.**

New Phase in Iraq

"Make no mistake, our commitment in Iraq is changing—from a military effort led by our troops to a civilian effort led by our diplomats. And as we mark the end of America's combat mission in Iraq, a grateful America must pay tribute to all who served there."—**President Obama, Disabled American Veterans conference, Aug. 2.**

If Diplomacy Fails

"If diplomatic and economic pressures do not compel Iran to terminate its nuclear program, the US military has the capability and is prepared to launch an effective, targeted strike on Tehran's nuclear and supporting military facilities."—**Former Sen. Charles S. Robb (D-Va.) and retired USAF Gen. Charles F. Wald, Washington Post, July 9.**



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Combat Outpost Keating—established in 2006 as a base for a provincial reconstruction team—was located in a “bowl”

in Nuristan province, about 10 miles from the Pakistan border in northeastern Afghanistan. The isolated camp sat near the intersection of two rivers, surrounded by steep mountains known to be populated by Afghan civilians and insurgents, all of whom had an eagle-eyed view of troop movements below.

Initially troops were charged with befriending the locals and stopping illegal movement across the border, but conditions around the post soon began to deteriorate. The mission shifted from winning the hearts and minds of the local people to a purely defensive strategy.

Over the course of at least 18 months, the outpost came under sporadic but increasing attack. Typically, a few insurgents would make their move, inflict as much damage as possible, and then disappear into the mountains a few minutes later.

Nothing prepared US forces for the massive and coordinated attack that came last Oct. 3, however. The final onslaught was well-planned and involved nearly 300 insurgents who had the base completely surrounded and refused to back down. Simply put, the troops at Keating were vastly outnumbered and they had nowhere to go.

Eight US soldiers were killed and 22 wounded during the massive, complex attack a year ago this month. Sol-

Right: Capt. Michal Polidor removes a protective cap from the seeker head of an AIM-9 Sidewinder missile. Below: SSgt. Matthew McMurtrey, the lone airman on the ground during the attack on Keating.



USAF photo by SRA Felicia Juenke

Saving Outpost Keating

The soldiers at the remote Afghan outpost were outnumbered and surrounded by a heavily armed Taliban force. Airpower beat the enemy back.

By Amy McCullough, Senior Editor



Photo courtesy of SSgt. Matthew McMurtrey



diers from Bravo Troop, 3rd Squadron, 61st Calvary, out of Ft. Carson, Colo., were pinned down early that morning. Roughly 80 US troops, outnumbered nearly four-to-one, were under fire from enemy fighters perched in the mountains overlooking the camp. The insurgents shot small-arms fire and rocket-propelled grenades down from all sides.

Nearby Observation Post Fritsche, which was located on higher ground, offered some “overwatch protection” but not much, according to the executive

summary of the Army’s investigation of the attack, provided by NATO’s International Security Assistance Force-Afghanistan. Insurgents simultaneously attacked Fritsche that day, limiting mortar support to Keating.

Those on the ground say the casualties in the 12-hour battle would have been much greater without airpower. In fact, the outpost probably would have been completely overrun if not for the intervention of Air Force and Army aircraft.

A Chinook helicopter lands at COP Keating in March 2007. Both fixed wing aircraft and helicopters took part in the defense of the outpost.

Nineteen aircraft, both Air Force fixed wing and Army helicopters, flew close air support missions during the desperate battle. Roughly 150 insurgents were killed, and the troops were able to hold on.

“There is no doubt that without the incredible air support we received, it would have been a much worse day,” Army Lt. Col. Robert B. Brown, who served as the 3-61 Cavalry commander during the battle, said in a release issued at the time. “Your ability to keep a steady flow of aircraft and ordnance on the enemy turned what could have been a terrible defeat into a hard fought victory.”

A Mission Unclear

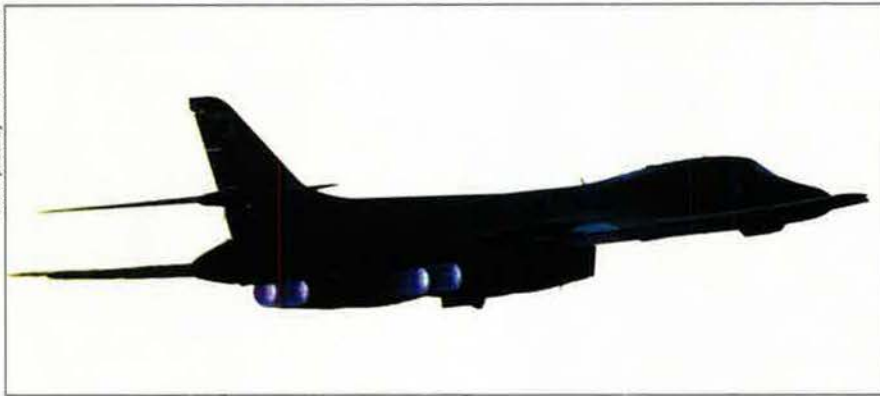
By the time soldiers from B Troop deployed to Keating in 2009, both US and Afghan National Army manning had dried up significantly, and the soldiers struggled to grasp why they were still there.

“The mission for COP Keating during the rotation of B Troop was unclear to the soldiers ... who understood counterinsurgency doctrine and the need to engage with and protect the local population,” read the Army’s investigation. “But owing to limited manpower and tactical reach off of the compound, the mission devolved into one of base

Photo courtesy of SSgt. Matthew McMurry



The remains of a building at COP Keating smolder after the insurgent attack. By the time of the attack, there was no longer a tactical or strategic value to holding the post.



A B-1 bomber, such as the one shown here, got the call to assist Keating while on a routine patrol. It brought more heavy weapons to the base's defense.

defense, and by mid-2009, there was no tactical or strategic value to holding the ground occupied by COP Keating.”

Commanders had already decided to close the remote camp as part of a new Afghanistan strategy to pull troops away from austere outposts and put them back into larger population centers. The closure, originally slated for July to August 2009, was delayed because “assets required to backhaul base supplies were diverted to support intense brigade-level operations in Barg-e Matal,” the summary stated.

Intelligence-surveillance-reconnaissance assets also were “reprioritized” to support Barg-e Matal, a village located just north of the Kamdesh Valley, where Keating was based. The ISR assets also were to be used to help locate a missing US soldier in southern Afghanistan, according to the summary. The additional equipment could have given Keating’s ground forces more situational awareness, but it is not clear that would have made a significant difference in the battle that followed.

Over B Troop’s five-month deployment to Keating, insurgents launched 47 attacks against the post—three times the rate of attacks against their predecessors, according to the Army. On several occasions, intelligence reports indicated “a large enemy force” outside Keating’s perimeter, but each time only a few fighters would attack using indirect and small-arms fire. The engagements themselves typically only lasted five to 10 minutes.

As a result, troops began to ignore intelligence reports of an imminent large-scale attack.

“Owing to this experience with the enemy in vicinity of COP Keating, the perception prevailed that reports of massing enemy forces were exaggerated and improbable,” according to the summary. “The focus became the enemy’s most

likely, rather than his most dangerous, course of action.”

Air Force SSgt. Matthew McMurtrey, a cyber systems operator who was attached to the 3-61 Cavalry, jolted out of bed around 6 a.m. the day of the attack. The wall next to his bunk in the information technology building—where he both worked and slept—was shaking and the room was full of dust. He didn’t know it at the time, but there was a four-foot hole on the other side of the building where a rocket-propelled grenade had struck just a few seconds earlier.

Being Overrun

McMurtrey quickly put his individual body armor over his physical-training gear, grabbed his M16 service rifle, and headed to his battle position—an aid station about 20 yards away. He was the lone airman on the ground that day. McMurtrey had deployed about three weeks prior, on his first combat mission from the 755th Air Expeditionary Group based at Bagram Airfield, to set up and maintain a satellite system used to provide troops Internet and phone access.

It was about 30 minutes before the first casualties began to arrive, but it didn’t take long for the scene to turn chaotic after that. An RPG struck a nearby wall, peppering several medics with shrapnel. An alternate aid station had to be set up on the front porch to accommodate the influx of wounded and killed.

McMurtrey, now assigned to the 624th Operations Center at Lackland AFB, Tex., offered assistance where he could—changing out IV bags, distributing supplies, and even clearing the weapons of the deceased and putting them in body bags.

“It seemed that it would get extremely intense, with a lot of fire, a lot of RPGs hitting the wall, and then it would die down,” McMurtrey said. “Basically, the air support was leaving and coming

back. As soon as they left, the insurgents would come back.”

Citing operational security concerns, military officials declined to say exactly when airpower arrived on scene or what platforms were the first to arrive. But by 8 a.m., there were four F-15Es from the 455th Air Expeditionary Wing and several AH-64 Apaches circling the outpost and dropping munitions.

Capt. Michal P. Polidor and then-1st Lt. Aaron Dove were sitting inside their Strike Eagle on the flight line at Bagram—about 100 miles away from Keating—waiting to head out on a routine patrol when they got the call for close air support. They were told Keating was “being overrun” with insurgents and that they needed to take off immediately, but few other details were relayed.

When they arrived on the scene about 10 minutes later, they were briefed by the first two F-15E pilots to arrive. That’s when the severity of the attack first started to sink in, Polidor and Dove said in separate telephone interviews.

“We were greeted with three radios that were busier than I could have ever imagined. They were all talking to us at the same time. It took 15 to 20 minutes just to sort out who was talking, where they were talking from, and what they were trying to say,” said Polidor. “We looked through our targeting pod, ... and all you could see were muzzle flashes in the infrared. It was pretty much like the Fourth of July. It looked like fireworks coming out of the base up into the hills.”

Polidor, the pilot, and Dove, weapon systems officer, dropped several 2,000-pound guided bombs and then immediately assumed the role of tactical air controller airborne.

The first two F-15Es had just come off a night sortie and were running low on fuel, so one of the Strike Eagles flew back to Bagram, while the other stayed behind for another half an hour, orbiting high in the air above nearby FOB Bostick to conserve fuel while acting as a communication relay.

The steep mountains were making it difficult for aircraft to communicate directly with Keating, so one of them had to circle above the joint terminal attack controller at FOB Bostick, about 20 miles away. The JTAC at Bostick would get coordinates from soldiers on the ground at Keating and then relay that information to the aircraft above. That aircraft would relay the information to Polidor and Dove, who would then relay the information to whatever aircraft was next in line to drop munitions.

After Polidor and Dove dropped several 2,000-pound Joint Direct Attack Munitions and strafed the hillside where the soldiers were receiving heavy fire, they called for their wingman to drop his munitions. The second Strike Eagle dropped two guided bombs, but then had to return to Bagram because its hydraulic system was malfunctioning.

When their wingman left, Polidor and Dove refueled, returned and dropped a few more bombs, then continued acting as the communication relay, before dropping one more set of munitions. In all, the radio tag continued for more than seven hours as the battle unfolded. (Polidor and Dove were later awarded Distinguished Flying Crosses for their actions that day.)

Around 9 a.m., a B-1 conducting a routine patrol about an hour away got the call that Keating was in trouble. The bomber, whose call sign was Bone 21, arrived a few minutes later and started listening to the radio traffic.

"Keating was packed full of jets, so we knew this was not an ordinary engagement," said Capt. Justin Kulish, the B-1 pilot, who was assigned to the 379th AEW. "Once we got overhead the target, the biggest thing that struck me was how much of Keating was on fire. It seemed like the entire COP was burning."

In fact, most of Keating was on fire. By this time, the building in front of the aid station where McMurtrey was stationed was burning, and the flames were so intense that troops on the ground feared the aid station would catch on fire. McMurtrey helped the medics move the casualties and equipment, one by one, about 20 yards away to a barracks—one of the few buildings untouched by flames.

Bone 21, which was fully equipped with 20 500-pound GBU-38s and 2,000-pound GBU-31s, dropped its first set of weapons and then flew off to refuel. The bomber had already been in the air for about nine hours before it arrived on scene, Kulish said.

Just before noon, a winter storm started to roll in from the west. There were clouds with embedded thunderstorms from 200 feet up to 30,000 feet, Kulish said. After the storm kicked in, the ground was no longer visible, so the aircraft could only drop GPS guided bombs—based solely on coordinates passed from troops on the ground, Dove said.

"Throughout the flight, [Dove] diligently used his aircraft's sensors



Photo courtesy of SSGT. Matthew McMurtrey

Air Force and Army munitions bombarded the countryside around COP Keating—and the outpost itself. Massive firepower from the air was credited with saving 72 lives.

to minimize risk to friendly forces and mitigate civilian collateral damage," according to his DFC citation. "He twice identified coordinate errors that were passed in the heat of battle and promptly directed attack aborts prior to release."

Refueling also became difficult. The tankers had to move about 100 miles away, meaning it would take the jet aircraft about 15 minutes each way to refuel. Even then, the weather continued to cause problems.

16 Tons of Bombs, 170 Rounds

Bone 21, which was starting to accumulate ice as it flew through turbulence, made several more runs. The bomber was able to drop the rest of its munitions after one temporarily aborted attack, then flew back to its home base after successfully completing a 16.5-hour sortie.

At the height of the battle, Polidor and Dove were directing 19 aircraft—all flying at varying altitudes above Keating. They "systematically ensured aircraft deconfliction in severe weather, orchestrating air strikes from six F-15Es, four A-10s, two AH-64s, and a B-1 to provide kinetic solutions," according to a DFC citation.

As the battle waged on, many of the Afghan National Army soldiers abandoned their posts, allowing insurgents to penetrate Keating at three different locations. This forced the American soldiers to withdraw to a "tight internal perimeter," according to the Army report. But thanks in large part to Air Force and Army firepower,

US soldiers were able to fight back and regain control of key buildings throughout the afternoon.

In all, 16 tons of bombs were dropped on the enemy that surrounded and infiltrated COP Keating. The insurgents also were strafed by 170 rounds. According to the DFC citations, the combined effect of this airpower saved 72 lives.

"As evening fell on the night of 3 October 2009, COP Keating remained solidly under US control, and enemy forces had suffered severe tactical defeat," according to the Army report, although "eight American soldiers made the ultimate sacrifice defending their outpost and their fellow soldiers."

Troops on the ground spent the next three days gathering classified documents and weapons from the burned rubble as they waited for airlift to bring them out, said McMurtrey, who was awarded two Army Commendation Medals for his role that day. The cavalry soldiers also gave him a Combat Action Badge and cavalry spurs, he said.

"Without air support, I don't think we would have made it, considering the number against us and the area we were in," McMurtrey said. "That doesn't mean anything should be taken from the guys on the ground. Those guys were amazing. They did their jobs and I'm here because of what they did, but air support was definitely a must."

Combat Outpost Keating was evacuated Oct. 6. The post was bombed soon after, to prevent any leftover items from falling into enemy hands. ■

Keeper File

Air War—the Short Version

Lt. Gen. Michael C. Short was NATO's air boss for the 1999 air war over Serbia. Short loathed the way pusillanimous politicians ran the war. "I'd have gone for the head of the snake on the first night," he said. "I'd have turned the lights out the first night." Early in 2000, in a speech at an AFA event, Short gave a thoughtful take on problems with coalition war. The Vietnam combat veteran was, however, typically blunt, noting that as he was soon to retire, "this will be my last opportunity [to speak], and I don't intend to blow it."

I want to talk for just a few minutes today about coalition air ops. ... I believe that for every instance where we face an adversary, we will look for a coalition opportunity. We will try to cobble together a coalition, because we want to fight that way, because we want to share the burden, and because we want the cloak of legitimacy that operating in a coalition gives us. That is what I want to talk about for just a few minutes this morning: coalition air operations. ...

You and I must be given political objectives. We need to know what our coalition is trying to accomplish on the political scene, and we need to have those translated to us, as professional soldiers, into military objectives. Ladies and gentlemen, we began bombing the first night with our objective being to show NATO resolve. That is tough to tell the airmen at Aviano [Air Base, Italy]—to go out and put it on the line to "demonstrate resolve." We need to know what our military objectives are, and we need to understand what we are trying to accomplish with airpower and ground power and sea power.

I knew—we all knew—what we were trying to do in Kosovo. We wanted [Slobodan] Milosevic to cease ethnic cleansing. We wanted the VJ [Yugoslav Army] out of Kosovo. We wanted a force on the ground, an international force under NATO leadership. We wanted the Kosovar Albanians to have the ability to return to their homes and pick up their lives. We wanted the ICTY [International Criminal Tribunal for the former Yugoslavia] process to work. We accomplished all five of those things to some degree by happenstance, rather than by design.

You and I need the clearest possible definition of an end state. General [John] Jumper has been very articulate in his observing that we don't know yet if we won in Kosovo. ... What was the end state? We knew what as soldiers we were going to try to accomplish: those five points I spoke to. But what is the end state in Kosovo? Is it a free Kosovo? Is it greater Albania? Is it return of the Kosovo province to Serb rule? We don't know yet. I have never seen it clearly articulated. We know in a general fashion what the international community wanted to accomplish, but we are not there yet, and we won't be there for a long time. [We need] political objectives, military objectives, and a clear end state.

We need to prepare our politicians as best we can for what is going to happen. If we are going to initiate an air campaign—not an air effort, but an air campaign—airmen need to be given the chance to explain what is going to happen, to our political leadership. Airmen, who have practiced their craft and their trade for 30 or 35 years, need to be given the opportunity to make that explanation. I read in General [Charles] Horner's superb book [about Desert Storm] how he went to Camp Da-

"Coalition Air War"

Lt. Gen. Michael C. Short, USAF
Commander, Allied Air Forces Southern Europe
Address to AFA Air Warfare Symposium
Orlando, Fla.
Feb. 25, 2000

Find the full text on the
Air Force Magazine's website
www.airforce-magazine.com
"Keeper File"

vid and briefed the President of the United States on how he intended to conduct an air campaign to prepare the battlefield in Kuwait and Iraq. I am not campaigning for a trip to Camp David, but there was a case to be made for an air campaign, and airmen should have made that case.

Our politicians need to understand that this isn't going to be clean. There is going to be collateral damage. There will be unintended civilian casualties. We will do our level best to prevent both, but they've got to grit their teeth and stay with us. We can't cut and run the first time we hit the wrong end of a bridge. We can't cut and run the first time we kill innocent people [who] clearly we did not intend to kill. Just as we did not target the Chinese Embassy as the Chinese Embassy, we never targeted civilians, and you know that, but there are people out there who believe that we did. Unfortunately, the reaction to every incident placed our airmen at greater risk and made it more difficult to do our job.

What we are left with now is a generation of politicians throughout the alliance who have an unrealistic picture of airpower and air war. It is a video game on CNN. All your nation has to do is send four airplanes and 60 people a thousand miles, turn them over to an American commander, and go about your business. ...

Our politicians need to understand that we will do our best to make airpower clean and painless as they want us to, but it is not going to work out that way. People die in airpower conflicts. There is collateral damage. There is unintended loss of life. When they choose to employ us, to take us to war, when they choose to use military force to solve a problem that politicians could not, then they need to grit their teeth and stay with us. ■

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A “New



Capt. Eric Cleveringa, deployed from the Air National Guard's 114th Fighter Wing, Sioux Gateway Arpt., S.D., signals that he's ready for takeoff on a mission from JB Balad, Iraq. F-16s were valuable assets in Iraq, defending airspace, escorting other aircraft, and providing close air support. A C-17 comes in for a landing in the background.

Dawn” in Iraq

Operation Iraqi Freedom came to an end this summer, but the Air Force will be sticking around.

Photography by USAF photographers
Text by June Lee



USAF photo by TSgt. Caycee Cook

After seven-and-a-half years of war, the last US combat troops officially withdrew from Iraq on Aug. 31. As the drawdown wrapped up, 49,700 US military personnel remain in the country. Approximately 6,000 of them are airmen. This considerably smaller US military presence will provide stability, training, and advise-and-assist support to Iraqi security forces in what is now known as Operation New Dawn. This pictorial commemorates the Air Force's mission during the years of Iraqi Freedom, from 2003 to the present day. **I11** Two F-16s from the 332nd Expeditionary Fighter Squadron wait out a sandstorm at Joint Base Balad in September 2008, while maintenance crews deal with winds hurling sand particles into sensitive equipment. **I21** A pararescueman from the 64th Expeditionary Rescue Squadron scans the perimeter at Balad, while an HH-60 Pave Hawk hovers above.



USAF photo by A1C Jason Epley



USAF photo by SSgt. Robert Barney



USAF photo

I31 Maj. Andrew Kowalchuk, a pilot with the 37th Expeditionary Bomb Squadron, performs a preflight check on a B-1 Lancer. **I41** Explosive ordnance disposal personnel remove the wings of a C-130 near Sather AB, Iraq, with controlled explosions. The aircraft had made an emergency landing in the field.



USAF photo by TSgt. Jeffrey Allen



USAF photo by TSgt Erik Gudmundson

2



USAF photo by SSgt Derrick C Goode

1



USAF photo by TSgt Douglas Fawcett

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USAF photo

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USAF photo

11 An F-117 and three F-15s taxi at an air base in Southwest Asia. *12* The silhouette of the air traffic control tower at Balad. *13* At Aviano AB, Italy, C-17s prepare to deliver Army and USAF paratroopers into heavily defended Northern Iraq. This 2003 mission was the largest combat airdrop since 1989. *14* A crew chief with the 46th Expeditionary Recon-

naissance Squadron carries out a postflight inspection on a Predator. Remotely piloted aircraft have been prevalent throughout Iraq, performing both reconnaissance missions and air strikes against insurgents. 15 Capt. Kim Campbell, an A-10 Thunderbolt pilot, surveys the battle damage to her airplane. Campbell's Warthog was battered during a close

air support mission over Baghdad in 2003.

111 At Balad, A1C Laura Smith and SrA. Matthew Wilson place support pins into a gun maintenance stand, while SSgt. Calvin Adger (l) and TSgt. Christopher Knackstedt keep the gun housing steady. 121 A tethered F-16 undergoes a full-afterburner engine run-up at Balad. 131 TSgt. Karyn Kazimer and SMSgt. Elliot Adkisson, clad in hazmat suits, scan the area before checking mail and packages that have been sent to the Victory Base Complex, Baghdad, in March. 141 Lt. Col. Douglas Schaare (center) receives a preflight briefing before a close air support mission. 151 A B-1 lands with full flaps at a Southwest Asia base after completing a combat mission over Iraq.



USAF photo by SSgt. Phillip Butterfield



USAF photo by TSgt. Eric Gudmundson



USAF photo



USAF photo by SrA. Matt Coleman-Foster

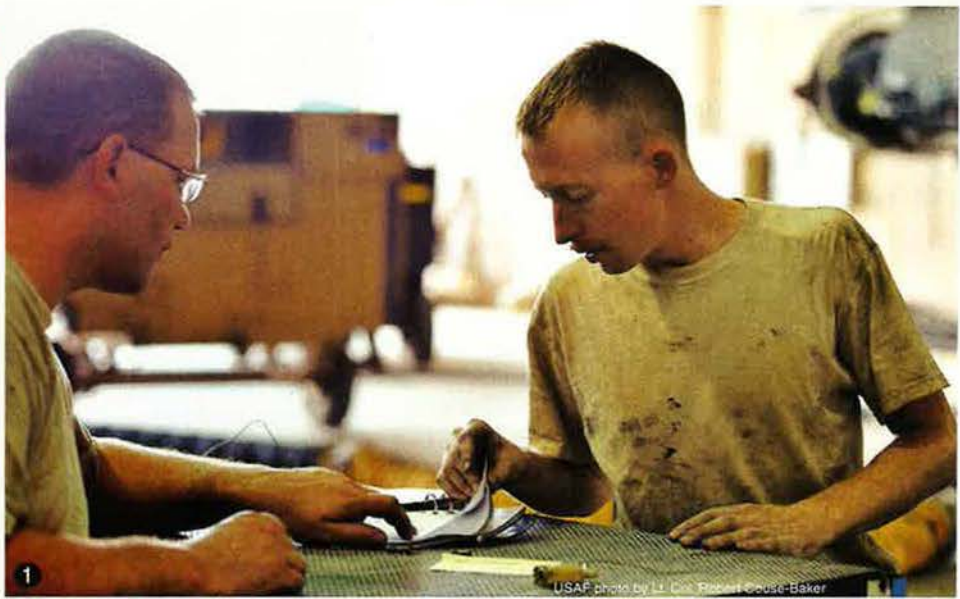


USAF photo by TSgt. Michael Boquette



USAF photo by SSgt. Stacy Fowler

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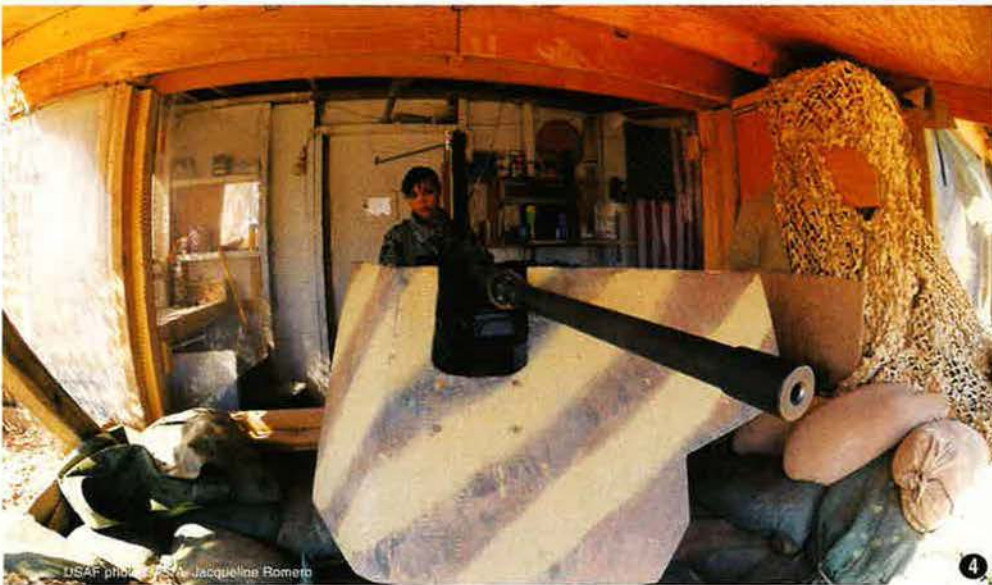


USAF photo by Lt. Col. Robert Gause-Baker



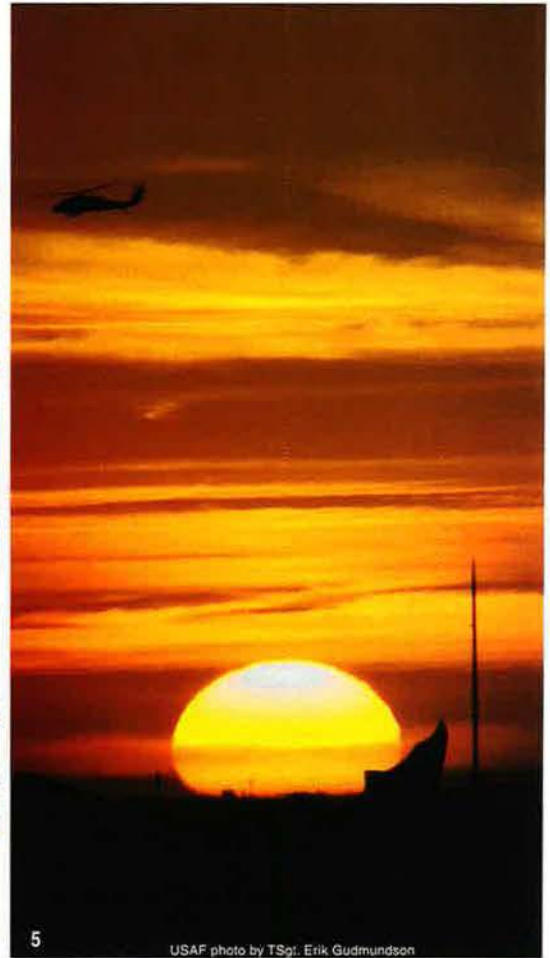
USAF photo by TSgt. Erik Gudmundson

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USAF photo by SAs Jacquelline Romero

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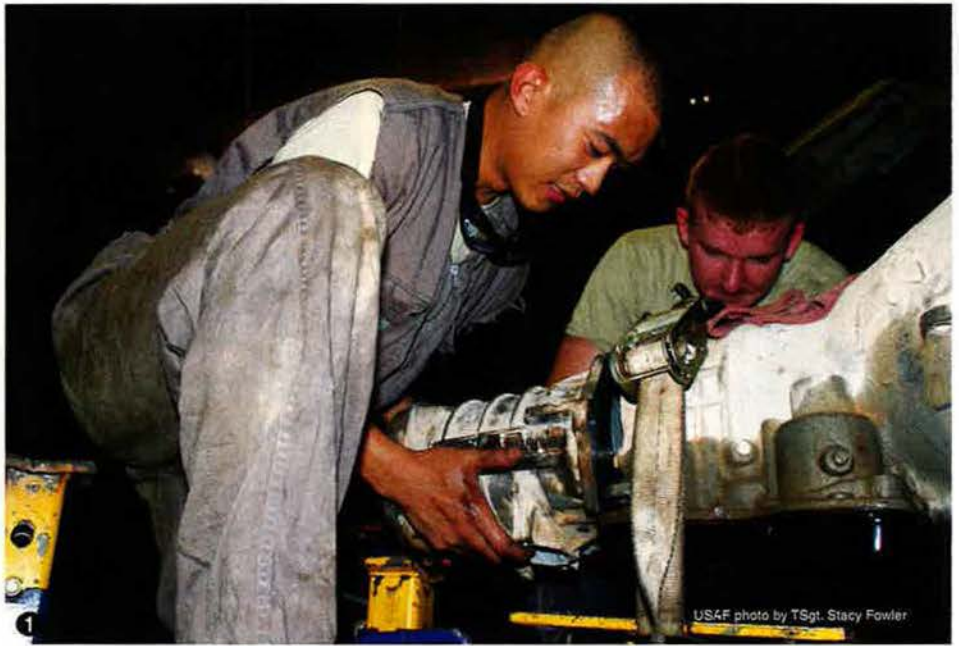
USAF photo by TSgt. Erik Gudmundson

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11) TSgt. Thomas Kennedy and SrA. Michael Schaefer, aircraft mechanics, look over technical orders during a 400-hour phase inspection of an F-16 in Iraq. 12) TSgt. David Duncan, with the 332nd Expeditionary Logistics Readiness Squadron, works on the air-conditioner compressor of a Humvee at Balad. 13) A C-130 and an F-16 taxi in opposite directions at Balad. Counterterrorism missions

continue, though the official combat operations ended. 14) SrA. Elizabeth Gonzalez mans a .50-caliber machine gun at a Sather Air Base defensive position. 15) As the sun sets, an Army Black Hawk helicopter flies over Joint Base Balad.

111 SSgt. Jeffery Ramirez (l) and SrA. Jeffrey Griffin put together a vehicle transmission at Balad. 121 SSgt. Michael Thomas and SrA. William Hunt, crew chiefs with the 37th Aircraft Maintenance Unit, remove fuel hoses from a B-1. 131 A-10s prepare to take off from al Asad AB, Iraq, on a combat mission in 2007. A-10s were crucial in providing CAS to coalition forces doing battle in Baghdad, Fallujah, and elsewhere. 141 A1C Latoya Tapscott performs an inspection at Balad. Her security forces team carried out random vehicle inspections, visa checks, and perimeter foot patrols.





USAF photo by SSgt Stacy Fox/AF

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USAF photo

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USAF photo by Sgt. Chris Butterfield

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111 As a C-17 pulls into position behind them, Black Hawks line a runway at Balad to be transported to their next destination during the drawdown in Iraq. 121 An aircrew deployed from Tinker AFB, Okla., works on an E-3 Sentry in Southwest Asia. The AWACS' command and control and battle management capabilities were essential over Iraq. 131 MSgt. Jesse Mathes checks an F-16 during an inspection at JB Balad. 141 A1C Robert Jacob guides a C-17 to its parking spot at Balad. The nation's attention has largely shifted to Afghanistan, but roughly 6,000 airmen will remain in Iraq. They provide security, intelligence, mobility, and training to Iraq's new defense and air forces. The tens of thousands of airmen who deployed before them made this smaller presence possible by helping defeat the insurgency and stabilize the new democracy in Iraq. ■

Manned space exploration has bolstered US science and strength, but the Administration may just give up on it.

An Inflection Point in the Space Race

By Richard P. Hallion



The space shuttle Atlantis, cargo bay doors open, orbits the Earth. The last shuttle mission is slated for next year.

NASA photo

For decades, the US civil and military space communities have been bound together by their pursuit of space power. What is beneficial to one is beneficial to the other. More importantly, what is injurious to one is injurious to the other.

In the years between the world wars, civil and military aviation research and development programs produced a technology base to support civil and military aviation alike. In the same way, civil and military space research and development

of the postwar years built the foundation for today's US space dominance.

The question is, will America long continue to enjoy such supremacy?

The answer is far from clear. Today, America's civil space authorities can no longer say with any certainty that the United States will remain dominant in space, or even build many of its own launch vehicles. It is an extraordinary situation, one that would have been inconceivable to the many architects of American space power.

After NASA retires its last space shuttle next year (and sets adrift thousands of skilled space workers), US astronauts will have to hitch rides on Russia's Soyuz, paying \$50 million apiece for the privilege, to get to a space station funded by the American taxpayer.

Those taxpayers might be forgiven for asking who really "won" the Kennedy-Johnson-Nixon-Khrushchev-Kosygin-Brezhnev-era space race.

The answer is that the space race is not over. When Neil Armstrong, Buzz Aldrin,

and Michael Collins journeyed to the moon, planted a flag, and left footprints in its dust back in July 1969, they won that particular race. No scientific and technological triumph, however great, suffices for all time to ensure the national superiority or even security.

The Space Age began on Oct. 4, 1957, with the Soviet Union's successful orbiting of Sputnik. Sputnik was a stunningly transformative event. Defense officials immediately realized the security implications: A nation that could orbit a satellite could strike another nation halfway around the world.

Lt. Gen. Donald L. Putt, the Air Force's deputy chief of staff for development, warned, "We cannot permit the dominance of space by those who say they will bury the United States."

The controversy precipitated a huge effort. Its result seemingly is well-established. The accepted narrative is that, in 1961, President Kennedy gave NASA the mission of putting a man on the moon within the decade. Guided by Wernher von Braun, the US filled space with satellites and ripped through Projects Mercury, Gemini, and Apollo, fulfilling Kennedy's mandate. The US thus won the space race, and then opened the era of the space shuttle and the International Space Station.

As is the case with most simple narratives, this one isn't really true. Reality was quite a bit more complex.

Kennedy may have focused national attention on "big" space and given America its moon goal, but it was President Eisenhower who really launched US space policy, particularly as applied

to the national security needs of the United States.

As general and President, Ike was a strong supporter of airpower and an early advocate of an independent Air Force. That attitude carried over into his handling of space—in particular, space-based reconnaissance. He presided over the Aug. 25, 1960, establishment of the National Reconnaissance Office.

In the view of space historian R. Cargill Hall, Eisenhower "framed the US space policy edifice. His successors either embraced the Eisenhower design or, at most, refined it by adding a window here and a door there."

Ambitions

Von Braun, the charismatic German-American engineer and rocket scientist, became the symbol of American space leadership. However, the US did much more than simply follow him through a series of ever more-complex and technologically demanding big space projects. More important, probably, was the careful, incremental approach of Air Force Gen. Bernard A. Schriever, who set to work in 1953 on an ICBM in response to a call by Trevor Gardner, special assistant for Air Force research and development. Together, Schriever and Gardner built America's practical military and civil space power.

Von Braun's launch vehicles vanished at the conclusion of programs they supported: Redstone with Project Mercury, Saturn with Project Apollo. However, Gardner and Schriever developed legendary ballistic missiles—Atlas, Thor, Titan—that formed the core of US national

launch capabilities. Derivatives and descendants are still used today.

Schriever's Atlas became operational in August 1960, and soon was a mainstay of civil and military spacelift. Success with Atlas and other programs contributed greatly to USAF's being named lead service for military space development in 1961.

The Air Force was ambitious. Schriever had forecast "the coming of astro power," and one space advocate predicted that, by the 1980s, the Air Force would have upward of 10,000 rated space-vehicle crew members routinely making spaceflights.

USAF was building on its vision of jet-and-rocket flight. Some proposed aircraft—the F-108 interceptor, the X-6 nuclear-powered airplane, the Aerospaceplane—were too fanciful or impractical. The Pentagon, however, abandoned two very promising projects: Dyna-Soar and the Manned Orbiting Laboratory (MOL). The former was an attempt to build a winged orbital boost-glider spacecraft, the latter an attempt at an early on-the-cheap military space station.

The Air Force-Boeing Dyna-Soar program offered USAF the potential flexibility and reusability of an airplane. Many today believe the program could have ushered in an era of small and extremely useful F-16-sized winged orbital spacecraft. However, Defense Secretary Robert S. McNamara decided to cancel it.

Recent development of the unmanned X-37B Orbital Test Vehicle, first flown in April 2010, is a similar effort to make space-access vehicles more like aircraft. The goal is fighter-like reusability—nearly a half-century after Dyna-Soar's demise.

The MOL program attempted to exploit the two-man Gemini spacecraft for military purposes, using proven Titan III launcher systems. MOL was hamstrung by the cost of the Vietnam War and Great Society social programs. Funding cuts brought delay. With the development of more-reliable unmanned satellite systems, MOL eventually ran out of support and was canceled in 1969.

Dyna-Soar and MOL were only two efforts. There also were plans to use tailored hypersonic re-entry shapes, known as lifting bodies, as possible manned spacecraft.

One of these, the Martin SV-5 shape, was flown as a small re-entry test bed; it re-entered the atmosphere at Mach 27 and maneuvered to an area in the Pacific near Kwajalein atoll. Tests in a low-speed, piloted variant, the X-24A, proved an astronaut could control such a craft and bring it to a precise landing.



The X-37B Orbital Test Vehicle, shown at the Astrotech Corp. facility in Titusville, Fla. Officials hope this unmanned space vehicle will provide orbital reusable access, not unlike a fighter for space flight.

However, there was never a piloted flight of an SV-5.

Fortunately, many other Air Force space projects of the '60s did go forward, building long-lasting and transformative space capabilities. Most were undertaken with other agencies. These included the Corona reconnaissance satellite, which ushered in the era of space-based orbital observation; the MIDAS (Missile Defense Alarm System) missile detection satellite; the Spacetrack satellite and debris tracking system; the Vela Hotel nuclear detection satellite system; and various communication, meteorological, and navigation satellites.

However, the US had missed a big chance. Dyna-Soar, the MOL program, the Gemini spacecraft, and various lifting body programs gave the US a unique opportunity to advance in space. Washington failed to take advantage of any of them.

After McNamara canceled Dyna-Soar, America still had an opportunity to achieve routine human access to space and exploit the potential of low Earth orbit, using Titan-launched Gemini and a small orbiting facility. Instead, successive Administrations abandoned such pioneering achievable systems and went for more immediate big space projects.

Gemini ended, to be followed by Apollo, the less-than-satisfactory Skylab project, the space shuttle, the International Space Station, and the abortive National Aerospace Plane.

Given the massive costs of the Great Society and Vietnam War, it was probably



Wernher von Braun (l) speaks with President Kennedy in May 1963.

inevitable that heavy civilian space outlays would end. After Vietnam, the services had to restructure and re-equip their conventional forces, which also served to put the squeeze on space spending.

Still, USAF's space element continued to mature. The Air Force developed systems such as the Defense Support Program infrared reconnaissance satellite, Defense Satellite Communications System, Defense Meteorological Satellite Program, and Global Positioning System navigation constellation.

During this period, Air Force activities greatly benefitted civilian space science. Vela satellites contributed to X-ray and Gamma-ray astronomy. Reconnaissance satellites influenced the design and capabilities of Hubble Space Telescope and various "fly-by" space probes.

Still, relations between the military and civil space communities were, at times, strained. The civilian space scientist looked outward to the cosmos. The military space practitioner sought the high ground of space for vantage over Earth.

Differing Philosophies

Lt. Gen. James Ferguson, USAF's deputy chief of staff for research and development, observed in 1962, "We must look downward and around us in space, while the scientists look upward and outward."

For all the tension, the pressure of the space race forced the camps closer together. When NASA hit problems moving from the simple Mercury and Gemini efforts to the complex Apollo program, it adopted Air Force management practices, dropping the Army-legacy philosophy originally used by the von Braun team. Lt. Gen. Samuel C. Phillips, Minuteman ICBM program director, went to NASA in 1964 and directed systems integration for the Apollo program, and he remained until after the 1969 moon landing.

Nor was Phillips a rarity. "By the mid-1960s," Hall wrote, "so many Air Force officers held important management positions in NASA that those on the left declared that the nation's civil space program was now being 'militarized' from the inside out."

The Soviet Union steadily advanced its own space capabilities, building upon its own Soyuz system, similar to Gemini. It worked slowly to achieve routine space access, largely fulfilling the visions of US Air Force space partisans in the 1950s and early 1960s. The Soviet program included test-flying long-range hypersonic re-entry vehicles and spacecraft. Only the profound

USAF photo



Maj. Gen. Bernard Schriever (r) and USAF assistant secretary for R&D Trevor Gardner (l) worked together to build US space power.

inefficiency of the communist system denied the Soviet Union even greater space success.

All was not well with America's civilian space endeavors. While the US military effort was based on careful investment in key technologies and programs that gave to the United States unprecedented abilities to use and exploit space, the civilian space enterprise tended more and more to resemble a top-down, Soviet-style model of governmental-industrial enterprise, obsessed with the next big thing.

The problem was exacerbated by the differing operational philosophy, and differing external expectations, between the old NACA and the NASA that replaced it.

In the interwar years, the National Advisory Committee for Aeronautics (NACA), the predecessor of NASA, pioneered research in aerodynamics, materials and structures, propulsion, and controls, issuing reports and findings that the American aircraft industry turned to military and civil use. Using NACA data—the gold standard of aeronautical research—American and foreign designers alike reshaped the airplane, building new and highly efficient military and civil aircraft.

The NACA of the 1930s, however, did not have to develop airliners and run airlines. In the 1960s and afterward, NASA had to develop spacecraft and run the "spaceline." It had to develop the database, compete various designs, pick a winner, sponsor development, build it, and then operate it.

The result was a largely corporate socialist enterprise, just the opposite of the free-market-driven aviation industry and



A Russian Soyuz spacecraft launches last April from Baikonur Cosmodrome in Kazakhstan. After the final space shuttle mission, US astronauts will have to hitch rides on Russian rockets.

the Air Force model of space development. NASA's space efforts, and to a degree its aeronautical research enterprise as well, was hostage to complex, expensive, difficult-to-maintain programs, particularly the space shuttle and International Space Station, each of which had long and costly development periods.

Management in Schriever's style, built upon proven launch technology such as Titan and Gemini, envisioned use of smaller spaceplanes. This could have generated a robust, innovative, and steadily evolving ability to operate in space.

What we got, instead, was the space shuttle, a much more complex and challenging system that, for all its great merit, was expensive to operate, unforgiving of error, and in an era of limited resources, a huge consumer of available capital.

Certain NASA and Air Force officials, most of them within the flight test and flight research community, tried to reverse this trend and achieve a more persistent space presence. They met

with little to no success. Indeed, so dominant did the shuttle program become that Congress canceled future buys of expendable launch vehicles, a serious error in judgment rectified only after the disastrous *Challenger* accident of 1986.

Today, there is undeniable evidence that Washington is retracing its steps and is about to commit the same errors, with the likely result of hampering the nation's civil space effort. It is a mistake that inevitably will affect the robustness of America's military space effort.

The Obama Administration's space budget, released in February, ended NASA's Constellation program, which aimed to return man to the moon. The Administration also truncated development of the Ares next generation launch systems. It chose to focus instead on preparations for a grandiose manned mission to Mars.

In a visit to the Kennedy Space Center on April 15, President Obama forecast a bold future of "the first-ever crewed missions beyond the moon into deep space," launching crews to asteroids, orbiting Mars, and then, in the "mid-2030s" landing on the "Red Planet" and returning to Earth.

All good stuff—dating to the 1950s and the speculations of von Braun and a myriad of other space enthusiasts.

Robust, Reliable, Ready

Astronaut Aldrin supported the go-to-Mars initiative. Other veteran astronauts resoundingly disagreed. Armstrong, James A. Lovell, and Eugene A. Cernan, respectively the mission commanders of Apollo 11, 13, and 17, issued an appeal remarkable for its forthrightness and passion.

In an open letter to the President, the three astronauts urged reconsideration, warning that his cancellations of the more modest programs would waste \$10 billion in R&D investment. More worrisome, they said, it would take "many

years ... to recreate the equivalent of what we will have discarded."

The astronauts said that, "without carriage to low Earth orbit and with no human exploration capability to go beyond Earth orbit for an indeterminate time into the future," the US risked becoming a nation of "second- or even third-rate stature," and that the cuts likely ensured the United States would be "on a long downhill slide to mediocrity," preventing it from ever fulfilling the President's desire to reach Mars.

"America," they concluded, "must decide if it wishes to remain a leader in space."

Over the last half-century, similarly bold plans have fizzled, to the frustration of space advocates who have witnessed other nations doggedly moving ahead even as the US slows down, approaching retrograde motion. They ask a compelling question: Does the US have a real future in space?

Writing in 1980, on the eve of the shuttle era, space historian Walter A. McDougall noted perceptively, "A thumbnail definition of a great power between the two world wars might have been: 'A nation that builds its own airplanes.' The updated version would be: 'A nation that launches its own spacecraft.'"

For the moment, and thanks largely to the Air Force, the nation continues to possess robust, redundant, reliable, and ready space capabilities, and its space practitioners are rightly focused on practical, necessary, and achievable future systems. It is not realistic, however, to expect the Air Force, in the years ahead, to continuously make up for civilian weakness caused by the lack of a coherent national space strategy.

National space strategy has to incorporate a coherent lasting vision of civil and military space working together to furnish the space power America will continue to need in the 21st century.

Feel-good sound bites evoking images of long-term, gargantuan state programs having at best a dubious chance of ever reaching the hardware stage cannot substitute for rational planning. Dreams of Mars make little sense in a time when key space infrastructure is being closed, thousands are leaving the aerospace field, and American astronauts learn Russian so that they can ride Soyuz into space. ■

Richard P. Hallion is an aerospace historian who served 11 years as the Air Force historian and has written widely on aerospace technology and airpower topics. His most recent article for Air Force Magazine, "Richard Whitcomb's Triple Play," appeared in the February issue.

The enemy could be anywhere, but the Air Force is up to the challenge.



USAF photo by TSgt. Jeremy K. Cross

USAF photo by TSgt. Francisco V. Govea II

The New Look of Base Defense



By Marc V. Schanz, Senior Editor





USAF photo

Facing page, top: SSgt. Mitchell Stein and a military working dog patrol at Bagram Airfield, Afghanistan. Bottom: An A-10 takes off from Kandahar Airfield, Afghanistan, on a close air support mission. Above: Lt. Col. Greg Harbin (l), embedded with Canadian troops, patrols a village near Kandahar.

On May 19, a Taliban assault force employing suicide bombers, rocket-propelled grenades, and small-arms fire attacked Bagram Airfield, Afghanistan, just before dawn, killing a contractor and wounding nine over the course of an eight-hour firefight.

Airmen with the 455th Expeditionary Security Forces Squadron and other service members engaged attackers at several points along the base's perimeter fence, killing about 12 attackers—including four intended suicide bombers—preventing penetration of Bagram's perimeter.

The attack was a stunning reminder that the Air Force may not be challenged in the skies over today's war zones, but that does not mean airpower is free to operate at will.

Air Force assets are forward deployed in a host of Southwest Asian nations to support the wars in Iraq and Afghanistan. Aircraft ranging from aerial tankers to fighters and intelligence-surveillance-reconnaissance assets are at facilities and forward operating areas often located in the middle of combat zones. The Air Force's force protection practices have consequently evolved—and quickly—to meet a combination of traditional and nontraditional threats.

USAF officials have spent the better part of the last decade figuring out how to protect forces and assets around a

battlefield with no front lines. The threats are often elusive, from isolated car bombs and mortar fire to coordinated small-team assaults. Officials must even be wary of the occasional large strike with heavy weapons. One thing is clear: This is not Cold War-style garrison force protection.

Hard Lessons Outside the Wire

For Col. John R. Decknick, director of force protection for US Air Forces Central, USAF's changing base defense profile is a daily concern. A former enlisted security policeman, Decknick has completed three security forces tours in Iraq dating back to 1991's Operation Provide Comfort. Even in the last decade, he notes, the Air Force's approach to force protection and base defense has evolved significantly.

"There is a massive, massive difference," he said, of force protection activities and tactics after nine years of combat. "The warrior skills ... just to get into these mission sets now ... have changed dramatically. We never would have dreamed of this type of stuff in the Cold War."

During the Vietnam War, the Air Force learned hard lessons about defending its bases using "outside the wire" operations, senior USAF force protection officials note. For the most part, however, the tactics and practices honed in Southeast Asia slowly eroded as the US reoriented

its base defense posture toward traditional Cold War threats.

Tactical level is just one piece of a broad portfolio of potential threats that range from cyber intrusion to ballistic missiles.

One of the largest hurdles the service has faced in recent years is the effort to integrate and standardize a joint approach to base defense, while redeveloping the ability to operate outside the wire, noted Brig. Gen. Jimmy E. McMillian, director of security forces in the Air Staff's logistics, installations, and mission support division. But in this time, he added, many changes in security forces doctrine, concepts, and practices originated in the USAF security forces community—and have since become standard practice across DOD.

"The basic principles of base defense are essentially the same, regardless of where an installation is physically located," McMillian said. New concepts to evaluate risk to facilities have developed over the last several years to give installation commanders the most flexibility to address their own unique threats at any given time or place—with the intent of increasing an installation's ability to detect, deny, and respond to threats within its immediate area, but as far away from the "operational resources" as possible.

"Our objective, in all cases, is uninterrupted operations," McMillian said. In some locations, this means uninterrupted aircraft sortie generation, in others, uninterrupted training activity.

Since 9/11, Air Force security forces personnel have often been face-to-face in battle with terrorists and militants in Iraq and Afghanistan—from augmenting convoys to running ambushes on rocket and mortar teams threatening bases, to being involved with and securing zones for medical evacuation.

As a result, the SF field is one of the hardest hit in the Air Force. Several of Decknick's fellow SF airmen have been killed in the line of duty since 2001, and many more wounded facing sniper attacks, roadside bombs, and other threats.

"Not only has the training changed, the deployment time has changed," he said.

Airmen confronting threats to air bases and joint facilities are often now operating with Army, Navy, and Marine Corps personnel, he said, as the nature of the war has pushed base defense into a different concept of operations. "It's no longer 'OK, Air Force. Go out and guard Joint Base Balad [Iraq], and have a good day,'" Decknick said.

While the Air Force's assets are not challenged in the skies in Southwest Asia



Capt. Jason Williams (l) gives a mission brief to 455th Expeditionary Security Forces Squadron airmen at Bagram Airfield.

today by enemy aircraft, the asymmetric advantage of airpower is all too apparent to militants in Afghanistan. In response, Taliban and al Qaeda forces continue to launch brazen attacks on US air hubs, such as this year's strike at Bagram.

The defenders' efficient response there averted a potential "spectacular event," according to Combined Joint Task Force-82 officials. "The quick defensive reaction by the Bagram security forces likely saved a lot of lives," said Army Lt. Col. Clarence Court Jr., spokesman for CJTF-82.

Three days later, Kandahar Airfield—the main air hub in the country's south—came under rocket attack, and in a similar manner, an element of Taliban fighters attacked the north side of the base only to be repelled by security forces.

These attacks, and the subsequent responses, revealed the interwoven nature of base defense in a combat theater today. Decknick noted that members of all services were eventually caught up in the response.

"No longer can any base just be secured from the fence line in," he said. "You have to integrate the indirect fire footprint, the approach and departure ends of the runway, the surface-to-air fire footprint. ... You have to integrate 10 clicks out with whomever owns that battlespace."

As much coordination with other combat elements—such as units conducting counterinsurgency missions, medical evacuation flights, or even transporting goods and equipment to and from the base—is involved in daily force protection activities for most SF units in US Central Command, he added.

"You get approval from the people who own that ground: ... In the case of

Balad, even now, soon it could be the Iraqis," Decknick said. "You deny the enemy that territory and create free lines of communications."

Lines of Communication

When it comes to protecting bases, the lines of communications run to and from the theater commander, he added. Deckrick has a counterpart who works at the combined air and space operations center for Southwest Asia, coordinating and sharing information on threats to bases in his theater, but the information must go both ways.

Lt. Gen. Gilmory Michael Hostage III, the AFCENT commander, "expects me to push [information] up," Decknick said. "Commanders on the ground have a greater grasp of tactical threats and what's

going on in their location. There's a lot of information sharing going on."

McMillian said the Air Force now models its approach on joint DOD security operations concepts, which revolve around the METT-T framework—that is, mission, enemy, terrain and weather, troops and support available for security operations, and time available. Looking at these factors, a tactical analysis is establishing a base boundary line—but not necessarily a traditional one.

A tactical boundary, as informed by operations in Iraq and Afghanistan in large part, is a line where an installation commander may deploy and use force. In Southwest Asia, this line is often located outside the perimeter fence. Since the advent of Operation Desert Safeside in 2005 in and around Balad, Iraq, this change in policy has moved Air Force SF personnel into close proximity with threats far from base gates.

The result of moving force protection activities farther afield from a base is closer coordination with commanders in the immediate environment—often Army and ground component commanders in Iraq and Afghanistan.

Despite the nontraditional nature of the threats to bases in Southwest Asia, the Air Force recognizes some vulnerabilities are the same in all operational environments.

The preferred method of attack against air bases historically has been through standoff weapons such as rockets and mortars, McMillian noted. To better plan for base defense, USAF developed the base security zone construct, identifying an area from which an enemy can launch an attack on the personnel and resources



Amn. Aaron Calzada keeps an eye out at an entry control point at Bagram Airfield. In an attack on Bagram last May, a contractor was killed and nine soldiers were wounded.

at a given location or aircraft departing and approaching the installation.

Because of the persistence of these types of threats, and due to the integrated nature of defending bases, McMillian said the Air Force took the complementary measure of setting up the Integrated Defense Risk Management Process (known as IDRMP) at the installation level across the force. This combines the decision-making process each commander must follow with the intelligence element of each installation and area and the relative risk.

The result of this policy change is moving installation security from a process more associated with compliance standards to capabilities-based effects and standards to confront threats. Information sharing, between theater commanders, local commanders, and other stakeholders near the location, as Decknick notes, is crucial to success.

In addition to policy changes, the Air Force has aligned specialized tracks in its training regimes, with base security operations focusing on inside the wire needs, area security for outside the wire scenarios, and other specialties. Each track includes specific field training exercises and collective skills exercises.

Critical to the success of proper force protection and base defense activities, McMillian said, is the establishment and improvement of a feedback loop. This turns "lessons identified" into "lessons learned" to incorporate changes into training curricula and lesson plans as quickly as possible. Speed is critical so that security forces can evolve with threats.

One method of keeping force protection activities up-to-date is sending deployed security forces members to regional training centers to give current perspectives on a location. The Air Force also rotates instructors into Southwest Asia to keep expertise and the curriculum relevant to the actual threats facing each base and theater.

Real-time information on threats has proved critical in operations at the tactical and theater level as well, McMillian said. It is an "absolute necessity" for successful operations in deployed locations, fixed bases abroad, and in protecting Air Force installations at home.

For his part, Decknick believes the lessons learned and tools honed in securing facilities in Iraq and Afghanistan apply in other theaters. "I think this is a revolution in military affairs. ... Everyone is a piece of [this]," he said. "This concept applies in Africa, in [the Pacific]."

The Air Force is seeking to improve threat detection and push enemies as far

A Pacific Perspective

In addition to the diverse array of tactical threats across Southwest Asia, the Air Force—and the Department of Defense—have also thought a great deal about the vulnerability of their large and permanent installations. So-called "anti-access threats" are a mix of political, geographic, and military factors that could prevent or delay US forces from deploying airpower in a combat theater.

Anti-access threats are a particular concern in the vast Pacific region, where many US bases are within range of Chinese and North Korean ballistic missiles.

A 2002 report by the Center for Strategic and Budgetary Assessments called the anti-access threat the "dominant strategic challenge" confronting future US power projection operations in regions of potential conflict.

DOD and the Air Force are focusing intently on the threats facing the Pacific installations in South Korea, Japan, and Guam. The threats include potential ballistic and cruise missile attack, and the US military's responses thus far have primarily centered on dispersing assets, hardening structures, and creating redundant capabilities.

away from airmen and resources as possible, noted McMillian. The process has helped improve DOD-wide standards.

The Air Force led the way in requiring 100 percent of entry-control identification credentials to be physically and visually inspected at installation perimeter entry points, for example. This is now standard practice across the department.

Tailoring TASS

USAF also began 100 percent inspection of large commercial vehicles at installation entry points, with the same goal of keeping potential threats from the troops and equipment.

Not only are tactics and training evolving with threats, the tools to keep airmen and facilities secure are constantly improving as well, said officials with USAF's force protection programs office at Hanscom AFB, Mass.

"A lot of what we're doing is the [integration] part. ... There's a lot of information out there, and a lot of it is stovepiped, and we're trying to bring it together," said Roy Higgins, the force protection programs joint projects manager at Hanscom. Higgins notes that much of what acquisition programs focus on in the base defense field is command and control and melding architectures for communicating data—be it access-control protocols or sensor information. "How do you share information from Hanscom, for example, with other bases and services?" Higgins asked rhetorically.

Since 1996, the force protection programs office at Hanscom has managed and upgraded TASS, the Tactical Automated Security System, a deployable integrated electronic security system that provides a tailor-made security footprint to a given location, said Patrick Dagle, chief of force

protection programs at the base. In use across the globe in various configurations, its biggest user is AFCENT.

TASS uses various sensors, cameras, radars, thermal integrators, unmanned aerial vehicles, and other tools at numerous locations across the theater to collect and disseminate a range of threat information to the installation and theater commanders. Versions of TASS are in use around the world, Dagle said, as the program can be tailored to the particular environment of each location and takes little time to set up.

Integrating different capabilities and creating familiar operating tools is key in war zones, numerous officials said. If Air Force security forces airmen leave a post in Iraq, Dagle said, they could very well be backfilled by ground troops. DOD needs to ensure images from an Air Force sensor can be transmitted to a Marine Corps laptop or displayed on an Army screen.

Combined operations will be the norm in combat zones, so integration must go beyond security. Under one demonstration effort under way, the force protection office is looking at how to tie different pieces of the base together, from the fire department to the chemical, biological, radiological, and nuclear response elements and other first responders. It's important for all these people to have a common operations picture, through better, more accessible, and interoperable command and control and ISR, he said.

"This particular teaming scenario, where everyone is in it together, ... applies for the future of our military and our government," Decknick said. "It really does take a flipping village these days," he added with a laugh. ■



An independent look at the Quadrennial Defense Review finds a pressing need for more long-range bombers and ships. In a twist, the panel says the defense topline should be raised to pay for them.

Rethinking the QDR

By James Kitfield

Ever since President Dwight D. Eisenhower created Project Solarium in 1953, with its three competing teams of top military and diplomatic officials arguing different approaches for winning the Cold War, officials have turned to the Red Team approach in developing national strategy. The latest “Red Team” to make waves in Washington is the Quadrennial Defense Review independent panel, tasked by Congress to test the assumptions and findings of last year’s QDR.

In its recently released final report, “The QDR in Perspective: Meeting America’s National Security Needs in the 21st Century,” the independent panel of national security experts did not just review current plans for US military force structure,

personnel, weapons modernization, and defense spending. The panel essentially turned conventional wisdom on its head. If Congress and the Administration choose to pay attention, the recommendations will bolster the Air Force and its future capabilities.

The independent panel found current DOD plans unsustainable and inadequate for the demands of an unpredictable world. The panel thus calls for a significantly larger fleet of Navy warships and expanded Air Force “deep strike” capability—primarily to counter the threat posed by a newly assertive China. The panel also calls for the current level of ground forces to be maintained, because they are needed to win the wars in Afghanistan and Iraq and to meet future demands for counterinsurgency and stability operations.

The panel, co-chaired by former Defense Secretary William J. Perry and former National Security Advisor Stephen J. Hadley, also argues that an arsenal of weapons systems worn down by years of constant combat must be rapidly replaced. Additionally, unspecified National Guard units should be dedicated exclusively to the homeland defense mission, and cyber defenses substantially improved.

Most notably, the independent panel calls for a significantly larger defense budget topline to pay for it all.

“Secretary [Robert M.] Gates’ directive on efficiencies to deal with DOD costs is a good start, but in our judgment will not be sufficient,” said Perry, testifying before the Senate Armed Services Committee.

Additional topline spending will be required, he said. “What we have described



Staff photo by Bulch Ramsey

A B-52 bomber maneuvers into place beneath the refueling boom of a KC-135. Right: USS Benfold leads USS Chosin (back), as a surface-to-air missile is fired during a RIMPAC 2010 exercise.

as a need [in the report] will be expensive. But deferring recapitalization” could result in even higher costs in the long run.

“An explicit warning is appropriate,” Perry and Hadley testified. “The aging of the inventories and equipment used by the services, the decline in the size of the Navy, escalating personnel entitlements, increased overhead and procurement costs, and the growing stress on the force mean that a train wreck is coming in the areas of personnel, acquisition, and force structure.”

Hadley noted that the panel’s instruction from Congress was to review the planned US military force in light of current and evolving strategic threats, “unconstrained” by concerns about costs or affordability.

“The country has to be prepared to increase the topline,” Hadley testified.

“And our expectation is there may need to be some increase.”

The report criticizes the 2010 QDR for dropping the venerable “force planning construct” that shaped the US military throughout the post-Cold War era: the need to be able to fight and win two conventional wars, nearly simultaneously. After 9/11, that force planning construct was amended, with the 2005 QDR calling for a force that could defeat one conventional foe while also waging a long-duration irregular warfare campaign, and protect the homeland against attack. The panel called Gates’ decision to drop a clearly articulated force planning construct in the 2010 QDR a “missed opportunity.”

Lacking such a force planning construct to evaluate, the panel actually embraced the general force structure baseline contained in the 1993 Bottom-Up Review.

“Although it may seem counterintuitive to look to a 17-year-old review for guidance for the future, the panel decided [that] ... given the stress on the force over the last 15 years and the increasing missions that



AP photo by Alex Brandon

QDR independent panel co-chairs William Perry (l) and Stephen Hadley testify before Congress.

the Department of Defense has assumed, it is unlikely that the United States can make do with less than it needed in the early 1990s, when Americans assumed the world would be much more peaceful post-Cold War.”

The independent panel found the Air Force’s current force structure generally acceptable, but recommended a steep increase in USAF’s deep strike platforms and capabilities. Whereas the 2010 QDR



USN photo by Mass Comm. Spec. 2nd Class Mark Logico

calls for a long-range bomber force of 96 aircraft, for instance, the 1993 BUR baseline embraced by the panel recommended a force of 184 long-range bombers.

When asked during his Senate testimony whether that recommendation meant the Air Force should modernize its existing, old bomber fleet by more rapidly developing a next generation bomber, Perry was unequivocal.

"My answer to that is a short one, which is, 'Yes,'" said Perry.

He elaborated in House testimony by saying a new bomber "should be a follow-on to the B-2 and have the kind of stealth capabilities that the B-2 has. That's the unique capability that the United States has today, and one which will be very important... in any new deep strike bomber."

In an Aug. 11 letter to Congress, Gates said he agrees with the panel's conclusions that "the Air Force will need to place greater emphasis on unmanned aerial vehicles and long-range strike capabilities in the mix of capabilities it fields."

The panel's emphasis on maritime power projection and deep strike capabilities comes with China's military buildup in mind. Adm. Michael G. Mullen, Chairman of the Joint Chiefs, recently said his view of China's largely opaque military buildup had evolved from being "curious" to "concerned."

"As a Pacific power, the US presence in Asia has underwritten the regional stability that has enabled India and China to emerge as rising economic powers. The United States should plan on continuing that role for the indefinite future," the report notes. "The panel remains concerned that the QDR force structure may not be sufficient to assure others that the United States can meet its treaty commitments in the face of China's increased military capabilities."

Adopting this force structure construct would have the greatest impact on the Navy. Whereas the 2010 QDR calls for increasing the size of the Navy fleet from the current 285 ships to roughly 322, the panel recommends a fleet of 346 ships. It also calls for modernizing the fleet with a new attack submarine, a next generation cruiser, and improved countermeasures to anti-access weapons such as anti-ship missiles and submarines. In analyzing the strategic landscape, the independent panel identified four vital interests of the United States, and a handful of current or evolving threats to those interests. As the underwriter of global security, the panel argues the United States and its military forces must adequately defend the homeland; assure access to the global sea, air, space, and cyberspace commons;

preserve a favorable balance of power across Eurasia; and provide for the global "common good" through such actions as disaster relief, humanitarian aid, and development assistance.

As major threats to the stability of that international system, the panel identified the spread of radical Islamist extremism and its attendant terrorism; the rise of new global great powers in Asia, with China and India at their fore; a continued struggle for power among myriad actors in the Greater Middle East; an accelerating global competition for resources ranging from oil to land and water; and the persistent problem of failed and failing states.

Hard Choices, Necessary Choices

"These trends are likely to place an increased demand on American 'hard power' to preserve regional balances," the report notes, stressing that the United States cannot realistically relinquish the burden of trying to stabilize that often fragile international order. "While diplomacy and development have important roles to play, the world's first-order concerns will continue to be security concerns."

However, the key problem confronted in both the independent panel report and the QDR is that the tools of American hard power are showing signs of severe stress and wear.

The post-Cold War 1990s were characterized by defense cuts and attempts to seize "peace dividends," for instance, by reducing the size of US armed forces by roughly 40 percent. "The general trend has been to replace more with fewer more-capable systems," the panel says in its report. "Beyond a certain point, quality cannot substitute for quantity."

Meanwhile, the post-9/11 period has seen nearly constant combat in Afghanistan and Iraq, accompanied by a delay in equipment modernization as money shifted to warfighting accounts. This took place at the same time as a steady growth in new missions to include counterterrorism, counterproliferation, cyber security, and homeland defense.

"There is increased operational tempo for a force that is much smaller than it was during the years of the Cold War. In addition, the age of major military systems has increased within all of the services, and that age has been magnified by wear and tear through intensified use," the report notes.

Sticking with a "business as usual" approach could have unacceptable consequences, the panel writes.

Continuing to buck conventional wisdom, the panel recommends sticking to current ground troop levels for the foreseeable future. This despite the fact that troop levels have dropped in Iraq by roughly half this year (from nearly 100,000 to 50,000 by Aug. 31), and that under the current status of forces agreement, US troops are scheduled to leave Iraq by the end of 2011.

While the Obama Administration has "surged" forces to Afghanistan over the past year, bringing troop levels there near the 100,000 mark, it has also promised to begin withdrawing them in July 2011.

"The current end strength of the active duty ground forces is close enough to being correct that adjustment to that number is not a top priority," the panel's report determines. "The need to deal with irregular and hybrid threats will tend to drive the size and shape of ground forces for years to come, whereas the need to continue to be fully present in Asia and the Pacific and other areas of interest will do the same for naval and air forces."

Spiraling personnel costs are rapidly making current ground force levels unaffordable. Failing to address the increasing costs will "likely result in a reduction in the force structure, a reduction in benefits, or a compromised all-volunteer force."

Sweeping personnel changes are needed, perhaps by lengthening military careers to 40 years; abandoning the "up or out" promotion model; emphasizing up-front cash bonuses for re-enlistment over expensive long-term benefits; and adjusting contributions to the Tricare health care system.

While acknowledging that all of those reforms are controversial, the panel warns that hard choices are now necessary to close the widening and increasingly dangerous gap between the reach of a downsized and overstressed US military force and America's strategic goals.

"The budget pressures facing the Department of Defense in the future are certain to be severe," the panel concludes. "If the long-term cost trends in the areas of personnel, operations and maintenance, and acquisition cannot be reversed or modified, the outcome will be stark, and the consequences for US national security will be enormous." ■

James Kitfield is the defense correspondent for National Journal in Washington, D.C. His most recent article for Air Force Magazine, "Crowded, Congested Space," appeared in the August issue.



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After a long and troubled development, the Air Force's first SBIRS satellite should soon be on the lookout for missile launches worldwide.

Missile Warning for the Future

By Marina Malenic

Illustration by Erik Simonsen

Satellites built for detecting and tracking missile launches are of high import for the US and its national security. They provide the nation and its military forces with notice of possible missile attacks and space launches worldwide.

"No rocket takes off anywhere in the world without us seeing it," Gary E. Payton stated flatly in a July interview just prior to his retirement as Air Force deputy undersecretary for space programs. The

Pentagon's Defense Support Program has played the lead missile-warning role for decades, but the long-anticipated Space Based Infrared System will soon launch its first space vehicle into geosynchronous Earth orbit (GEO).

Payton was optimistic the heretofore troubled, next-generation SBIRS will substantially bolster US capabilities in detecting space launches.

After experiencing years of development problems and cost overruns, the

In an artist's conception, SBIRS GEO-1 detects a nuclear emission source.

Air Force is eyeing 2011 as the year a dedicated SBIRS satellite goes into orbit. This bird will complement two SBIRS sensors that are already in use, hosted on classified satellites in high elliptical orbit.

As one senior Air Force official admitted, SBIRS "has not exactly been a model acquisition program" since its 1996 inception. In 2001, the Pentagon

made the first of what would be several Nunn-McCurdy notifications to Congress for cost growth, forcing the program to be restructured. Many more restructures and notifications of cost increases would follow, but Air Force officials now finally seem certain that the SBIRS program is out of the woods.

Over the summer, military engineers and those working for prime contractor Lockheed Martin completed system testing on the first SBIRS GEO satellite, designated GEO-1, and planned for delivery to Cape Canaveral, Fla., early next year.

"We are marching towards a spring 2011 delivery date, targeting right now the March time frame ... with the intent of getting it launched shortly thereafter," Col. Roger W. Teague said in June.

Cutting No Corners

Teague is the commander of the SBIRS wing at the Space and Missile Systems Center, Los Angeles AFB, Calif., and manages both the legacy Defense Support Program and the follow-on SBIRS effort. Teague said SBIRS GEO-1 still has a shot at making the Fiscal 2011 launch manifest.

The satellite was previously scheduled to be delivered to the Cape later this year, but Teague said extended testing of the flight software redesign pushed the delivery date to the spring.

"That development has gone extremely well," he added. "We're in the final stages of now qualifying that software before we launch it."

He explained that qualification stresses the software in ways that mimic "anomalous conditions" the satellite might experience while on orbit. "Given the journey that we've had so far, it doesn't make sense to cut any corners from a mission assurance standpoint," Teague added. SBIRS GEO spacecraft will have both scanning and staring sensors. Pointing mirrors in front of the telescopes will allow the system to hone in on specific parts of the world. The scanning sensor is expected to provide a shorter revisit time than the DSP over its full field of view, while the staring sensor will be used for step-stare or dedicated stare operations over smaller geographic areas.

The GEO staring sensor is also built to stare at one Earth location and rapidly move to other locations, with improved sensitivity compared to DSP. Several areas can be monitored by the staring sensor, with revisit times significantly quicker than DSP.

The SBIRS constellation is someday expected to replace completely the old DSP constellation, which currently serves as the main US early warning system for missile launches around the world.

DSP has been operational for almost four decades. Several replacement programs were started throughout the 1980s and 1990s, but none came to fruition. These earlier attempts reportedly failed due to immature technology and high cost.

But the true genesis of the SBIRS program as it is currently formulated can be found in the events of the 1991 Persian Gulf War. Based on experiences with Iraq's short-range missile launches, DOD officials concluded more robust theater missile warning capabilities were needed, according to Air Force officials familiar with those discussions. Plans for an improved infrared satellite sensor capability for both long-range strategic and short-range theater ballistic missile warning began shortly thereafter.

In 1994, defense officials studied potential consolidation of various infrared space requirements, such as for ballistic missile warning and defense, technical intelligence, and battlespace characterization, and they selected SBIRS to both replace and enhance the capabilities provided by DSP. But Payton pointed to that very consolidation as a major culprit behind SBIRS' troubled history.

"In the '90s, we were looking to save money by combining several missions onto one platform," Payton explained. "So we jammed four missions onto SBIRS."

According to industry sources, the program is currently expected to run upward of \$15 billion in acquisition costs alone—nearly a fourfold increase over initial projections. Reports by government auditors show that the program has been plagued throughout its history by technological immaturity, unclear requirements, unstable funding, and poor oversight.

Congress, reacting to the developmental problems, responded by significantly cutting program funding on several occasions, throwing the program into further disarray.

In Fiscal 2002, lawmakers denied procurement funding altogether—a total of \$94 million—and would only permit the program office to conduct development work at the time. Air Force officials forged ahead while also beginning work on fallback options in the event SBIRS proved unrecoverable.

Lockheed Martin is currently on contract to produce the SBIRS satellites and payloads, while Northrop Grumman is

Lockheed Martin photo



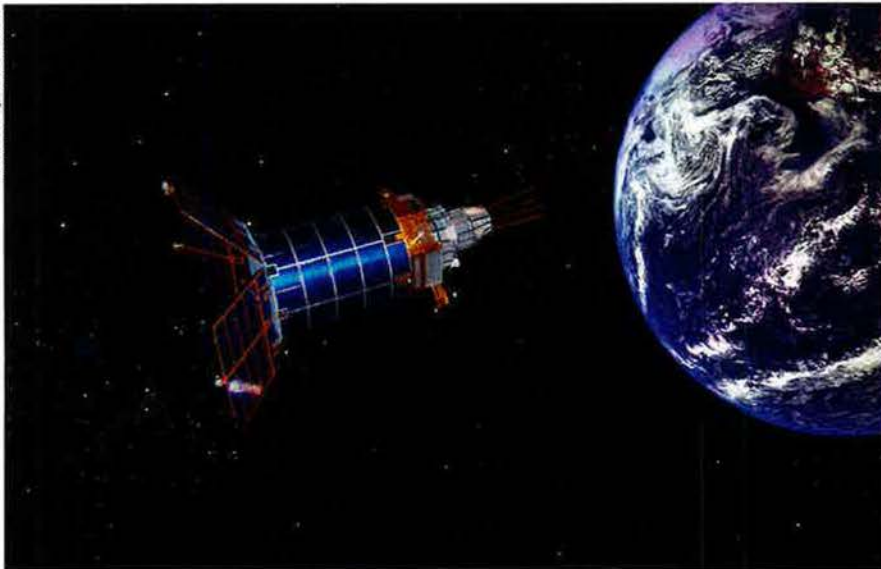
SBIRS GEO-1 is prepared for thermal vacuum testing at a Lockheed Martin Space Systems facility.

Lockheed's payload integrator. Because of the developmental problems, the government has on several occasions withheld contract award fees from Lockheed Martin, although Air Force officials decline to provide specific figures. Teague said this summer that, over the years, Lockheed has received fees "commensurate with the work it has performed."

Payton went a bit further: "There have been times when their award has been zero."

Officials at US Strategic Command remain concerned about the program's progress. Despite recent upbeat projections about SBIRS, the system might not be completely ready before DSP satellites begin failing. In late 2009, STRATCOM commander Gen. Kevin P. Chilton sent an urgent-need request to the Air Force's Operationally Responsive Space (ORS) office for alternatives to augment the mission. Those types of concerns are again surfacing.

Lt. Gen. John T. Sheridan, Space and Missile Systems Center commander, and other space procurement officials have emphasized that DSP has already proved



The Defense Support Program satellite in orbit, in an artist's conception. SBIRS is the follow-on to this long-lived legacy program, which currently provides notice of rocket launches worldwide.

far more robust than expected, however. Several officials said they expect DSP to continue functioning well for another decade or longer.

Gen. C. Robert Kehler, head of Air Force Space Command, has said that AFSPC experts are exploring further life extensions for the DSP constellation. However, because of the time lag in purchasing components for SBIRS GEO-3 and beyond, a coverage gap could still occur if there are more SBIRS delays and Space Command is not able to keep DSP on life support long enough.

In 2005, with concerns about the program's viability peaking, the Pentagon's acquisition office ordered the Air Force to develop a competing capability for SBIRS. The Air Force started a parallel effort known as the Alternative Infrared Satellite System (AIRSS).

AIRSS, which evolved into the Third Generation Infrared Surveillance system, or 3GIRS, showed early progress. It was first seen as a less expensive alternative and then as a supplement to SBIRS, once prospects for the earlier program had improved sufficiently.

The ORS office continues to explore various options for mitigating any potential missile warning gap. One possibility already being openly discussed by senior officials is preparation of additional sensors produced under AIRSS/3GIRS by Raytheon and SAIC.

The first of these sensors is scheduled for launch next year on an SES Americom satellite, built by Orbital Sciences as a commercially hosted payload experiment. One official estimates that any 3GIRS-based supplement to the mission would

cost "a fraction" of what the SBIRS program cost in its first couple of years.

Strong Progress

SBIRS ground system and software development also seems to be making solid progress. Researchers in the SBIRS program office at Los Angeles Air Force Base this past summer successfully completed a major system-level test of the interfaces between the ground facilities and the GEO-1 satellite, explained Capt. James Palmer, the SBIRS systems test program manager.

The test demonstrated the command and control capability of the GEO-1 satellite, plus the ability to transmit and receive data between the ground system and the satellite using rapidly changing frequencies, known as frequency hopping.

The ground segment for the system is being developed and fielded in blocks. It will consist of three major components: two fixed operational sites, several relay ground stations, and communications links. Relay ground stations around the world will receive data from the satellites and forward it to the mission control station at Buckley AFB, Colo.

MCS software will create launch reports that include information such as missile type, launch point, time, and azimuth, as well as predicted impact point.

Online since 2001, the MCS operates the DSP satellites today and will have the capability to operate the SBIRS payloads and spacecraft in the future.

Lockheed Martin's vice president for SBIRS, Jeff Smith, said this summer that the company has 138 scripts running to qualify the redesigned flight software for GEO-1. "We're about half done with those, and the plan is to complete them in the November timeframe, which would lead up, early next year, to the shipment down to the Cape," he said. "We just need to make sure that every nook and cranny is wrung out of this before we launch it."

System testing on the GEO-1 satellite was completed in May, according to Air Force officials. The testing certified "space-to-ground integration verification," Teague explained. Last fall, the vehicle completed its most important and grueling verification, thermo-vacuum testing, Teague said, describing the event as a "final environmental test to ensure that the satellite would survive and operate in a space environment."

Similarly, the ground system completed a test that validated its functionality, performance, and operability, he said.

The ground segment of SBIRS consists primarily of the mission control station at Buckley; the mission control station backup at Schriever AFB, Colo.; and the survivable mission control station. In addition, joint tactical ground stations provide deployable downlinks for SBIRS data. The components of the program, both space and ground, are coming together in operational readiness for launch and support of the SBIRS GEO-1 satellite, said Teague.

In the meantime, he said, the GEO-2 satellite "continues to make strong progress." GEO-2 completed its first phase of satellite-level testing in February. During the four-month event, called baseline integrated system testing, the Air Force ran the satellite through hundreds of "scripted test events" at Lockheed Martin's plant in Sunnyvale, Calif. The test demonstrated the satellite's hardware integrity and the functionality of its payload and spacecraft bus, service officials said.

GEO-1 is expected to be available for operational use about 14 months after its launch next year.

If all goes well, GEO-2 should launch sometime in 2012, and is projected to enter operational use roughly six months after that, according to Air Force officials. ■

Marina Malenic is the Pentagon correspondent for Defense Daily, a Washington, D.C.-based defense newsletter. Her most recent article for Air Force Magazine was "Fighters Far and Wide," in the January issue.

The Air Force has been at the forefront of aerial firefighting since Day 1.



USAF photo by TSgt. Rick Storza

Attacking Fires From the Air

By Frederick A. Johnsen

Many have watched—perhaps on the evening news or maybe in person—as a thundering aircraft barreled through smoky skies to discharge a bloom of red fluid over a wildfire. The Air Force has been an interested but largely unheralded contributor to this mission since the end of World War I, and USAF continues to play a critical role battling wildfires to this day.

The frequent inaccessibility—and scale—of wildfire sites makes aircraft especially attractive tools to subdue fires. As the western United States became increasingly populous in the early 20th century, the Pacific Northwest was scarred by out-of-control fires that burned three million acres in Montana, Idaho, and

Washington in August 1910. Spurred by winds, the Northwest fires of that year burned an area the size of Connecticut in two days. Seventy-eight firefighters and eight residents died. Smoke darkened the sky hundreds of miles away as 1910 became a benchmark year still visible in ancient charred stumps.

To a growing nation only recently realizing its coast-to-coast dream, the loss of so much timber was a financial and strategic wound to be healed.

The fires of 1910 set in motion national wildfire policy for the first time. The policy idealistically expected all reported fires to be extinguished by midmorning the day following their discovery.

While foresters pondered how to check fires such as 1910's "Big Blow-up,"

A Reserve C-130 equipped with the Modular Airborne Firefighting System.

California's magnificent Sierra Nevada mountains provided the terrain to generate thunderstorms that hurled incinerating lightning into the trees, burning resources and habitat each summer. Fire crews then attacked the blazes from the ground, but success depended largely on how quickly they could get to a nascent fire.

Air Service Curtiss JN-4 Jenny biplanes flew fire patrols over mountainous California beginning in June 1919, adding their wilderness reach to the effort until they were replaced by larger de Havilland DH-4 aircraft.

Limitations on radio effectiveness led the fire spotter crews to relay fire sightings by air-dropped messages and carrier pigeons. Budget shortages handicapped a promising patrol mission for the Air Service, with the deHavillands sometimes grounded for lack of gasoline.

"Army airplanes and captive balloons will cover portions of the national forests of California, Arizona, New Mexico, and other states this summer, to aid in detecting and suppressing forest fires," *American Forestry* reported in May 1919. The Air Service was to "cooperate with the Forest Service of the United States Department of Agriculture in

this work, [and] conferences are under way to determine where, and to what extent, the air scouts will supplement the forest rangers.”

The forestry journal explained, “That there is a distinct and important place for aircraft in fire protection of timberlands is regarded by the forestry officials as beyond doubt, but experimental trial of methods and possibilities will have to be the first step.”

As early as 1919, the use of aircraft to attack fires was posited: “It is believed that bombs charged with suitable chemicals can be used with good results.”

Less prescient, though undeniably imaginative, was an idea calling for “transporting firefighters by dirigibles from which ladders can be lowered to the ground.” But the main thrust for aircraft in wildfire control in 1919 was fire detection.

“At present the Forest Service relies for this partly on patrol, usually by men on horses, motorcycles, or railroad speeders, and partly on watchers stationed at lookout points. Aircraft have many points of obvious superiority for both classes of detection work,” the forestry journal explained.

“Airplanes would use wireless in reporting fires, as they have done in communicating with the artillery,” the article noted. The time was only 16 years after the Wright brothers’ first flight, and American experience in the air was both short and limited in breadth. “From the Army standpoint, the use of aircraft in protecting the national forests affords a valuable opportunity for training fliers and developing

further the possibilities of aircraft and the art of flying.”

“Army aviators, while patrolling their aerial beats along the Mexican border, will take time to locate forest fires on the Coronado National Forest, in southern Arizona,” the American Forestry Association reported in May 1920. “Aviators will be permitted to leave their border patrol in order to ascertain the exact location of forest fires, and in certain cases, special patrol trips may be undertaken with the permission of the district commander of the air service. ... When forest fires are discovered by the airmen, notice will be telegraphed to the nearest forest ranger.”

The Water Solution

Results from 1920 Air Service fire-spotting flights in California encouraged foresters. More than half of the 196 forest fires discovered and reported by fliers from the 9th Aero Squadron operating out of Mather Field near Sacramento were reported with coordinates that had an accuracy of one-half mile—guiding ground crews to the locations. Eighty-three fires were reported by the pilots expeditiously using radio.

When a wildfire blackened 25,000 acres in Lassen National Forest, “a special reconnaissance plane, equipped with radio and with a forest officer for observer, hovered over the fire and actually directed the movements of bodies of forest [firefighters] by wireless messages received right on the fire line.” This aircraft also patrolled a completed, unattended fire line stretching 14 miles. “If reports from the air showed

the line to be clear, the firefighters were kept at work elsewhere, but if the observer wirelessed in that the fire had broken away, then a force of men was rushed to the spot and the fire corralled again.”

By 1924, Air Service patrols had been discontinued over California at least in part as a funding issue and, according to one account, because increased numbers of fixed lookouts were on station all day, while aircraft could provide patrol coverage for only a few hours.

In early 1925, the Forest Service arranged with the Air Service to patrol Northwest forests. Three de Havilland DH-4s were assigned. Larger-than-life Spokane, Wash., pilot Nick B. Mamer and two other Air Service reserve officers flew the patrols. That same year, the Secretary of War suggested future fire patrols should be mounted by commercial fliers in arrangement with the Department of Agriculture, to remove the government from competing with private industry.

Sequoia National Park Superintendent John R. White wrote an after-action report on a 1926 fire at Kaweah in California’s beautiful Giant Forest in the Sierra Nevada mountains. His efforts at scoping out the size of the fire included a de Havilland that picked him up at Fresno, Calif. White flew for two hours over fire-threatened areas, “getting a splendid view of the fire and an opportunity to study the terrain on the fire line which could only have been

A modified 747 releases fire retardant during a grid test.



Evergreen International Aviation photo



Los Angeles County officials pore over maps next to an airship and county trucks loaded with firefighting equipment.

obtained otherwise by several days on foot and horseback.”

Back on the ground, White “telephoned instructions for changes on the fire line and also laid off 100 men ... whom I considered surplus. It is no exaggeration to say that this airplane trip saved the government several hundred dollars a day in labor alone for a period of several days.”

If airplanes could fly over a fire, why couldn’t they drop water on the fire? California pilot Charlie J. Jensen installed a pair of watertight hoppers on either side of a surplus Jenny biplane and made two drops on a fire east of Oroville, Calif., in 1931.

In 1943, the Northern Rocky Mountain Forest and Range Experiment Station published a paper by Roy Headley, titled, “Rethinking Forest Fire Control.” Headley recounted the post-World War I era, saying, “It was natural that many men wondered why fires could not be ‘bombed’ with fire-retarding or fire-extinguishing chemicals.”

William B. Greeley, then chief of the Forest Service, accordingly organized a cooperative study with the Chemical Warfare Service of the Army. They concluded that there was no worthwhile practicable use to be made of any known chemicals, but into the 1930s the Forest Service had spent time and money researching ways to drop chemicals or explosives from aircraft to attack fires. Tests included the use of monoammonium phosphate as a retardant added to water. Foaming agents were tested as far back as the 1930s, but the viability of air tankers remained an illusive goal.

Forest Service testers in the 1930s also contemplated the effectiveness of explosive bombs, according to Headley,

“which would throw dirt on the edge of a fire and thereby retard its spread.”

Headley’s paper cites the decisive obstacle to successful aerial firefighting at that time as “inability to hit the target.” His 1943 study bluntly offered, “Whatever the truth may be about military ‘precision’ bombing, protracted effort failed to attain enough accuracy in bombing fires to make the method worthwhile.”

This included chemical bombs; the concept of free-fall liquids had not gained traction.

In his report, Headley imagined a list of firefighting agents that helicopters could release, such as “chemical solutions or dusts, dirt-throwing explosives, diatomaceous earth, Portland cement, or even plain water.”

The Scramble

In the summer of 1947, a Republic P-47N Thunderbolt at Eglin Field, Fla., performed a military test of firefighting theory by releasing a pair of water-filled 165-gallon drop tanks. In July, two P-47Ns and a B-29 flew to Great Falls AAB, Mont., on the eastern edge of Montana’s divide between open range and forest land, to explore aerial firefighting. Test fires in the Lolo National Forest were targeted, followed by sorties against actual wildfires in western Montana. Forest Service emblems were applied to the B-29 and at least one of the Thunderbolts.

The Thunderbolts dropped a total of 56 tanks, some fitted with stabilizing fins as well as unfinned teardrops. The pilots employed both glide bombing and dive bombing approaches to fires. Finned tanks were used for the P-47 dive bombing runs,

which were discontinued in favor of glide bombing passes with unfinned tanks. Tanks dropped by the P-47s were expected to rip open on impact, spewing water over the fire area. Initial results indicated the P-47 drops were superior to those made by the B-29.

The giant B-29 Superfortress, nicknamed the *Rocky Mountain Ranger*, cast a big shadow from its 141-foot wingspan over the Montana forest tests as it hefted eight 165-gallon drop tanks in its bomb bays. Weighing about 1,000 pounds each when filled with water, these tanks were armed with proximity fuses set to explode and rupture the tanks 50 feet above the ground to foster maximum dispersion of the water and some chemical fire retardants. The Superfortress dropped 46 tanks on test fires during seven missions flown typically at 3,000 feet. One tank could cover a swath 48 feet wide and 108 feet long.

An Aerial Bombing Evaluation Board composed of seven forestry specialists and one lieutenant colonel from the Army Air Forces Air Proving Ground Command observed the tests. The summer of 1947 was a transitional period at once filled with hope and uncertainty, and not yet infused with the Cold War urgency that would follow. Into this arena, a vastly downsized military stood to benefit from meaningful missions.

The Aerial Bombing Evaluation Board opined that deployment of warplanes as firefighters “will help maintain high esprit de corps of military personnel in peacetime by assignment to productive missions that contribute to training.”

“After this brief survey, we feel that this method of fire suppression offers definite promise for the better protection of lives and property,” the board members confidently reported. “The present project already has proved that military aircraft can be flown in mountainous areas and that tanks containing extinguishing agents can be dropped with sufficient accuracy to hit and retard the spread of small fires.”

A proposal to deploy 75 fighters and 30 B-29s as fire bombers for the 1948 wildfire season went fiscally stillborn.

If hindsight questions the use of fuzed bombs over domestic forests, the Air Force tests nonetheless pointed the way toward aerial delivery of water and fire retardant over wildfires.

The concept of aerial firefighting was not yet deemed practical. Water bombs weren’t the answer, and according to one Forest Service official, the value of wildland resources had not yet appreci-



The Modular Airborne Firefighting System dumps hundreds of gallons of water on the ramp during a test at Chico, Calif., in 1985.

ated enough to overtake the considerable costs of retardants and aircraft to deliver them.

That began to change in the 1950s.

Modern air tanker technology was suggested by serendipity in the latter half of 1953. The prototype Douglas DC-7 four-engine airliner was fitted with water ballast tanks to enable flight-test crews to alter the aircraft's center of gravity for testing handling.

On one test flight, the Douglas flight crew jettisoned 1,300 gallons of free-falling water over the runway at Palm Springs, Calif., laying down a wet swath 200 feet wide and nearly a mile long. The implications were obvious—and exciting.

In early 1954, Marine Corps Reserve pilot Maj. Warren Schroeder tested a different free-fall drop system while flying a Douglas AD-2 Skyraider.

The Skyraider carried a 250-gallon napalm tank, the ends modified to use glass plates that could be broken by detonators activated by the pilot. A solution of water and foam was released from a height of about 35 feet at 160 mph. The Skyraider placed a visible pattern on the ground 50 feet wide and 300 feet long.

The scramble to create usable firefighting aircraft was on. Forays with biplane PT-17s and N3Ns were promising, if on a small scale. Forest Service and private operators quickly embraced the single-engine Grumman TBM Avenger torpedo bomber as a workable, and available, surplus bomber. Surplus B-25s, and then B-17s, PB4Y-2s, and other used ex-military aircraft filled the ranks of this new occupation.

Aerial firefighting grew into the 1960s as an entrepreneur's dream played out by plucky civilians.

Air National Guard and Air Force Reserve C-130s became part-time firefighters with the introduction of the Modular Airborne Firefighting System, or MAFFS. The roll-on, roll-off system of tanks and discharge mechanism could equip any C-130. First generation MAFFS versions discharged retardant off the back ramp of the C-130.

Starting in 1971, Guard and Reserve C-130s have participated in annual wildfire suppression missions. Typically, military C-130s are called only when all commercial equipment has been used or there is a threat to life; the Forest Service then arranges for Guard or Reserve firefighting assistance. Personnel and equipment are then under the direction of the Forest Service.

Carrying the System

MAFFS was designed by FMC Corp.'s Defense Technology Laboratory in San Jose, Calif., for the Air Force. The system was developed in rapid fashion between March and October 1971, when it was first used on a wildfire.

Aero Union of Chico, Calif., picked up the MAFFS and developed it further.

The next generation MAFFS II firefighting system is suitable for C-130 E, H, and new J models. The upgraded system can carry 3,000 gallons of retardant in a pressurized tank. The retardant exits through a nozzle in a special paratroop door plug at the side of the fuselage to the rear. This allows the C-130 to remain pressurized, providing crew comfort and safety benefits.

The MAFFS II does not need time-consuming modifications, enabling quick conversion to and from the fire suppression mission. The modular unit can disgorge retardant in variable amounts, depending on the nature of the fire. This includes a saturation of eight gallons of retardant for every 100 square feet of surface to be covered, doubling the coverage possible with older MAFFS units.

Four C-130 units today fly MAFFS. Three are Air Guard: the North Carolina Guard's 145th Airlift Wing, the California Guard's 146th Airlift Wing, and the Wyoming Guard's 153rd Airlift Wing. They are joined by the Air Force Reserve's 302nd Airlift Wing from Peterson Air Force Base in Colorado.

The advent of stretched, upgraded C-130Js mated to the new modular system promises better, safer performance. Future MAFFS tanks may increase capacity to 4,000 gallons—thanks to a 12 percent increase in C-130J power.

MAFFS II "is head and shoulders" better than the first generation system, according to officials with the 146th AW at Channel Islands Air National Guard Station, Port Hueneme, Calif. The new system's modern head-up displays in the C-130J give firefighting pilots easier situational awareness over a crowded and smoky fire scene.

The wing knows a few things about aerial firefighting. It has flown MAFFS since 1974, and officials note that the "Malibu fires of 1993 literally burned to the edge of our base."

MAFFS crew postings are prized in the wing, notes the 146th's Maj. Kimberly Holman. "They take the best of the best," she explained, and not all C-130 crew members are MAFFS-rated.

The development of aerial firefighting techniques and hardware in the United States illuminates the seesaw between proponents of government programs versus private industry. Sometimes, only the Air Force had the hardware available; now, modern iterations of civilian-owned air tankers include promising conversions of huge 747 and DC-10 jet airliners.

But ingenuity and vision were required to conceive ways to leverage the promising capabilities of aircraft over wildfires. Airmen seeking meaningful work during the force drawdowns following both world wars contributed greatly to today's aerial firefighting capability. ■

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The crew of the *Enola Gay* guessed—but had not been told—what the weapon in its bomb bay was.



Atomic Mission

By John T. Correll

On Sunday morning, Aug. 5, 1945, the clouds that had hung over southern Japan for a week began to clear and the weather forecast said conditions would be right on Monday for daylight visual bombing. That was the news that a group of airmen on Tinian had been awaiting. Special Bombing Mission No. 13 was on.

Shortly after noon, the weapon that would be used was removed from a secure assembly hut at North Field on Tinian, covered with a tarpaulin, and hauled on a trailer to a loading pit. A B-29 Superfortress was towed into position straddling the pit and the

weapon was hoisted by hydraulic lift into the bomb bay.

Among those who watched the loading was Col. Paul W. Tibbets, 30, commander of the 509th Composite Group. He would fly the B-29 on its mission to deliver the bomb. Up to then, the bomber was identified by side number 82 stenciled on its aft fuselage, but it had not been given a name. Tibbets sent for a painter, who printed “Enola Gay”—Tibbets’ mother’s name—in neat block letters below the cockpit window on the left side of the nose.

The weapon had a name as well: “Little Boy,” even though it was 12 feet long and weighed more than 9,000 pounds. It

The crew of the Enola Gay. Paul Tibbets, the pilot, is standing fourth from left.

was the world’s first atomic bomb, and Special Mission No. 13 would drop it on Japan. The primary target was Hiroshima.

Through the summer of 1945, the Japanese home islands were reeling from massive firebomb attacks by B-29s flying from Guam, Tinian, and Saipan in the Marianas chain. Despite the certainty of defeat, Japan refused to surrender and the war dragged on with mounting casualties on both sides.

The 509th had been on Tinian a little more than a month, operating from tightly guarded facilities at North Field. It was a

different kind of group in several ways. It had only one bomb squadron, and was self-contained with its own transport aircraft, maintenance, military police, and engineers. Its crews did not fly regular bombing missions. When they did fly, they dropped practice munitions called "pumpkins" because of their color (orange, for visibility) and unusual shape (resembling an atomic bomb). The 509th, secretive and strange, was not popular with the other groups on Tinian.

The mystery deepened July 26, when the cruiser *Indianapolis* arrived with a special cargo. The ship's captain did not know what it was, only that if the ship went down, he must ensure that it was loaded into one of the available lifeboats. En route, it had been in the custody of two standoffish persons (supposedly Army officers, but they wore their corps insignia upside down) who kept the crate in their cabin, chained to the deck. What the *Indianapolis* carried was the main assembly of the atomic bomb. The remaining parts were brought to Tinian by one of the 509th's C-54 transports July 29.

That same day, Gen. Carl A. Spaatz landed on Guam to take command of strategic air forces in the Pacific. He brought with him a special order from the War Department directing that the 509th "deliver its first special bomb as soon as weather will permit visual bombing after about 3 August 1945, on one of the targets: Hiroshima, Kokura, Niigata, and Nagasaki."

The target committee in Washington used several criteria. The target would be a large urban area of importance where the damage could convince the Japanese of the destructive force. To make it clear the damage was not from previous incendiary attacks, the target would be a city not previously bombed. Several cities had thus been "saved" as potential targets for the atomic bomb.

Hiroshima fit the criteria. The headquarters for the Japanese Second Army, with a garrison of more than 25,000 troops, was there. So were major armament plants, including Mitsubishi Electric Corp. and Japan Steel Co., an ordnance supply depot, an infantry training school, and a factory that turned out 6,000 rifles a week. The port was a major assembly point for naval convoys. US planners believed that Hiroshima was the only one of the target cities where there were no allied POWs. In fact, 23 American prisoners were held in 400-year-old Hiroshima castle, now occupied by the army.

Paul Tibbets had been an outstanding B-17 pilot and squadron commander

in the Combined Bomber Offensive in Europe and a test pilot for the B-29, the biggest and best American bomber of the war. In September 1944, almost a year before the atomic bomb was ready to use, Tibbets was chosen to organize and train a B-29 group to deliver it against targets in Germany and Japan.

The organization was named the 509th Composite Group to indicate that it was self-contained, with all of its own support elements. It reached its authorized strength of 225 officers and 1,542 enlisted members at Wendover Field in an isolated part of northwestern Utah where security could be maintained. The men were told only that they would "take part in an effort that could end the war." The atomic bomb was not mentioned.

Outrunning the Shock Wave

The mission had the highest priority, but recognizing that too many people had heard that story before, the Pentagon gave Tibbets a code word, "Silverplate," which would be recognized and honored, even by those who knew nothing of the program.

Tibbets pulled in men he knew and trusted, including four who had flown with him in Europe: Maj. Thomas W. Ferebee, bombardier; Capt. Theodore J. "Dutch" Van Kirk, navigator; SSgt. George R. Caron, tail gunner; and SSgt. Wyatt E. Duzenbury, flight engineer. Ferebee and Van Kirk had a special relationship with Tibbets. He named them group bombardier and group navigator for the 509th.

The long training period was necessary for several reasons. Elsewhere in the war, lead crews took bomber formations to the release point and brought them home again. The circular error probable—the standard measure of bombing accuracy—was about 1,000 feet. Tibbets announced that every crew would be able to navigate precisely over land or water and bomb from 30,000 feet with a CEP of 200 feet. Van Kirk and Ferebee would show them how.

The big requirement was outrunning the shock wave of the atomic bomb. To survive, a B-29 needed to be at least eight miles from the explosion. If the aircraft was at an altitude of 31,000 feet, the slant range distance from the target would be six miles. The bomb would fall for 43 seconds before detonation, after which the shock wave would take another 40 seconds to travel eight miles. It would be a close call.

"The most effective maneuver would be a sharp turn of 155 degrees," Tib-

bets said. "This would put considerable strain on the airplane and would require a degree of precision flying unfamiliar to bomber pilots." Nevertheless, all of the 509th pilots would be trained to do it.

Tibbets ordered that the group's modified B-29s be delivered stripped of guns, turrets, and armor plate except for the tail. "I quickly learned that the stripped airplane could operate about 4,000 feet higher than one fully equipped, that it was faster and more maneuverable, and that I could turn inside a P-47 that was flying against us," he said. "Also, once the P-47 made an attack and turned to come back again, he could not catch us."

In May 1945, Tibbets picked out his personal aircraft at the Martin plant in Omaha. A foreman pointed to No. 82 on the assembly line and said it was the best airplane in the factory. "That's the one you want," he said. "It was built at midweek, not on a Monday." Even the screws in the toilet seat had been given an extra turn.

The war in Europe ended May 8, before the atomic bomb was ready. All 18 of the group's B-29s soon deployed to the Pacific.

Tinian was just 12 miles long and six miles wide, crowded with B-29 hardstands, Quonset huts, and docks. There were two airfields, each with two 8,500-foot runways, the longest operational runways in the world.

On July 16, the atomic bomb was tested successfully at Trinity site in the New Mexico desert. Only one operational bomb was immediately available, and it was on its way to Tinian. By the end of July, everything was in place.

On Saturday, Aug. 4, radio reports from Mao Zedong's partisan forces in China said the skies were clearing and good weather was moving eastward toward Japan. That was sufficient indication to gather the crews for their first mission briefing.

There would be seven B-29s in all, including the *Enola Gay*. Three weather airplanes would take off an hour ahead of time to visually check conditions over Hiroshima and the two alternate targets. One B-29, a spare, would accompany the mission as far as Iwo Jima, where it would take the bomb on board in case the *Enola Gay* had to abort. A bomb-loading pit had been dug and was ready at Iwo Jima.

Two B-29s would go along with Tibbets to the target. Maj. Charles W. Sweeney in *The Great Artiste* would drop instruments to measure the shock wave, radioactivity, and other factors of the



detonation. Capt. George W. Marquardt would fly the yet-unnamed No. 91 as the photo airplane.

The Saturday briefing was conducted by Navy Capt. William S. “Deak” Parsons, the senior ordnance official for the Manhattan Project, which had developed the atomic bomb. Parsons would be aboard the *Enola Gay* as weaponeer, and had been at Trinity site for the test.

Parsons told the crews that the bomb was the “most destructive weapon ever produced” and that the mushroom cloud would rise to 30,000 feet, preceded by a flash of light brighter than the sun. He passed out protective goggles for the crews to wear. The word “atom” was not uttered.

That weekend, Tibbets made two changes for security reasons. Tokyo Rose—perhaps informed by Japanese stragglers in the hills—had twice referred to the distinctive insignia, an arrow in a circle, on the tails of the 509th aircraft. Tibbets had it painted out on the seven B-29s and replaced with a large R, the tail insignia of neighboring unit, the 313th Bomb Group. He also changed the group’s call sign from “Victor” to “Dimples.” The *Enola Gay* would fly as Dimples Eight-Two.

On Saturday evening, Parsons watched as bombs and ammunition exploded when a B-29 crashed on takeoff. Concerned that the *Enola Gay* might crash and cook off the atomic bomb, Parsons decided to arm the bomb in flight. As soon as the weapon was in place on Sunday, he climbed into the bomb bay and practiced until he was confident that he could perform the 11 necessary actions in the air.

At the final crew briefing just before midnight on Sunday, Tibbets said, “We

are going on a mission to drop a bomb different from any you have ever seen or heard about. This bomb contains a destructive force equivalent to 20 thousand tons of TNT.”

A Long Trip

There would be 12 people aboard the *Enola Gay*: the nine regular members of the aircrew, plus Parsons and two other Manhattan Project specialists. After the final briefing, the flight surgeon gave Tibbets a small cardboard pillbox with 12 cyanide capsules. Tibbets gave one to Parsons and kept the others. He intended to offer them to the crew if the airplane went down over Japan and they faced torture and slow death by angry mobs.

If the aircraft cleared the Japanese coastline, the rest of the distance was patrolled by Navy “Dumbo” flying boats, cruisers, destroyers, and submarines that would pick up the crew if they had to ditch at sea.

The three weather airplanes went first, and were away at 1:37 a.m.

The mission almost took a fateful turn when Duzenbury, the flight engineer, made his pre-takeoff inspection and found two containers on the catwalk in the bomb bay. They contained the tools and explosive charge Parsons would use to arm the bomb, but Duzenbury did not know that. Before he could remove the containers, he was distracted by bright lights and went to check. It was the klieg lights for motion picture cameras. Duzenbury never got back to the boxes.

When Tibbets and the rest of the crew got there, the *Enola Gay* was bathed in floodlights for motion picture filming ordered by Gen. Leslie Groves, head of the Manhattan Project. Tibbets let

The Enola Gay touches down on the runway at Tinian on Aug. 6, 1945. Its crew had just dropped the atomic bomb on Hiroshima, Japan.

the photography go on for a while, then ordered the floodlights cut off, and Duzenbury started the engines. Ground crews pulled the chocks at 2:30 a.m., and the *Enola Gay* taxied more than a mile to the southwest end of the runway for takeoff.

Tibbets had already decided to make use of every inch of the runway. The aircraft was heavily loaded with fuel and the 9,000-pound bomb, and was 15,000 pounds over the usual takeoff weight. He released the brakes, advanced the throttles, and rolled down the long runway, gathering speed. Tibbets resisted the urge to attempt takeoff before the aircraft reached its best speed possible.

“I held firm until we were a little more than 100 feet from the end of the pavement,” Tibbets said. “Thanks to our extra speed—we were at 155 miles an hour—the plane lifted off easily and climbed steadily.”

It was 1,700 miles from Tinian to the south coast of Japan. Eight minutes after takeoff, Parsons and his assistant, Lt. Morris R. Jeppson, lowered themselves into the bomb bay. Jeppson held a flashlight while Parsons armed the bomb. It took 25 minutes.

About 4:30 a.m., Tibbets crawled back through the access tunnel to visit with the crew in the waist. Tail gunner Caron had also come up from his turret in the rear of the aircraft. Caron asked, “Are we splitting atoms today, Colonel?” Tibbets replied, “That’s about it.”

When they reached Iwo Jima, the backup aircraft landed, and Sweeney and Marquardt, who had been flying around

10 miles behind, tightened up on the *Enola Gay*. At 6:07 a.m., they turned northwest toward Japan. They crossed the Japanese shoreline at 8:30 a.m. at their bombing altitude of 30,700 feet and received a coded message from Maj. Claude R. Eatherly, flying the weather plane *Straight Flush*. The cloud cover over Hiroshima was less than three-tenths at all altitudes. They would strike the primary target as briefed.

Hiroshima came into view at 9:07 a.m. When they reached the initial point for their bomb run, 152 miles east of the center of Hiroshima, they took a heading almost due west toward the target. They could see eight large ships anchored in the nearby harbor. Tibbets reminded the crew to put on their protective goggles.

Van Kirk's navigation had brought them to the target precisely on time. Now it was up to the bombardier, Tom Ferebee, crouched over the Norden bombsight in the forward-most position of the B-29's Plexiglas nose canopy.

His aiming point, selected ahead of time, was the T-shaped Aloi Bridge on Ota River.

Ten miles out, Ferebee said, "OK, I've got the bridge." He adjusted the bomb sight—which was linked to the autopilot—for wind drift and synchronized it with movement of the aircraft relative to the target. Ninety seconds before release, Tibbets took his hands from controls and told Ferebee, "It's all yours." Sixty seconds before drop, Ferebee flipped a toggle switch for automatic release. It activated a high-pitched tone, which would sound in the headphones of the crew until it stopped abruptly with release of the bomb.

The bomb fell at 9:15 a.m.—crew time plus 17 seconds, exactly 17 seconds behind planned release time. It was 8:15 local time in Hiroshima.

The aircraft was instantly 9,000 pounds lighter and the nose leapt up sharply. Tibbets made a hard, 155-degree diving turn to right. He lost 1,700 feet of altitude in the turn and was heading away from target at full power. Sweeney in *The Great Artiste* dropped three instrument packages, suspended by parachutes, and made a corresponding diving turn to the left. The centrifugal force pinned the crews to their seats. Marquardt's photo airplane had remained 15 miles from Hiroshima and did not need escape measures.

Tibbets and the co-pilot, Capt. Robert A. Lewis, found they could not fly the airplane through this difficult maneuver with the goggles. Dark glasses blacked

out the instrument panel, so they pushed the goggles back on their foreheads. Ferebee, watching the bomb's fall, forgot to put his glasses on.

Recognition Long Delayed

At 8:16 a.m., Hiroshima time, after a 43-second drop, the atomic bomb exploded at the preset altitude of 1,890 feet. More than half of the city was destroyed in a flash and about 80,000 Japanese were killed instantly. A brilliant flash of light swept the aircraft, and the mushroom cloud rose more than three miles above the devastation of Hiroshima.

Tail gunner Caron was the only member of the crew with a direct view. He could see the shock wave approaching at almost 1,100 feet per second, the leading edge made visible by condensing moisture. The *Enola Gay*, according to Tibbets, was nine miles from the point of detonation when it was rocked violently by the shock wave.

According to enduring myth, co-pilot Lewis said, "My God, what have we done?" In reality, he said nothing of the sort. Tibbets announced over the intercom, "Fellows, you have just dropped the first atomic bomb in history."

Tibbets gave the radio operator, Pfc. Richard H. Nelson, a message to transmit to Tinian, reporting that the primary target had been bombed visually, with good results, no opposition by fighters or anti-aircraft fire. Parsons made a more detailed report in code. The mushroom cloud was visible to the crew for another hour and a half as they flew southward.

Sweeney and Marquardt reduced speed so the *Enola Gay* could land first, touching down at 2:58 p.m. Spaatz met Tibbets on the ramp and pinned the Distinguished Service Cross on his flight coveralls.

The death toll from Hiroshima and Nagasaki, where the second atomic bomb fell Aug. 9, was staggering, but these two missions finally brought an end to the war in the Pacific, where more than 17 million people had died at the hands of Imperial Japan. The war's end also meant that the planned invasion of the Japanese home islands—an operation several times larger than the D-Day landings at Normandy, with expected casualties exceeding Hiroshima and

Nagasaki put together—would not be necessary.

The Japanese surrender on Aug. 15 was formally confirmed on V-J Day, Sept. 2.

With few exceptions, Americans at the time approved of using the atomic bombs to end the war. Gradually, opinion began to shift. On Aug. 31, 1946, *The New Yorker* devoted its entire editorial space to "Hiroshima," a treatise by John Hershey that began the tradition of emphasizing Japanese suffering instead of Japan's aggression and refusal to end the war.

In the years that followed, Tibbets and the crew of the *Enola Gay* fared poorly in historical and popular remembrance.

At the end of World War II, all of the B-29 groups on Tinian—except one—were awarded the Distinguished Unit Citation. The 509th Composite Group never received an official decoration or recognition, and neither did any of its component squadrons.

In 1990, surviving members of the group requested that some award be approved retroactively, but they were rebuffed by the Pentagon bureaucracy.

It was not until 50 years after the mission that *Enola Gay's* crew received the national acclaim that had eluded them before. Ironically, it happened as the result of a plan in 1994 by the Smithsonian Institution to use the restored *Enola Gay* as a prop in a political horror show presenting the Japanese in World War II as victims rather than aggressors. The radical program was canceled when the public, Congress, and even much of the news media rallied to the support of the mission and the crew. In the process, the nation came to a more balanced understanding and regard for the atomic missions.

In 1999, the crew asked the Air Force Association to help. AFA, working with various USAF agencies and directly with Air Force Secretary F. Whitten Peters, earned the crew reconsideration.

The Air Force approved the Outstanding Unit Award with device for valor for the 509th Composite Group for the period July 1 to Aug. 14, 1945.

The award was presented Oct. 16, 1999, at a 509th reunion at Andrews AFB, Md. Among the veterans present for the ceremony was Paul Tibbets, then 84. ■

John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributing editor. Two of his previous articles, "The Decision That Launched the Enola Gay" in April 1994 and "The Invasion That Didn't Happen" in June 2009, address the broader issues about the Hiroshima mission.

Books

Compiled by Chequita Wood, Media Research Editor

The Black Bats: CIA Spy Flights Over China From Taiwan 1951-1969. Chris Pocock with Clarence Fu. Schiffer Publishing, Atglen, PA (610-593-1777). 144 pages. \$39.99.



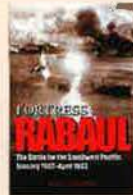
"Follow P-D-I": My Experiences as an AAF B-25 Pilot During World War II. Dan Bowling. Order from: Cambria Music, Box 374, Lomita, CA 90717 (310-831-1322). 133 pages. \$23.95.



National Security Space Strategy Considerations. Robert E. Larned, Cathy Swan, and Peter Swan. Order from: www.Lulu.com. 99 pages. \$9.95.



Camp Edwards and Otis Air Force Base. Donald J. Cann and John J. Galluzzo. Arcadia Publishing, Mount Pleasant, SC (888-313-2665). 127 pages. \$21.99.



Fortress Rabaul: The Battle for the Southwest Pacific, January 1942-April 1943. Bruce Gamble. Zenith Press, Minneapolis (800-826-6600). 398 pages. \$28.00.



The Nuclear Express: A Political History of the Bomb and Its Proliferation. Thomas C. Reed and Danny B. Stillman. Zenith Press, Minneapolis (800-826-6600). 392 pages. \$30.00.

Come Up and Get Me: An Autobiography of Colonel Joe Kittinger. Joe Kittinger and Craig Ryan. University of New Mexico Press, Albuquerque, NM (800-249-7737). 256 pages. \$27.95.



From Storm to Freedom: America's Long War With Iraq. John R. Ballard. Naval Institute Press, Annapolis, MD (800-233-8764). 321 pages. \$37.95.



Skies to Conquer: A Year Inside the Air Force Academy. Diana Jean Schemo. John Wiley & Sons Inc., Hoboken, NJ (877-762-2974). 314 pages. \$25.95.



Dangerous Games: Faces, Incidents and Casualties of the Cold War. James E. Wise Jr. and Scott Baron. Naval Institute Press, Annapolis, MD (800-233-8764). 241 pages. \$34.95.



Guests of the Emperor: The Secret History of Japan's Mukden POW Camp. Linda Goetz Holmes. Naval Institute Press, Annapolis, MD (800-233-8764). 147 pages. \$29.95.



Such Men as These: The Story of the Navy Pilots Who Flew the Deadly Skies Over Korea. David Sears. Da Capo Press, Cambridge, MA (800-343-4499). 395 pages. \$25.00.

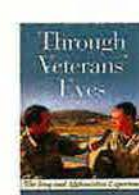
Deathride: Hitler vs. Stalin—The Eastern Front, 1941-1945. John Mosier. Simon & Schuster, New York (800-223-2336). 470 pages. \$30.00.



Information Operations Matters: Best Practices. Leigh Armistead. Potomac Books, Dulles, VA (800-775-2518). 152 pages. \$22.50.



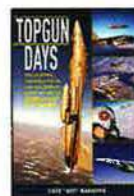
Through Veterans' Eyes: The Iraq and Afghanistan Experience. Larry Minear. Potomac Books, Dulles, VA (800-775-2518). 243 pages. \$55.00.



Eyes in the Sky: Eisenhower, the CIA and Cold War Aerial Espionage. Dino A. Brugioni. Naval Institute Press, Annapolis, MD (800-233-3764). 466 pages. \$36.95.



Moon Men Return: USS Hornet and the Recovery of the Apollo 11 Astronauts. Scott W. Carmichael. Naval Institute Press, Annapolis, MD (800-233-8764). 237 pages. \$36.95.



Topgun Days: Dogfighting, Cheating Death, and Hollywood Glory as One of America's Best Fighter Jocks. Dave Baranek. Skyhorse Publishing, New York (212-643-6816). 308 pages. \$24.95.



The commander of the 12th Army Group didn't need wild declarations about how airpower helped win the war in Europe. The results spoke for themselves.

was none other than Army Gen. Omar N. Bradley, four-star commander of 12th Army Group.

Today it's uncommon for senior ground commanders to spend time and resources analyzing airpower's role at the operational level of war. This was not the case in 1945. Writing up airpower's scorecard was deemed a vital task—so much so, it had to be completed before forces rotated back to the United States.

As American airpower starts its third decade in action in US Central Command, it is instructive to look back at how air superiority, interdiction, reconnaissance, and lift affected the war in

Omar Bradley's View of Airpower

At the end of World War II, the US Army brass in Europe sang the praises of airpower. For the first time, airpower influenced the design for major campaigns—and made a difference in the tactical outcomes of battles from Normandy to Remagen, Germany.

Lost in dense volumes of after-action analyses was one of the most unusual and compelling reports ever written on airpower. The report, titled "Effect of Air Power on Military Operations: Western Europe," was authored by Army ground officers. The Air Effects Committee of 12th Army Group consisted of Army infantry officers drawn from the air branches of G-3 (operations) and G-2 (intelligence) of 12th Army Group. The man who signed off on the report on July 15, 1945, in Wiesbaden, Germany,



By Rebecca Grant

Europe—and why the Army valued those lessons.

Bradley's 12th Army Group was the largest American force ever assembled on a field of battle. His four field army commanders—including Lt. Gen. George S. Patton Jr. at the head of Third Army—had 48 divisions and 1.3 million men among them.

Days after the war ended, Gen. Dwight D. Eisenhower, the supreme allied commander in Europe, wanted to know: How well had airpower done in supporting this victorious force? The answers came back in a 195-page report, with two appendices, drawn from the fresh combat experiences of the ground forces. An opening section discussed strategic bombing, but the bulk of the report covered the role of airpower in the 11 months from June 6, 1944, to the surrender of the German high command on May 8, 1945. Behind it all was the idea of assessing how well air and ground worked together. Tactical engagements were important and many dramatic ones were cited throughout the report. But the overall

idea was to evaluate airpower at the operational level of war, where major campaigns carried out Allied strategy.

Twelfth Army Group wanted three operational effects from airpower: air superiority being the first, with the second being the use of airpower to isolate the battlefield by preventing effective movement of enemy troops. The third, richly discussed in tactical detail, was the “combined effort of the air and ground forces, in the battle, to gain objectives on the immediate front of the ground forces.”

An Underlying Theme

The first two were a roaring success. On the third point, commanders found airpower highly effective in rapid maneuver, but prone to bogging down just like the ground forces when facing dug-in resistance.

Control of the skies was a new luxury. Beginning with Normandy, the Allies enjoyed real air superiority for the first time.

“In contrast with air operations in North Africa, air superiority and sufficient forces allowed the air-ground team to use the air umbrella effectively,” noted historian

David N. Spires, in his book *Air Power for Patton's Army*.

The 12th AG was profoundly grateful that air superiority had prevented the German Luftwaffe from attacking England during the buildup for cross-Channel operations. The report spent some time reminiscing and citing statistics on how vulnerable the congested English ports and ammunition dumps would have been to air attack in early 1944.

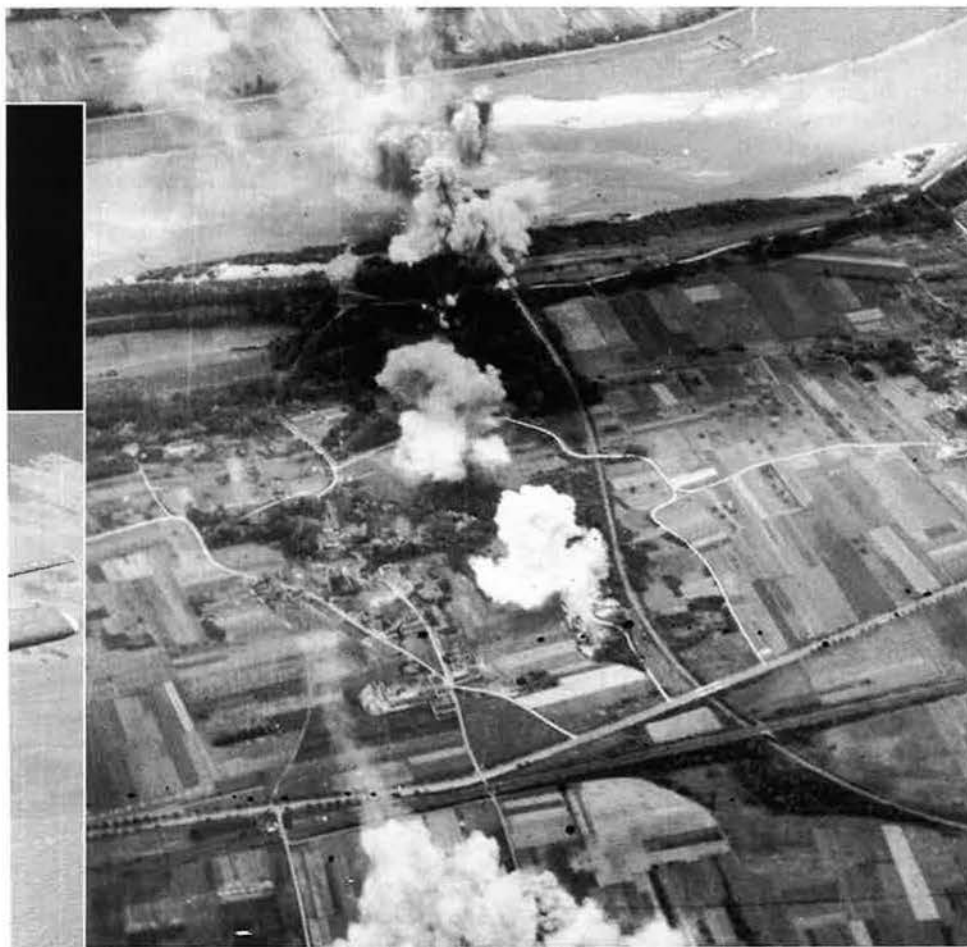
Once Allied troops were ashore in Normandy, air superiority underwrote the whole maneuver plan, as intended. “During the rest of the campaign, our air superiority was so conclusive that it was an accepted factor in all planning and, of course, forms the underlying theme of this report,” summed up the authors.

There were exceptions, such as when a flight of eight P-47s chased off 18 Luftwaffe aircraft attempting a dive bombing run five miles east of Dreux, France. Many infantry soldiers in the three main armies told stories about daylight strafing attacks. But the Luftwaffe was drained beyond the point where it could seriously affect ground operations. Finally, the Allies had control of the skies and sufficient aircraft, though replacing combat losses continued to pose difficulties. With air superiority virtually achieved, the land forces could task airpower to seal off sections of the battlefield and set conditions for successful close combat.

Twelfth Army Group and other Allied troops faced nearly 60 German divisions. Also, the Germans were ensconced in the world's most sophisticated rail and road transportation system. Isolating the battlefield so German commanders could not easily move reinforcements was a top assignment for airpower.

Isolation operations began before the D-Day invasion with the elimination of rail bridges over the Seine, for example. From experience in Italy, the Allies learned strikes against rail marshalling yards interrupted traffic for only short periods.

Attacking bridges was the real key to blocking off areas of the battlefield. Myths about thousands of bombers tasked to knock out a single target have misrepresented the actual tactics of Ninth Air Force's bridge-bombing experts. Extreme low-level attacks by fighter-bombers such as the A-20 dropped bridges with great efficiency, often in a single raid. Airmen could cut any bridge selected by 12th Army Group—although they took losses and sometimes needed repeat attacks on bridges through heavy flak. “Attacks on bridges ... imposed a maximum of delay



Opposite page, top: Maj. Gen. J. Lawton Collins, commander of VII Corps, describes to Lt. Gen. Omar Bradley (l) how Cherbourg, France, was taken in 1944. Left: A Ninth Air Force A-20 over France. Above: Heavy bombers from Eighth Air Force destroy a bridge in France, hindering German troop reinforcements.



US troops and equipment move across the Ludendorff Bridge in Germany. With airpower isolating the German troops near Remagen, the Allies were able to use the bridge to cross the Rhine.

on the movements of German forces and supplies, [and] increased the fuel shortage in the battle area by forcing long road detours," said the report. "In addition, destruction of the bridges created temporary blocks behind which rail and road traffic piled up, thus affording admirable targets for fighter-bombers."

At the outer arc, German troops disembarked their trains far away from the leading edge of the battle. Half the troops who detrained at the Loire River in France had to march for six to 12 days to move into battle positions. Retreat in good order was difficult for the same reason. The beachhead and breakout areas were never impermeable, but air attack slowed reinforcement to a sluggish pace. The result? "The enemy was unable to use the rail system inside the Seine-Loire area for any large-scale movement of troops."

Twelfth Army called on airpower to isolate the battlefield many times. In early 1945, air isolation proved vital again during the race for the Rhine bridges into Germany. Although German forces were retreating, shorter distances made it easier to reinforce and counterattack in some cases.

Hitler himself ordered in all reserves when the Allies broke through at Remagen. The Ludendorff Bridge over the Rhine was captured intact on March 7, 1945, when explosives rigged by the Germans failed to detonate. The Allies used the bridge for 10 days before it collapsed, crossing five divisions of men and equipment.

To block the counterattack, 9th Tactical Air Command hit marshalling yards

feeding rail traffic to the bridgehead area. Weather often forced blind bombing techniques, but it worked anyway. Hitler's reinforcements were forced from rail to road, which prevented the Germans from containing the bridgehead. Finally there was the daily art of using airpower for immediate front-line forces. Close air support was effective, but what the Army truly embraced was partnering with airpower for rapid maneuver.

The Devil in the Details

This was no wartime expedient. The long drive toward mobility, which began in the last phases of World War I, saw Army thinking trade heavy firepower and trench lines for lighter, mobile "open" warfare. Tanks were a centerpiece, and air would be vital in providing firepower. Airpower had to be part of the equation for achieving rapid breakout and advance. The young officers on the eve of World War II were quite air-minded. Eisenhower and Patton both learned to fly before the war, and the wealthy Patton even bought his own airplane. In the late 1930s, new Army divisions emphasized speed and mobility "which meant that medium rather than heavy artillery became the standard issue," wrote historian Spiers. Twelfth Army now took advantage of the conditions of air superiority established in the intense air war of the past two years.

The Allies counted on airpower to speed them ahead in the breakout across France in the summer of 1944. Tactical airpower met some of its toughest tasks in support of fast-moving armies—Patton's Third Army, Lt. Gen. Courtney H.

Hodges' First Army, and Lt. Gen. William H. Simpson's Ninth Army.

From 12th Army Group's perspective, the overall success of close air support depended on whether armies were moving fast or bogged down. On balance, 12th Army Group liked its close air support best when armored columns were sprinting ahead under constant air cover. Flights were allocated on a steady basis—what was in later decades termed "push CAS." In the summer of 1944, they called it armored column cover. Incoming flights checked in by radio with forward airmen ground controllers in tanks and with the flight lead of aircraft already over columns. They "disposed" of any immediate targets, as the report put it, and then ranged up to 30 miles ahead of the column "in an intensive search for enemy vehicles, troops, or artillery." Armored column cover marked the apex of airpower in maneuver warfare. The biggest dilemmas faced at 12th Army Group came from apportioning air support when requests multiplied and the tactical situation sagged.

In those cases, air commanders had to divide efforts between interdiction for moving forces and extra airpower to tip the balance against German strongholds.

Complaints about air support burgeoned when the armies slowed down and faced hardened opposition from the Germans. The principal reason was demand for air support outstripped supply both in tactical engagements and in commanders' choices about which operations to support.

"During periods when movement was relatively slow, requests were numerous and frequent from corps and divisions for close support fighter-bomber attacks against enemy strong points, dug-in infantry, dug-in tanks, and self-propelled guns as well as other artillery," noted the report.

Not all taskings could be filled. The effects were not as great as they were against German forces in the open. Airpower in these engagements was described in terms such as "softening up and blasting out enemy strong points." It had little effect on concrete pillboxes and guns in case-ments. Likewise, dug-in infantry were harder to shake than troops in the open.

As usual, the devil was in the details. At first, airmen and soldiers preferred not to approve close support requests for targets within range of field artillery. But as they found at Normandy, sometimes organic artillery did not show up on time or as planned. It "became apparent to staff officers in the combined air-ground

operations centers that various factors affected this preconceived tenet, and that each request should be considered from all angles" rather than being denied outright, the report concluded.

As it turned out, this tactical close support was wildly popular. Fighter-bombers could drop heavier ordnance at closer range than artillery; in many cases. "Effective bombing with 500-pound [general-purpose] or 260-pound fragmentation bombs was conducted by fighter-bombers against close-in enemy positions, sometimes within 300 to 500 yards of our own forward elements," wrote the appreciative soldiers. Many commanders felt that concentrated fighter-bomber attack on close-in enemy positions was worth more than any artillery preparation, if the air attack was followed immediately by a determined infantry attack.

The operational-level division of effort was also a problem—and one that 12th Army Group knew well. Should air be focused on armored column cover or break off to help break resistance where the armies bogged down?

A case in point was the two-week diversion of sorties to Brest, France, where the Allies were trying to eliminate a German stronghold in order to free up use of the Brittany ports. Brest was Ninth Air Force's top priority on Sept. 3, 1944. Units attacked German troop positions, pillboxes, and coastal batteries. Maj. Gen. Otto P. Weyland went so far as to assign four-airplane patrols to each division to form a miniature umbrella over the town. Napalm was employed on a major scale, and in the final phases, P-47s identified and attacked individual fortified houses, in what amounted to house-to-house fighting, Spires recounted.

Brest eventually fell on Sept. 18, amidst ringing praise for the close air support delivered. However, both air and ground commanders decried the diversion from Patton's main offensive which was seeking airpower to isolate the battle area prior to crossing the Mosel River. Commanders still hoped for decisive ground action to cause a collapse in the west before autumn ran out. Patton had logistical problems, but the wrangling over allocation of air effort didn't help.

All this air support came at a cost. Pre-invasion planning anticipated average loss rates of 20 percent of each unit's aircraft per month. According to historian Will A. Jacobs, Ninth Air Force lost 295 fighters in June 1944 alone, a 25 percent loss of its equipment strength. December 1944 saw an even higher loss rate of 28.6 percent.

Loss rates per sortie were low, but high operations tempo drove up attrition. "The relatively lower risk of a sortie over occupied France was offset by the high number of such sorties ... in a given period," Jacobs concluded.

Bombs and strafing weren't the only methods of support. One of the report's most intriguing findings was supplies delivered by airlift often made a crucial tactical difference.

Patton's Third Army could gobble up air-delivered supplies. Total supplies delivered by air were a small percentage of total volume. However, the airlift during certain crucial phases of the campaign assisted the continued advance of spearheads and gave the final impetus to operations east of the Rhine, said the report.

Details Speak for Themselves

Critical air supply made a difference in Normandy with resupply for paratroopers of the 82nd and 101st Airborne Divisions, which got 500 tons of canister or glider drops during the first week after D-Day, before emergency landing fields were ready. For the rest of June, airlift made up critical shortfalls in blood, plasma, and 105 mm howitzer ammunition. Approximately 6,649 casualties were flown out during the first three weeks—almost a quarter of total evacuees.

Another chance for airlift to bail out maneuver operations came in late August 1944. Third Army needed 7,000 tons of air-delivered supplies—and sent back 11,600 casualties. The best method was delivery to hastily prepared airfields. The single most famous incident, of course, was the airdrop and glider delivery of 850 tons of supplies to the surrounded 101st Division holding the vital communications center at Bastogne during the Battle of the Bulge.

Finally, the last race into Germany again saw Patton's Third Army outrunning its supply lines. "Between 30 March and 9 May, 22 percent of all the gasoline delivered to the Third Army arrived by airlift," the report found.

Twelfth Army Group's authors were not shy about analyzing the shortcomings of airpower or dissecting cases where bad decisions restricted effectiveness. They often had a bone to pick with airlift being set aside for airborne operations that were later canceled.

There were problems airpower never surmounted in Europe, such as night operations.

From the Normandy invasion through the Ardennes and Remagen, "it was apparent that a lack of night air activity allowed the enemy the freedom of movement which he had lost by day." Enemy air activity ginned up around dusk.

Although there were eventually two night fighter squadrons operating in 12th AG's area, it wasn't nearly enough to let them capitalize on the German habit of forming up columns for movement at night. Navy carriers in the Pacific had fielded night fighter units earlier in the war, but the procedures never matured for the European Theater.

Then there was weather. "Weather in this theater was a critical limitation on the use of airpower," the report stated flatly. Radar bombing aids were useful on occasion. Bombing missions on rail yards around the Remagen bridgehead were lauded as outstanding examples of the effectiveness of blind bombing. Still, the Ardennes salient and many other incidents confirmed weather was a constant trial that kept airpower out of action at critical moments.

For all its tactical candor, there was much the report of 12th Army Group could not say. One missing piece was the exploitation of intelligence through Ultra, the intelligence decryption program.

Another was subtler: Airpower worked in part because of the close working relationships between field army and tactical air force commanders. Bradley himself started out exasperated about the fact that air forces were not available for more air-to-ground training before the Normandy invasion. He was soon reveling in the close relationship with air support for First Army, provided by Maj. Gen. Elwood R. Quesada, commander of 9th Tactical Air Command. "This man Quesada is a jewel," Bradley said later.

Bradley left discussion of air tactics strictly to airmen. He delivered to Eisenhower "a careful review of ... how our operations were affected by our tremendous advantage in airpower." No wild declarations about airpower were needed; the detailed results spoke for themselves. Through their careful analysis and attention to both tactical and operational implications, 12th Army Group's soldiers gave airpower a resounding cheer. ■

Rebecca Grant is president of IRIS Independent Research. She has written extensively on airpower and serves as director, Mitchell Institute, for AFA. Her most recent article for Air Force Magazine, "Desert Shield," appeared in the August issue.

AFA National Report

natrep@afa.org

By Frances McKenney, Assistant Managing Editor

PACAF Perspective

Alaska and Hawaii, noted Joseph E. Sutter, then Air Force Association Chairman of the Board, "are a long way from the center of the action." He endeavored to remedy this through an outreach visit to Pacific Air Forces bases in the 49th and 50th states this summer.

Other reasons for his tour: an invitation from PACAF Commander Gen. Gary L. North at Joint Base Pearl Harbor-Hickam, where the **Hawaii Chapter** has been undergoing a renewal. Sutter said he wanted to "meet with the chapter leaders and also thank the PACAF leadership for their support."

In addition, the Alaska AFA leaders invited him to visit their chapters to help motivate their members. Harry Cook, Alaska state president, and James W. Malingowski, president of the **Fairbanks Midnight Sun Chapter**, met Sutter when he arrived in Fairbanks on July 26. Cook was his escort for the next four days.

Eielson and Elmendorf

At Eielson Air Force Base in Fairbanks, Sutter had breakfast with enlisted airmen and lunch with company-grade officers. He said later that they were "upbeat and positive," but straining to cope with repeated deployments and aging equipment.

He received briefings on Red Flag Alaska and made office calls on Col. Phillip W. Hoover, 354th Operations Group commander, and Col. Donald S. Wenke, who heads the Air National Guard's 168th Air Refueling Wing.

Sutter had lunch with Fairbanks chapter members, including then-AFA National Treasurer Steven R. Lundgren, before heading to Anchorage on July 28.

He arrived at Joint Base Elmendorf the day a 3rd Wing C-17 crashed after taking off from the base, so he was surprised the next day when 11th Air Force Commander Lt. Gen. Dana T. Atkins found time to meet with him. Even the hospital commander, Col. Paul A. Friedrichs, insisted on personally escorting Sutter around the medical facility, though the doctor had been up for nearly 30 hours in the aftermath of the crash.

Sutter took briefings on F-22 and rescue operations before heading to Hawaii.



Joe Sutter (r), then AFA Board Chairman, listens to Lt. Col. Brian Toth, 353rd Combat Training Squadron, describe targeting pods on the F-16 in the background. Sutter visited this Red Flag Alaska maintenance hangar, the "Thunderdome," while at Eielson AFB, Alaska. It was the first stop on his outreach tour of PACAF bases.

More photos at <http://www.airforce-magazine.com>, in "AFA National Report"



At the home of PACAF Chief of Staff Col. Jay Strickler and Pam Strickler, then-AFA Board Chairman Joe Sutter meets (l-r) TSgt. Scotty Phelps, MSgt. Tricia Benning, and Capt. Tamekia Payne.

Hawaii's Aloha

At an AFA Hawaii reception on July 31, Sutter met key personnel in Honolulu's military community. Among those on the guest list: PACAF commander North; Lt. Gen. Herbert J. Carlisle, head of 13th Air Force; Col. Sam C. Barrett, the 15th Wing's new commander; Navy Capt. Richard Kitchens, commander, Joint Base Pearl Harbor-Hickam; and retired Adm. William J. Fallon, former head of US Pacific Command.

Hawaii Chapter President Nora Ruebrook had 44 people on her original guest list but said another 20 showed up on top of that. AFAers joining her at this reception included Lance Bleakley, treasurer; Jack Murphy, awards chairman; and Jack DeTour, past president.

Ruebrook arranged for Sutter to attend a reception, the next day, for Rim of the Pacific, the international maritime exercise. The reception marked the end of the 38-day exercise and took place on the aircraft carrier USS *Ronald Reagan*, in Pearl Harbor. Here, Sutter had an opportunity to talk informally with North and USAF Col. Charles Baumgardner, deputy commander of Pearl Harbor-Hickam.

During his visit to the base, Sutter dined with groups of airmen and held a round-table discussion with PACAF senior leaders.

He was briefed on joint basing, 13th Air Force, and Pearl Harbor and visited the 613th Air and Space Operations Center and the Air National Guard section of Hickam. In July, the 199th Fighter Squadron, 154th Wing, had become the first F-22 unit with the ANG as the lead.

Reflecting on what he gained from the PACAF tour, Sutter said, "I learned of the enormous challenges and the 'tyranny of geography' in the Pacific," where the area of responsibility stretches from pole to pole and across numerous time zones. He said the visit underlined the urgent need to replace aging equipment and infrastructure. He noted that what he learned on his outreach visit was added to the AFA 2011 Statement of Policy.

"We owe this to our airmen and their families," he said.

Living Legends: Tuskegee Airmen

Four Tuskegee Airmen, all panelists for a **Donald W. Steele Sr. Memorial Chapter** symposium, were stopped repeatedly as they made their way through the halls of the Pentagon. People wanted to take photographs with them. Others—including Pentagon workers and tour-group visitors—clapped and cheered and shook hands with William Broadwater, James W. Pryde, Cicero Satterfield, and Ivan Ware. Everyone wanted to thank America's first African-American military pilots and their support personnel.

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But the four Tuskegee Airmen told the audience at the Steele Chapter's "Living Legends" symposium that during World War II, they hadn't thought of themselves as pioneers.

Instead, said Joseph Price—the Steele Chapter's leader for this event—the four panelists emphasized that they were "standing on the shoulders of those who came before them": black soldiers who fought in the Revolutionary War, Civil War, and World War I.

Broadwater had joined the enlisted reserve corps at 17 and waited another six months until he was of legal age to join the flying program at Tuskegee AAF, Ala. After the war, he became an FAA air traffic controller. Pryde served as a radio operator and went on to a career in the National Security Agency. Satterfield was an assistant crew chief. Ware served in a ground-support role.

Price said the four guest speakers encouraged those who follow in their footsteps to "hold the door open, raise the bar, and help those who come next."

The Steele Chapter's Living Legends summertime series takes place at the Pentagon, where entrance requirements and seating limit the guest list. Thus, only a lucky 50 people were able to hear the Tuskegee Airmen. However, twice that number dropped by before the program began, just to pay homage, said Price.

Keystone Convention

Pennsylvania State President Robert Rutledge called it "a slimmed down version" of the usual two-day AFA state convention. In the Keystone State, the gathering took place on July 31 in Carlisle, hosted by the **Eagle Chapter**.

During a morning business meeting, the conventioners re-elected all state officers: as president, Rutledge, who is also secretary of the **Lt. Col. B. D. "Buzz" Wagner Chapter** in Johnstown; as VP, Susanna B. Gyger, who is also president of the Eagle Chapter; as secretary, Thomas G. Baker, head of the **Altoona Chapter**; and as treasurer, Karen G. Hartman, who is the **Joe Walker-Mon Valley Chapter's** treasurer, too.

Guest speaker for the awards luncheon was the commander of the ANG 193rd Special Operations Wing at Harrisburg Arpt., Pa. Brig. Gen. Eric G. Weller spoke about the unit's psychological warfare and information operations mission, carried out with unique EC-130J airborne battlefield command and control aircraft. There are three of the modified C-130 aircraft in the USAF inventory, all stationed at Harrisburg.

At this awards luncheon, Baker was named Member of the Year, the **Lehigh Valley Chapter**—led by Gerald Still—

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received the Chapter of the Year award, and Sister Alice Hess of Archbishop Ryan High School in Philadelphia received the State Teacher of the Year award. She has taught math for 47 years and is well-acquainted with AFA, having been a **Liberty Bell Chapter** Teacher of the Year and having received several AFA Educator Grants, including one during the past school year.

More Chapter News

■ When the Winchester Royals took on the Rockbridge Rapids in Virginia's Shenandoah Valley, the final score for this baseball game was five to two, Rockbridge. The real winners, though, were 42 vets and several staff members from the Department of Veterans Affairs medical center in Martinsburg, W.Va. The **Northern Shenandoah Valley Chapter** veterans affairs VP, Jim Phillips, had made arrangements for the vets to attend the game, part of the local summer collegiate baseball league series. Chapter members Norman Haller, Raleigh Watson, Thomas Shepherd, Bill Carnegie, and Phillips accompanied the guest veterans.

■ "Nice article on one of our chapter projects," wrote Carol Wolosz, president of the **Richard I. Bong Chapter** in Duluth, Minn. He was modestly noting a half-page article in the *Duluth News Tribune*. It featured Civil Air Patrol cadets who were among awardees honored at a

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At a Donald W. Steele Memorial Chapter symposium, Tuskegee Airman William Broadwater (second from left) fields a question from the audience at the Pentagon. With him are fellow Tuskegee Airmen (l-r) James Pryde, Cicero Satterfield, and Ivan Ware.

chapter banquet in June. Pictured were Kristin Young, Jacob Jones, Andrew McDonell, and Nicholas Young. Along with Erik Carlson and Lucas Mlinar, they received checks from the chapter to cover half their fees for a summer CAP training camp. Their scholarships are named for chapter member Keith M. Bischoff.

Obituary

William J. Farrell, US and European sales manager for *Air Force Magazine*, died Aug. 23 after an illness. He was 71 years old. Mr. Farrell worked for the magazine for nearly 30 years and helped guide it through the tumultuous advertising period that accompanied the industry consolidations of the 1990s. A resident of Lake Bluff, Ill., Mr. Farrell was born in St. Paul, Minn., and graduated from the University of St. Thomas in that city. He began working for the magazine in 1978 as the Midwest area sales manager, based in Chicago. He retired in 2007.

Have AFA News?

Contributions to "AFA National Report" should be sent to *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (703) 247-5828. Fax: (703) 247-5855. E-mail: natrep@afa.org. Digital images submitted for consideration should have a minimum pixel count of 900 by 1,500 pixels.

Reunions
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23rd Flying Tiger Assn, 23rd FG, 23rd Tactical Fighter Wg, 23rd Wg (1941-present). Oct. 23-30 in Valdosta-Moody AFB, GA. **Contact:** John Collier (john.collier@mocdy.af.mil).

91st Strat. Recon Wg Assn, Barksdale, Lockbourne, McGuire, Yokota (1948-57), including 91st PRS, 91st SRS, 322nd SRS, 323rd SRS, 324th SRS, 91st ARS, FMS, AEMS, RTS, PMS, Sup Sq, Med Gp, AP Sq, Com Sq, HQ, 16th PRS, 31st PRS, 6091st SRS, **91st BW** (Vietnam era), 91st Missile Wg, 91st Intel Sq, and 91st Network Warfare Sq. May 19-24, 2011, at Avista Resort, North Myrtle Beach, SC. **Contact:** Jim Bard, 3424 Nottingham Rd., Westminster, MD 21157 (410-549-1094) (jimbardjr@comcast.net).

434th FS, George AFB. April 2011 in Branson, MO. **Contact:** R. Thorpe, 6616 E. Buss Rd., Clinton, WI 53525 (608-676-4925).

DSP satellite personnel, military and civilian. Nov. 5-6 at Buckley AFB, CO. **Contact:** Capt. Chris Castle (720-847-5451) (dspturns40@buckley.af.mil).

E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "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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a. Total No. of Copies (Net press run)	121,834	124,360
b. Paid Circulation		
(1) Mailed outside-county paid subscriptions stated on PS Form 3541	114,675	115,903
(2) Mailed in-county paid subscriptions stated on PS Form 3541	0	0
(3) Paid distribution outside the mails, incl sales through dealers & carriers, street vendors, counter sales, and other paid distribution outside USPS	567	571
(4) Paid distribution by other classes of mail through USPS	0	0
c. Total Paid Distribution [sum of 15b (1), (2), (3), (4)]	115,242	116,474
d. Free or Nominal Rate Distribution		
(1) Free or nominal rate outside-county copies included on PS Form 3541	332	322
(2) Free or nominal rate in-county copies included on PS Form 3541	0	0
(3) Free or nominal rate copies mailed at other classes through the USPS	113	122
(4) Free or nominal rate distribution outside the mail	57	57
e. Total Free or Nominal Rate Distribution [sum of 15d (1), (2), (3), (4)]	502	501
f. Total Distribution [sum of 15c and 15e]	115,744	116,975
g. Copies not Distributed	6,090	7,385
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i. Percent Paid [15c / 15f X 100]	99.57%	99.57%

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17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Juliette Kelsey (signed), Managing Editor. Date: Sept. 13, 2010

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).



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Canberra



The jet-powered Canberra was the mainstay of the Royal Air Force's postwar light bomber force, serving an astounding 55 years. It replaced the Mosquito and handled a variety of roles—tactical bombing and photographic, electronic, and meteorologic reconnaissance. USAF acquired its own variant, the B-57, which was built by Martin as the first foreign military aircraft produced in the US since 1917.

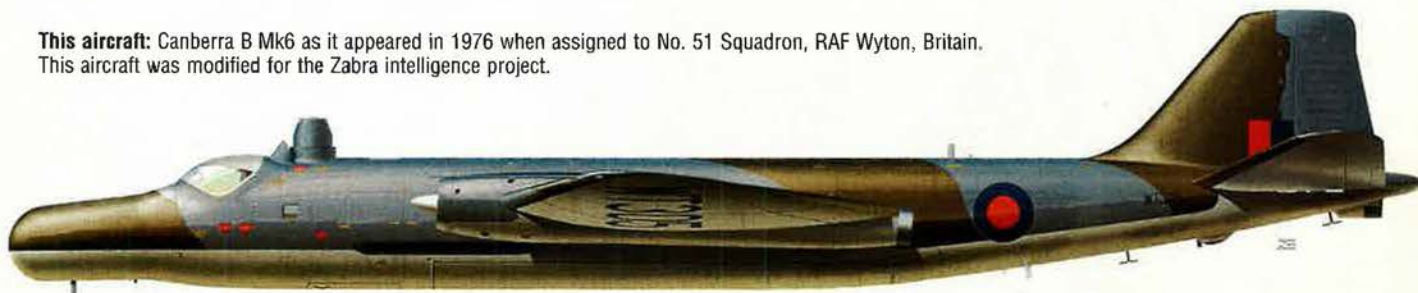
The English Electric Canberra was an all-metal, midwing monoplane with its jet engines mounted in the wing structure. EE designers changed the swept wings of the original design to a more unconventional design, in which wings were broad and squared off. It had a pressurized cabin and excellent maneuverability. Given its great

speed and ability to reach very high altitude, Canberra carried no defensive armament. It was built in more than 20 versions, and served in 38 RAF squadrons. When the Korean War revealed USAF needed to replace its B-26 light bomber, the Canberra filled the role. Variations served in the Vietnam War and remained in the USAF inventory until 1982.

RAF Canberras saw action in the Suez Crisis and Malayan Emergency, and the aircraft was used by both sides in the India-Pakistan wars of 1965 and 1971. The Argentine Air Force used Canberras in the 1982 Falkland Islands War. For the RAF, the later PR9 recon variant saw action in the 2003 Iraq War and in Afghanistan in 2006. It was finally retired by the RAF in June 2006.

—Walter J. Boyne

This aircraft: Canberra B Mk6 as it appeared in 1976 when assigned to No. 51 Squadron, RAF Wyton, Britain. This aircraft was modified for the Zabra intelligence project.



The Canberra was a multirole standard bearer.

In Brief

Designed by English Electric ★ built by EE, Handley Page, Short Brothers (RAF); Martin, General Dynamics (USAF); Government Aircraft Factory (RAAF) ★ first flight May 13, 1949 ★ crew of two or three ★ number built 1,352 (RAF 901; USAF 403; RAAF 48) ★ bomb load 8,000 lb ★ **Specific to B.Mk 6:** two Rolls Royce Avon RA.7 Mk 109 turbojet engines ★ armament none ★ max speed 541 mph ★ cruise speed 450 mph ★ max range 3,380 mi ★ weight (loaded) 55,000 lb ★ span 63 ft 11 in ★ length 65 ft 6 in ★ height 15 ft 7 in.

Famous Fliers

Air Force Cross: Larry Mason (Vietnam War). **Record-setter:** Roland Beamont, first unrefueled jet airplane trans-Atlantic flight. **Test pilot:** O. E. Tibbs. **Notables:** Chuck Yeager, Nguyen Cao Ky, Robert Mikesh, Robert Herres, Donald Kutyna, Barry Goldwater.

Interesting Facts

Entered fleet as RAF's first jet-bomber ★ flew 1953 spy mission over USSR's Kapustin Yar rocket launch site ★ nicknamed Cranberry, Caterpillar, Marrow ★ still serves as NASA's WB-57F weather aircraft, achieving altitudes exceeding 80,000 ft ★ exported to Argentina, Chile, Ecuador, Ethiopia, France, India, New Zealand, Pakistan, Peru, Rhodesia, South Africa, Sweden, Venezuela, West Germany ★ flew in special projects "Tropic Moon," "Heartthrob," "Patricia Lynn," "Diamond Lil."



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Fuel Cost Per Flight Hour	\$3,800	\$4,700 (+24%)
Fleet Fuel Costs/ Life of Program	\$92B	\$114B (+24%)
Fleet Maintenance Costs/Life of Program	\$3.4B	\$4.1B (+20%)
New Infrastructure Costs	Low	High

When you look at the real facts, it's easy to see which tanker offers the lowest total cost to the U.S. Air Force. The Boeing NewGen Tanker. Right tanker, right choice.

