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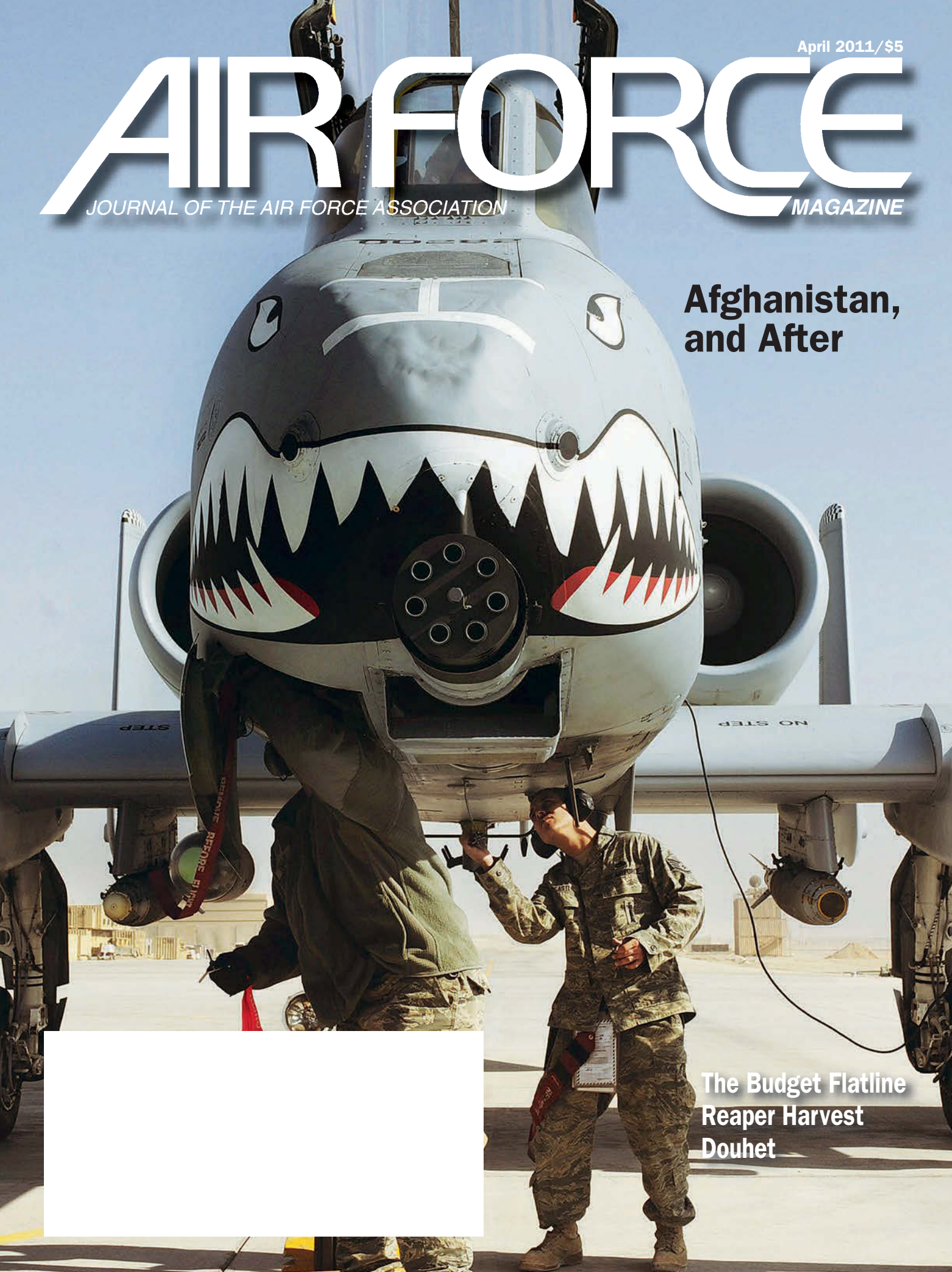
AIR FORCE MAGAZINE

JOURNAL OF THE AIR FORCE ASSOCIATION



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April 2011, Vol. 94, No. 4

AIR FORCE MAGAZINE
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About the cover: Crew chiefs work on an A-10 Thunderbolt at Kandahar Airfield, Afghanistan. See Afghanistan and After, p. 22. USAF photo by SrA. Willard E. Grande II.

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Editorial

By Adam J. Hebert, Editor in Chief

Air Force Normal

NEARLY 10 years after the 9/11 terrorist attacks, the Air Force is still ramping up to field the systems needed to fight the War on Terror. There is danger in this approach. Today's wars are not expected to last much longer, and in an era of flat budgets, the systems needed for today are crowding out the capabilities needed for tomorrow.

The MQ-9 Reaper unmanned aircraft can serve as a case in point and represent the larger effort to develop the intelligence-surveillance-reconnaissance and strike capabilities needed in today's battles.

The current plan is for USAF to be able to fly 65 simultaneous combat air patrols with the Reaper in 2013. Tactically, this will help meet demands by US and NATO troops and commanders in Afghanistan for better force protection and situational awareness. Strategically, the more Reapers in place, the easier to track, monitor, and kill insurgents when necessary.

The Reaper is a significant upgrade of the iconic MQ-1 Predator drone that essentially created its own combat niche. General Atomics Aeronautical Systems' Reaper production is still building toward a maximum rate of 48 MQ-9s per year. By March, the Air Force had 48 Predator and Reaper CAPs in place—compared to just 18 in 2007.

The Reaper is not the only ISR asset being pushed into Afghanistan. MC-12 Liberty aircraft were hastened into service to provide manned intelligence for ground troops; the C-27 small airlifter is to deploy this year to help meet the resupply needs of dispersed troops; and Air Force Special Operations Command continues a lengthy growth spurt.

These are all necessary capabilities needed for today's wars, but the 2012 USAF budget request, delivered to Capitol Hill in February, is a risky proposition. It seeks 114 aircraft for the Air Force, but 51 of these are unmanned. Of USAF's 63 manned aircraft, 19 are F-35 trainers, and there is literally one operational fighter, bomber, or attack aircraft requested: an AC-130 gunship.

The Navy and Marine Corps, with a smaller combined inventory, actually have a much healthier aircraft modernization budget request. They seek 207 manned aircraft in 2012—a request that includes not just F-35s, but some 40 F/A-18 Super Hornet and EA-18 Growler fighters.

When pushing for the systems needed in Iraq and Afghanistan, Defense Secretary Robert M. Gates once derided the military services for having "next-war-itis"—an unhealthy preoccupation with the theoretical next war at the expense of today's combat needs. Today, with Gates serving as the Air Force's investment advisor, the opposite has become true.

The Air Force needs to change its stated priorities into actual purchases, and time is running out.

Gates brushes off criticism that he is mortgaging the nation's future capabilities by pointing to his support for the F-35 and a next generation bomber.

USAF had a program in place to develop a bomber by 2018, however. Gates canceled it just two years before ordering a new program. The F-35 should become a workhorse fighter, but has been repeatedly delayed. Just this year, DOD pulled 57 Air Force airframes out of the Pentagon's five-year spending plan.

"For the Air Force, its traditional orientation has been air-to-air combat and strategic bombing, and members of those communities have so dominated the service leadership and organizational culture that other critical missions and new capabilities have been subordinated and neglected," Gates asserted in comments at the Air Force Academy last month.

The Secretary clearly feels the Air Force is at risk of relapsing into what he views as unhealthy old ways when today's wars end. "I'm concerned … that once I depart as Secretary, and once US forces draw down in Iraq and in Afghanistan in accordance with the President's and NATO's strategy, things can get back to what some consider to be real Air Force normal," he said March 4.

"This must not happen."

Apparently Gates feels the Air Force is still run by a clique of parochial generals who value bombers and air superiority fighters above the nation's true military needs. "The services must not return to last century's mindset after Iraq and Afghanistan, but prepare and plan for a very different world than we all left in 2001," Gates said.

Give the Air Force some credit. With the War on Terror nearly a decade old, thousands of Air Force tech sergeants and captains have known nothing but the demands of today's wars, and are keenly aware of what works and what is needed. Even at the highest level, two of USAF's four-star generals (Gen. Phillip M. Breedlove, vice chief of staff, and Gen. Edward A. Rice Jr., head of Air Education and Training Command) were still colonels on 9/11.

With experience forged in war, USAF seeks a force applicable for both low-level insurgency and major theater war. One need look no further than the service's modernization priorities to see the Air Force is committed to a balanced portfolio. USAF's top priorities are tankers, fighters, ISR, long-range strike, and space assets—systems useful not just for Afghanistan, and not just for possible future war with China, Iran, or Russia, but for all wars.

This is the real Air Force normal. The Air Force now needs to change its stated priorities into actual purchases, and time is running out.

The nation cannot afford tunnel vision, and cannot simply promise tomorrow's needs will be met. Without proper investment, the American wartime advantages that for decades provided deterrence, kept the US unchallenged in the skies, and kept ground troops safe from enemy air attack will be lost.

The Air Force recently sent 250 fighters to an early retirement, is flying its smallest fleet since before the Korean War, and its oldest ever. The 2012 budget does not arrest this trend.

Mobility, ISR, drones, and space systems are necessary but insufficient. DOD needs to get the F-35 into service and push for a next generation bomber, or it risks creating an Air Force without combat aircraft. ■


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Letters

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Replanting ROTC

Your editorial on ROTC returning to prestigious schools was insightful and timely *["Editorial: Replanting ROTC," February p. 4]*. While I agree that your expectations of faculty reaction are unfortunately realistic, at least at Harvard, it appears that the administration and the students get it. In addition, it appears that our military leadership recognizes the importance of offering ROTC at prestigious school.

On Nov. 17, 2010, Harvard President Drew Faust and Chairman of the Joint Chiefs of Staff Adm. Mike Mullen addressed this issue at the John F. Kennedy School of Government. President Faust made it clear that the end of DADT would enable her to move forward with re-establishing ROTC at Harvard. Admiral Mullen confirmed that "it is incredibly important to have ROTC units at institutions like this."

On Jan. 31, 2011, the Harvard *Crimson* came out with an editorial in strong support of ROTC on campus, completely refuting the 1989 editorial. The *Crimson's* Roving Reporter published a video of campus interviews with Harvard students which were overwhelmingly supportive of an ROTC presence on campus.

Finally, I'd like to point out a few of Harvard's many historic contributions to the military. Its members have earned more Medals of Honor than any institution except USMA and USNA. Harvard men made several notable contributions to early military aviation. The first American fighter pilots were mercenaries in the French Foreign Legion, flying for the Lafayette Escadrille. The unit was founded by a Harvard graduate, and nine of the 38 pilots on the official roster attended Harvard. There were no members of USMC and USNA on the roster.

Quentin Roosevelt, Teddy's son, was among the first US fighter pilots.

In the interests of full disclosure, I am a member of the Advocates for Harvard ROTC. I am a product of the Harvard ROTC program, class of 1964, and served a tour in NATO air defense flying F-102s with the 525th FIS.

Joseph J. Gano
Wilmington, Del.

It seems that two questions need to be raised concerning the replanting of ROTC units in the thorny ground of recalcitrant schools: 1) With the drawdown of our military and reduction in class size at service academies, do we need those restarts? 2) What are the true numbers of "five-and-outs" among ROTC and service academy grads who have received excellent no-debt educations?

Further, any institution that produces junior officers permeates its grads with a particular world view and set of belief dynamics that often conflict with the realities of our military functions. Law and medicine may be the only specialties that must perform apart from the warfare arts in order to regulate and repair human existence by strict science.

It is naive thought to believe that "prestigious" schools can put more into their grads—of worth to the mili-

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tary services—than the ROTC-friendly institutions. Serious evaluation of those relics of past educational glory shows how they have crushed the laurels they rested on. In fact, most of those student bodies are bright, well-endowed, and purposely trained to be "masters of the universe." Unfortunately, we lately have come to see how many of their kind have risen to corrupt and destroy our national substance.

The officer leadership of our military services needs to stand above the evil that circulates in those gilded halls. We live in a time that requires a gathering of certain hearts and minds that must refrain from applause in the halls of politics, that can come together in unity of purpose in the mission of defending our nation from all harm, without guile or self-interest. A collection of vaunted diplomas guarantees no loyalty nor any superiority of character, just an accumulation of academic approvals. What happens in their days of command depends fully on the individual content that made each military officer from date of birth.

We live in "times that try men's souls."

Wendell Lepic
Delavan, Wis.

As a 1955 AFROTC graduate from the University of Michigan in Ann Arbor and a retired reserve officer, I must repond to the interesting editorial, "Replanting ROTC," in the February 2011 issue. While serving as a captain in the ready reserves, I was a Ph.D. candidate at the University of Wisconsin-Madison, 1964-69. This period experienced violent anti-Vietnam protests and a movement by liberal far left faculty to remove all ROTC programs from the campus. The ROTC commandants asked any and all supporters to help defend their programs, and I joined a conservative faculty group supporting ROTC. We testified at all appropriate campus faculty meetings, gave newspaper interviews, and delivered speeches. What follows is a list of our ROTC arguments:

First: If liberal or, for that matter, all faculty and university administrators want to influence the military with their views, what better way than to have direct input to ROTC detachments right on campus? For example, if they want to debate "Don't Ask, Don't Tell" (DADT) policy, it stands to reason they need to have access through communication channels within the academic community. One cannot influence change in the military by avoiding it. I think Hebert has it dead right: Most of the protests are anti-military based and simply use a number of controversial issues to remove ROTC from a campus. The Harvard *Crimson's* position is a good example of such negative motivation, and most college newspapers are very liberal, if not far left.

Second: There is not the slightest bit of factual evidence that ROTC "compromises" any institution's academic integrity. The ROTC courses were as, and in many instances more, rigorous than the typical liberal arts courses. The ROTC instructors were well-educated, experienced, and effective teachers with very high standards. We only received three hours credit per semester for at least the equivalency of three courses and zero credit for the extra drill, field trips, and summer camp. We learned technical, civic, and history disciplines. In fact, the only formal leadership training I ever received in my experience at three different universities was in the ROTC courses.

Third: When a school fails to allow ROTC to operate on its campus, it denies its students a wonderful opportunity to compete for a very good scholarship and a wonderful career option after active duty. Most of us felt it was and is an honor and privilege

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Letters

to serve our country. ROTC produced many distinguished senior commanders, including the legendary SAC leader and Chief of Staff Gen. Curtis LeMay, an ROTC graduate from the Ohio State University.

Lt. Col. Richard L. Pinkerton,
USAFR (Ret.)
Strongsville, Ohio

Never Again Forever

Many thanks to John Correll for his informative article, "Origins of the Total Force" *[February, p. 94].* I had heard before that the Air Force was historically further along with Total Force implementation than the Army but didn't realize its roots in the Air Force. I am also duly impressed that Army Gen. Creighton Abrams stated that America should never go to war again without the Guard and Reserve and firmed up the commitment to Total Force accordingly. As a former full-time military technician in the Air Guard, I would be most interested in learning the history of the Guard technician and AGR programs; I personally think these programs should be officially re-evaluated in light of modern force structures and operational requirements of the total Air Force to determine whether they should be modified or discontinued. But that's another story. Again, thank you for a very interesting article.

Lt. Col. Dave A. Kolmer,
USAFR
Richmond, Va.

Even the words, "national guard" and "reserves" carry with them a generous measure of negative stereotype and connotation directed toward any who chose to fulfill their military obligation in this manner. Those individuals made their decision based solely on their best interests, none of which was a sense of patriotism or dedication to duty. Their loyalty and integrity were always in question.

Those in the professional military (active duty) had little or no use for either agency, known for harboring draft dodgers and peaceniks. Those organizations were filled with many who wanted the benefits without the commitment, but who still wanted recognition for their status as members of the military, when it seemed convenient. Yes, they could dress up and play war now and then, attend summer camp to get away for a couple of weeks, all the while knowing that dad and mom were just down the road.

Those individuals thought they were getting away with something then, but now, they seem to look back a bit remorsefully and with a certain amount of contrition when in conversations with the "real" veterans. They have learned that the stigma still exists.

I salute each and every person who stepped forward to raise a hand while offering a life in support of our country. These warriors did not ask how long they must give. These brave souls did not ask how much they must give. They simply stated that they were here to give. Not one asked if it was going to interrupt their plans for the weekend.

MSgt. Drew Thomas,
USAF (Ret.)
Bradenton, Fla.

Who Makes the Call?

There are many unexamined issues in "The Long Road to Missile Defense" article, March *[p. 54].*

First, who would make the decision to intercept during the boost phase of flight, the first five minutes? There is not enough time to explain the situation to senior commanders, let alone the President. The answer has to be the on-duty commander, maybe a colonel at best. Or do we entrust the decision to a computer algorithm, which may or may not be correct?

What are the consequences of a wrong decision to intercept? On July 3, 1988, Iran Air Flight 655 was shot down by the USS *Vincennes,* which mistook it for an enemy aircraft. Two hundred and ninety innocent civilians, including 65 children, were killed.

During the midcourse phase of flight, the incoming missile would be tracked by the mobile Sea-Based X-Band Radar. Unfortunately, that component is presently down for modification. Eventually it will be home ported in Adak, Alaska, far from Mideast rogue nations. True, it can be moved—very slowly. Likely the attack will be over before it reaches the trouble spot.

As for other sea-based trackers like Aegis cruisers and destroyers, the lesson of the *Vincennes* is instructive.

The terminal phase of flight when decoys are deployed is the most difficult time to intercept. We use decoys on our offensive missiles; therefore, they must work.

On 9/11, NORAD was completely blindsided by an attack from within. Foolishly, NORAD expected the opposite, an external attack.

Even if a layered defense worked, a smart enemy would not attack through strength, but would look for weakness. Commercial shipping ports are our Achilles' Heel where cargo containers arrive with little scrutiny. Why use a missile when a nuke can be more easily delivered in a cargo container?

The whole strategy of missile defense needs to be re-examined.

James A. Bailey
Schenectady, N.Y.

B-52s Aren't Dirty

Please revisit your picture of the B-52 on p. 74 of the February magazine *["Sharpening the Spear"].* It states that the B-52 "taxis at Andersen." It is in fact under full power on takeoff. Just look at the exhaust. The earlier B-52s with the old J-57 engines never left that kind of "dirty" exhaust while at taxi power. The H model surely doesn't.

I was deputy leader of the first B-52 strike over Vietnam on June 18, 1965, from Andersen in an F model and feel I have some knowledge of the subject.

Dick Ionata
Battle Ground, Wash.

It's Bigger

With regard to his "21st Century Rivet Joint" *[January],* Marcus Weisgerber's reference to the "Boeing 707-based RJ" on p. 52 indicates he is apparently under the still widespread misconception the myriad models of the KC-135 are same-size derivatives of the 707 aircraft. Actually, 707 airframes are substantially larger than the 135-series, being both longer and with a larger diameter fuselage, which is easily appreciated by viewing a photograph of a KC-135 refueling a true 707-based aircraft like the E-3, E-6, or E-8.

Elliott Stoffregen III
Millbrook, Ala.

18 Is 18

An outstanding article, one that I, for one, greatly appreciated *["BMT Gets Real," February, p. 44].*

I went through basic at Lackland 54 years ago (July/August 1957), fresh out of high school. The article brought back a lot of memories and points out the many changes.

No more pith helmets or World War II barracks with no air-conditioning, much longer and varied course of learning, uniforms, etc. Of course it was a different time and society, but an 18-year-old is an 18-year-old, and it was and is a new life for someone that age. Thanks again.

Harold B. Bachman
Adrian, Mich.

Pictures of Midway

I'm a big admirer of Barrett Tillman and have bought all his books I can afford. I have a couple of comments about his Midway article *["The Battle of Midway," February, p. 90].*

The SBD in the foreground of the photo on page 92 may have launched from *Hornet,* but the diagonal tail stripe identifies it as an *Enterprise* aircraft. Also, the carrier on p. 93 is almost certainly *Hiryu* and is under attack by B-17s—look at the bomb splashes.

The SBD from the outset had one advantage over the Aichi D3A "Val"; it could carry a 1,000-pound bomb to the Val's 550. The Japanese were greatly surprised during the Indian Ocean raid that Vals could sink armored cruisers. The SBD later had more guns, bigger guns, more armor, and, of course, self-sealing fuel tanks.

Capt. Larry M. Robinson,
USAF (Ret.)
Greenville, S.C.

A Keeper

In December 1971, I reported for duty as a deputy missile combat crew commander with the 91st Strategic Missile Wing, Minot AFB, N.D. That was almost 40 years after my father reported to the 91st Bomb Group (Heavy), Bassingborn Airfield, England, as a B-17 crew chief. For the five years that I was assigned to the 91st SMW, I was privileged to wear the unit awards and decorations that my father and all the airmen of the 91 BG(H) earned. Both of us began our Air Force careers and our families with the 91st. Your article *["The Real Twelve O'Clock High," January, p. 70]* brought back a lifetime of memories for me. This is an issue that I will definitely keep.

Lt. Col. Terry O. McQuain,
USAR (Ret.)
San Antonio

Washington Watch

By John A. Tirpak, Executive Editor

March 19 dawns on Libya; Protecting our assets; Going offboard with the bomber. ....

NO FLIES ON LIBYA

WASHINGTON, D.C., MARCH 21, 2011

The UN has implemented a no-fly zone over Libya, responding to Muammar Qaddafi's attempts put down a popular uprising by using mercenaries and air strikes on rebels and civilians alike. The March 17 authorization followed weeks of debate, during which it became clear that many US government and opinion leaders seemingly aren't aware of the enormous commitment of resources such an operation requires.

A no-fly zone is an aerial blockade that prevents a country from flying aircraft to attack its own citizens, and prevents weapons resupply by air. Such a military step was taken against Iraq after the first Gulf War in 1991—and persisted for nearly 12 years—and another was applied in the Balkans in the 1990s.

The UN Security Council resolution demanded an immediate cease-fire in Libya, a halt to all attacks on civilians, a halt of airlift of mercenaries into the ground fight, and authorized member states to use "all necessary measures" to enforce the edict. It directed the establishment of "a ban on all flights in the airspace" of Libya to "help protect" civilians but granted safe passage to humanitarian flights.

"Of course we have to have a no-fly zone" over Libya, Sen. John McCain (R-Ariz.) said in remarks before the Atlantic Council on March 1. "We are spending over $500 billion, not counting Iraq and Afghanistan, on our nation's defense. Don't tell me we can't do a no-fly zone over Tripoli."

McCain expressed irritation with those who cautioned against moving too fast to militarily intervene in the Libyan conflict. The armed forces "always seem to find reasons why you can't do something rather than why you can," he said, adding that it is a moral obligation of the US and its allies to prevent Qaddafi from murdering innocent civilians from the air.

Sen. John Kerry (D-Mass.), appearing on the CBS show "Face the Nation," warned against a military intervention in Libya, but said he didn't think a no-fly zone would constitute such a step.

"I don't consider the fly zone stepping over that line," Kerry said.

Many members of Congress and the media weighed in with support of an air exclusion zone, suggesting it would help Libyan rebels without the need to directly involve the US in the fighting.

In the midst of this enthusiasm for air action, Defense Secretary Robert M. Gates told the House Appropriations Committee's defense subcommittee in early March he was disturbed by the "loose talk" about establishing a no-fly zone over Libya.

"If it's ordered, we can do it," Gates said. However, "let's just call a spade a spade. A no-fly zone begins with an attack on Libya to destroy the air defenses. That's the way you do a no-fly zone. And then you can … fly planes around the country and not worry about our guys being shot down."

Gates went on to say that "it also requires more airplanes than you would find on a single aircraft carrier. So it is a big operation in a big country." (Libya is about a quarter of the size of the continental US, although most of its population and assets are clustered along the Mediterranean coast.)

DOD photo by CHerie Cullen

Gortney: Targets included Qaddafi's ground forces.

The attacks began on March 19. Air Force B-2 bombers struck Libyan Air Force hardened aircraft shelters while the Navy fired some 120 Tomahawk cruise missiles from ships and submarines in the Mediterranean Sea. Soon afterward, Air Force F-15Es and F-16CJs attacked Qaddafi's ground forces as they moved toward rebel enclaves near Benghazi. Adm. Michael G. Mullen, Chairman of the Joint Chiefs of Staff, said on ABC News' "This Week" that the pre-emptive attacks on Libyan air defense sites had been "effective" and the no-fly zone was essentially "in place."

Vice Adm. William E. Gortney, operations director for the Joint Staff, said the USAF aircraft and Marine Corps AV-8B Harriers attacked ground forces that posed a peril to Libyan civilians, but insisted they were not performing close air support in support of Libyan rebels.

Attacks on air defenses had produced no civilian casualties, Gortney said. Qaddafi spokesmen insisted there had been dozens of civilian deaths, but multiple news outlets reported he offered no evidence for this claim. Local hospitals in Tripoli had seen no influx of injured people.

Air Force Chief of Staff Gen. Norton A. Schwartz, in budget testimony before the Senate Armed Services Committee March 17, said a Libyan no-fly zone would involve fighters, bombers, tankers, airlift and intelligence-surveillance-reconnaissance aircraft. The action would force "some trade-offs" with other operations; namely, some assets would have to be pulled from the fight in Afghanistan.

Schwartz said a no-fly zone "would not be sufficient" to reverse Qaddafi's ground gains against the rebels. He echoed the remarks of National Director of Intelligence James Clapper, who a week earlier had told Congress Qaddafi would probably "prevail" against the rebels, given his superior military forces.

Gortney said that Libyan Cold War-era, Soviet-made SA-2 and SA-5 fixed surface-to-air missiles were hit, but not, initially, mobile SA-6s and SA-8s. He also warned that there are "quite a few" SA-7 man-portable SAMs in Libya that could be anywhere, and that coalition warplanes would use "speed and maneuver" to elude them if they are fired.

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Years of sanctions and neglect have grounded most of Libya's fighters and bombers, leaving only a "couple dozen" serviceable aircraft and a like number of attack helicopters, one former intelligence officer reported.

A former naval officer told NPR's "All Things Considered" that a single aircraft carrier could maintain a no-fly zone for about a day only, before the aircrews and aircraft would be "exhausted." The operation would demand large numbers of ground-based aircraft, supported by an Airborne Warning and Control System, or AWACS-type aircraft, as well as large numbers of aerial refueling airplanes.

The Center for Strategic and Budgetary Assessments, in a white paper released in mid-March, said that based on the historical costs of the no-fly zones over Iraq and the Balkans, such an operation in Libya could cost the US between $15 million and $300 million per week, depending on the size of the area to be patrolled and the extent of the precursor attacks required.

A CAREFUL LEAD IN FIGHTERS

The Air Force is taking a measured and cost-conscious approach to fielding its premiere new aircraft, determined to address new threats only as needed, at the appropriate pace and with only as much program as necessary.

Air Force Chief of Staff Gen. Norton A. Schwartz, in an interview, said the service isn't ignoring the air superiority challenge posed by Russia's and China's fifth generation prototype aircraft, but the answer, for now, isn't a new-start program to develop a sixth generation fighter.

Commenting specifically on China's J-20 fighter, the recent first flight of which seemed to catch the Pentagon by surprise, Schwartz said the aircraft seems to him more of a "demonstrator" than a prototype. The new foreign fighters will need extensive development to make them into viable weapon systems, he said, and "given the struggle we've had to field our own fifth gen platforms," it's not likely they'll pose a significant new operational threat soon. The fighters will need to be integrated with other systems and networks, and paired with the right weapons—significant hurdles to overcome.

"I respect the Chinese engineering and manufacturing capability ... but ... we should keep in mind that this is something that we invented, and it wasn't a cakewalk for us," Schwartz asserted.

That said, the Air Force has extensive research and development programs under way to refine technologies that would benefit a future sixth generation fighter. Schwartz listed such areas of development as including sensors, materials, manufacturing, data links, apertures, high-resolution radars, and other technologies, as well as a long-term project called ADVENT (Adaptive Versatile Engine Technology) that seeks greater efficiency and performance in jet engines.

"We've got over $2 billion in R&D" to develop capabilities for a fighter significantly more advanced than today's F-22 or the upcoming F-35, he noted.

Moreover, the F-22 is "not standing still," and an extensive upgrade program—"one of the half a dozen or so largest programs we have"—is in the works to squeeze the most performance possible out of the Raptor.

"That is in the [Fiscal 2012] budget, and we're committed to that," he said. So, in air superiority, "we're certainly not backing away" from the modern threat. And "we'll definitely keep an eye" on the progress of the J-20 and Russia's T-50.

Asked if he was worried that the J-20's resemblance to the F-22 and F-35 indicated successful Chinese industrial espionage or some sort of leak, Schwartz said the similarity serves as a reminder that the Air Force and its industrial partners must "protect our advantages. … It's a team sport between government and industry."

NEXT GEN REACH AND POWER

Schwartz described the beginning of a new next generation bomber program as part of the Air Force's Fiscal 2012 budget a big deal, given that there were many opponents who felt the Air Force didn't require such a program.

"We persuaded the leadership of the Department of Defense that this was, in fact, something that the country needed. ... That's not a trivial achievement," Schwartz said.

The new bomber program, he said, will in some ways mirror the KC-X tanker project, which was recently awarded to Boeing's 767-based concept and immediately dubbed the KC-46A. Given EADS North America's stated intention not to protest the award, the KC-46 should not languish in litigation limbo.

The next generation bomber, like the KC-X competition, will "have mandatory requirements and nonmandatory requirements, and you'll qualify and then there will be trade space," the Chief explained. The new airplane will be cutting edge, but won't demand the invention of any new technology, he said. "There is consensus in the [Pentagon] about what the general outlines of the requirement set [are]. And I'm sure that will be refined and trades will be made as we go down the road, but there is consensus on that."

To keep the program and make it work, USAF will have to "temper [its] ambitions, field a capability that relies predominantly on proven technology, and to do it in a way where cost is essentially an independent variable."

The new bomber program aims to "have at least—at least—a flying prototype in the middle of the 2020s, if not more than that," Schwartz said. That will be possible, he said, because "this isn't a completely new start." The Air Force was taking briefings from industry for years under the previous next generation or "2018 bomber" program, which was terminated.

"The offers for the previous effort produced lots of proposals. ... This isn't the first time people have been thinking about a long-range penetrating bomber." Building on technology in hand will allow a "streamlined procurement approach," Schwartz said, which may even bypass traditional competition.

"An early downselect is one option, in order to control costs," he said. "I wouldn't be surprised if, when the time came, that isn't one of the options that the then-leadership team seriously considers."

The new bomber will not be a "stand-alone" system, but will rely on a host of offboard platforms, sensors, and systems to do its job, Schwartz said. Some of these will be capabilities already resident in the force. However, it will not be a platform in the tradition of previous USAF bombers.

"If we see ourselves as a cross-domain service, it would be foolish to have a concept of operations or a design for a penetrating platform that didn't take advantage of air, space, and cyber." It was this willingness to break the mold that convinced the DOD leadership to go ahead with the program, he said.

The bomber is emblematic of other efforts to do business in a new way, Schwartz said.

Not all the changes in the way the Air Force does business are beneficial, he conceded. For example, the old paradigm of organizing and measuring the Air Force's capabilities by tactical fighter wings or combat wings has been discarded, and today USAF has "a number of platforms which satisfy the accepted [Office of the Secretary of Defense]-approved scenarios," Schwartz said. "It's about 2,000 fighters, it's about 300 big airplanes and so on." As to "whether we have a traditional force-sizing construct" by which to measure how prepared USAF is to answer the demands of the national military strategy, "the reality is, we do not." He said this is true for all the services across the DOD.

"I've been on the record as saying I wish we did have a more explicit force-sizing construct," he noted. ■

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Air Force World

By Aaron Church, Associate Editor

Airmen Killed at Frankfurt Airport

A gunman killed two airmen and wounded two more in a shooting at Frankfurt Arpt., Germany, March 2.

A1C Zachary R. Cuddeback, a vehicle operator assigned to the 86th Vehicle Readiness Squadron stationed at Ramstein Air Base, and SrA. Nicholas J. Alden assigned to the 48th Security Forces Squadron at RAF Lakenheath, England, were slain.

The shooting occurred on a bus waiting to transport a 15-member security forces team from the airport to Ramstein, en route to Afghanistan for deployment. German authorities arrested the shooter and are investigating a possible terrorist motive and connection to radical Islamic groups.

Following the attack, a third airman remained in critical condition in a hospital in Frankfurt, with a fourth in serious condition, according to US Air Forces in Europe officials on March 4.

Airman Dies in Iraq

A1C Corey C. Owens, 26, of San Antonio, died in a noncombat-related incident on Feb. 17 at Al Asad AB, Iraq, the Defense Department announced.

Owens was an installation patrolman assigned to the 47th Security Forces Squadron, Laughlin AFB, Tex.

Deployed in Iraq, Owens served with the 332nd Air Expeditionary Wing. He joined the Air Force in 2008, and was serving his second deployment. At press time, the cause of Owens' death was not available.

Airmen Press On With Relief Efforts

Air Force Secretary Michael B. Donley and Chief of Staff Gen. Norton A. Schwartz told lawmakers in March they continue to monitor the roughly 30,000 airmen and their families based in Japan "very closely" to ensure they are not at risk following the devastating earthquake and tsunami that rocked the island nation earlier that month.

"There is a continuous reading of the health situation on an ongoing basis at both Misawa and Yokota," Donley told the Senate Armed Services Committee. However, "airmen and their families are not ... at risk," Schwartz added.

USAF aircraft have delivered 107.4 tons of relief supplies and emergency equipment to the island nation since the disaster struck. Tankers have offloaded more than 29,900 gallons of fuel to keep the aerial lifeline going, according to *The Wall Street Journal,* and Global Hawks have conducted intelligence-surveillance-reconnaissance missions to help the Japanese government determine the full extent of the damage.

Special tactics airmen succeeded in clearing the runway at Japan's Sendai Airport, near the tsunami's epicenter, for use as a staging area. HH-60 crews flying from Yokota Air Base near Tokyo aided in establishing a forward refueling area at Yamagata Airport near the disaster

USAF photo by SSgt. Jonathan Steffen

Four-Layer Space Defense

The newly released National Security Space Strategy outlines a four-layer approach to building space resiliency in an effort to protect US assets against threats.

According to Gregory L. Schulte, deputy assistant secretary of defense for space policy, "If Ethiopia can jam a commercial satellite, ... you have to worry about what others could do." Schulte spoke at a Pentagon press conference in February.

The "first layer of deterrence" is to develop a set of international norms, creating an extra layer of protection against possible adversaries, Schulte said. The US also must build international partnerships, so "an attack on one would be an attack on all," he emphasized.

The third layer requires the US to revamp its training and doctrine so that the military is able to fight on despite an attack, and finally, the last layer is actually developing capability to respond to an attack, if necessary.

Both Iran and Ethiopia have jammed commercial satellites, Schulte reported.

zone to facilitate the quick turnaround of US and Japanese search and rescue helicopters.

Cutting the Bone

The B-1B bomber fleet will be reduced from 66 to 60 aircraft to help pay for upgrades to the remaining aircraft in the fleet, Air Force Secretary Michael B. Donley told the House Armed Services Committee. Testifying on the Fiscal 2012 budget request, Donley said savings would be "harvested" from the proposal.

According to the service's 2011 posture statement, proposed upgrades include the bomber's central integrated test system, fully integrated data link, and vertical situation display unit.

Donley said the Air Force's assessment is that the six-aircraft reduction won't create "an unreasonable burden on operational risk" for the remaining B-1 fleet.

RIF Coming

The economy is bad, retention and recruiting are way up, and the Air Force has more people than it's authorized. To get down where it belongs by the end of Fiscal 2012, USAF has announced some involuntary force management initiatives that will go into effect this year. The efforts build on voluntary measures announced last year.

Fixes include force-shaping boards for junior officers beginning in May, fol-

03.15.2011

A fuel truck approaches the cargo bay of a C-130 at Yokota AB, Japan. The aircraft ferried the truck to Yamagata Airport in Higashine, Japan, to aid in the relief effort after a massive earthquake struck near the Pacific island nation. The quake was followed by a tsunami. Among other humanitarian missions, USAF C-17s filled with food, water, medical gear, doctors, and radiation-detecting equipment were also dispatched to Japan.

lowed by a reduction-in-force board in September for midgrade officers.

Despite a multiyear effort to try to entice excess officers to leave the service, the Air Force ended Fiscal 2010 some 2,300 officers over strength. Retention is the highest in 16 years.

"Without additional measures, we could grow to 7,000 over our authorized end strength by the end of Fiscal Year 2012," said Chief of Staff Gen. Norton A. Schwartz.

Next, Tactical Nukes

The ink was barely dry on New START, the treaty governing strategic nuclear weapons, when President Obama said he now wants to reduce tactical nuclear stockpiles as well.

Obama issued a statement about his intentions Feb. 2, when the US and Russia exchanged the instruments of ratification of the agreement. Russia's tactical nuclear stockpile far exceeds that of the US. New START went into force Feb. 5.

After consulting with NATO allies, Obama said, the US will seek to begin discussions about the tactical nukes "not later than one year after the entry into force of the New START treaty." The discussions would address the "disparity" in the two stockpiles and seek to "secure and reduce tactical nuclear weapons in a verifiable manner."

In remarks given to a security conference in Washington, D.C., in January, assistant secretary of state for arms control, verification, and compliance Rose Gottemoeller said, "Work is under way, and is intensifying, to prepare for dialogue with Russia on nonstrategic nuclear weapons."

Hardening Times in the Pacific

The Air Force will have to harden and further distribute its bases in the Pacific against the possibility of Chinese missile attack, said former Pentagon China affairs specialist and Center for a New American Security fellow Abraham M. Denmark.

"As China is developing precision capabilities to strike our bases ... to limit our ability to generate air sorties to project power," the US must move beyond a "one big base" mindset to a "broader network," Denmark said at the Center for National Policy in Washington, D.C., Feb. 9.

While USAF's shifting of its forces to Guam—outside of China's short-range missile range—is a first step, Denmark emphasized that someday China will likely develop precision missile capable of reaching even Guam.

Pacific Air Forces Commander Gen. Gary L. North said that PACAF officials are studying ways to protect the long-range bombers operating from Andersen AFB, Guam, possibly including erection of hardened aircraft shelters, he told reporters at AFA's Air Warfare Symposium in Orlando, Fla., Feb. 17.

Long-range bombers on an airfield, such as the B-52s that deploy to Andersen on rotations, are a "lucrative target" that an enemy force would be interested in attacking, said North.

While massive hardened shelters large enough to house these bombers would be "very expensive," he emphasized "the airplanes they [would] protect are national assets" USAF has an obligation to safeguard.

"The first job of any military is to defend its base whatever that base is, fixed or mobile, whether it's [from] ballistic missiles ... or attempts to close a base by nonkinetic means," said North.

Global Hawk Buy Cut Short

The Air Force will only buy 11 of 22 planned Northrop Grumman RQ-4 Global Hawk Block 40 remotely piloted aircraft, according to service budget director Maj. Gen. Alfred K. Flowers.

Explaining the Fiscal 2012 budget request, Flowers said USAF will use the savings generated by foregoing the additional aircraft to upgrade the existing Global Hawk Block 30 fleet's electro-optical and infrared sensors.

Air Force Secretary Michael B. Donley, in a press conference, said the move will put the eventual RQ-4 inventory at 66 aircraft, which he deems adequate for USAF needs.

The Block 40 is configured to carry the Northrop-Raytheon MP-RTIP radar for ground surveillance. Marilyn Thomas, USAF's budget deputy, said the smaller Block 40 inventory will provide two combat air patrols (24/7 coverage) deemed "sufficient" when combined with the E-8C JSTARS aircraft's ground moving target indicator capability. Cost and performance issues factored in the decision, she said.

USAF photo by SrA. Kenny Holston

Airmen at Whiteman AFB, Mo., on March 19 ready a B-2 bomber for a mission in support of Operation Odyssey Dawn to protect Libyan citizens from attacks by forces loyal to Libyan dictator Muammar Qaddafi. B-2s, F-15s, and F-16s participated in the strikes against Qaddafi's military.

No Sole-Source Helicopter Buy

Despite reports that the Air Force might be close to inking a deal to procure Army Black Hawk helicopters to replace the Vietnam-era UH-1N Hueys currently protecting the nation's ICBM fields, senior service leaders told House lawmakers "that's not the correct strategy."

Lt. Gen. Mark D. Shackelford, military deputy to USAF's acquisition executive, told the House Armed Services Committee's tactical air and land forces panel March 15, that there are three to four companies capable of providing the type of helicopter under consideration for the Common Vertical Lift Support Platform.

"We have a range of options and one extreme is going to a sole-source contract, but that's not the option we are leaning toward," Shackelford testified. He added, "We expect that to be a competitive acquisition strategy so we can get the best arrangement we can for the Air Force and the taxpayer."

SLEP Disorders

The Air Force's Fiscal 2012 spending plan contains no money for service life extension program kits for the service's F-16 fighters. However, there is $25 million to study a "potential SLEP" and "defining" precisely what it would entail, USAF budget director Maj. Gen. Alfred K. Flowers said in a Pentagon briefing in February.

Flowers also said that if USAF must operate under a continuing resolution for all of Fiscal 2011, it has no authority to start equipping F-15s with an advanced radar.

"We are worried" about that, Flowers said, because without the new radars, "we are at risk of having to ground some aircraft in the future," suggesting the F-15's existing radars are nearing the end of their serviceability.

Out of Joint

The Pentagon will complete disestablishment of US Joint Forces Command by the end of August and conclude all associated personnel shifts by March 2012, announced JFCOM commander Army Gen. Raymond T. Odierno.

"We will retain the most critical functions … in an organization flattened for agility and efficiency," said Odierno Feb. 9, stressing that an entirely "different organization" will carry out the mission.

The new organization will remain in Norfolk, Va., with a two-star general at the helm. Its workforce will comprise about 2,425 personnel, representing a 48 percent reduction from JFCOM's current employee roll of 4,700.

DOD will cut mostly civilian contract workers and the Joint Staff will assume most of JFCOM's role to ensure there's no loss in "the momentum and gains in jointness" within US and NATO forces, Odierno said.

With the Greatest of EASE

Hoping to save at least 10 percent on the multibillion-dollar price of new satellites, Air Force leaders have announced the Evolutionary Acquisition for Space Efficiency strategy, or EASE.

The new approach to space acquisition for satellites and rocket boosters debuted in the Fiscal 2012 budget request and emphasizes block buys of both. It seeks to combine the space requirements of the military services, National Reconnaissance Office, NASA, and other spacefaring agencies.

Satellite costs have been steadily rising to $2 billion apiece, requiring USAF to rob funds from other space priorities to pay for them. The EASE concept also emphasizes fixed-price contracting, and a steady stream of work to preserve the space industrial base.

The new strategy would require congressional support since it uses a new funding stream that would smooth out spikes and valleys of space funding.

First SBIRS Go for Launch

GEO-1, the Air Force's first Space Based Infrared System early warning satellite, passed final exams and is cleared for launch aboard an Atlas V rocket this spring, prime contractor Lockheed Martin announced Feb. 16.

Confidence testing at Lockheed's plant in Sunnydale, Calif., was the last milestone following installation of the satellite's final subassemblies.

Lockheed delivered the satellite in March to Cape Canaveral AFS, Fla., for placement in orbit.

"GEO-1 will usher in a new era of critical missile warning capabilities vital to our national security," said Col. Roger W. Teague, USAF's infrared space systems director.

GEO-1 will join two SBIRS payloads already hosted in orbit aboard classified NRO intelligence satellites.

Tougher Mission for X-37B

The Air Force and its industry partners launched the second Boeing-built X-37B orbital test vehicle, OTV-2, into space on its inaugural mission March 5.

The reusable space vehicle lifted off from Cape Canaveral AFS, Fla., aboard a United Launch Alliance Atlas V, aiming for low Earth orbit.

"We have just started what is a very systematic checkout of the system," said Richard W. McKinney, USAF's deputy undersecretary for space programs, following the launch.

McKinney said OTV-2's flight will expand upon the secretive orbital tests conducted with OTV-1 during its maiden mission last year.

Air Force officials said OTV-2 likely will remain on orbit for about 270 days, perhaps longer. Program officials want to test OTV-2's ability to land in stronger wind conditions than OTV-1 faced when it returned to Earth.

Air Force and DOD Release Fiscal 2012 Budget

The Air Force is requesting $119 billion in its Fiscal 2012 baseline budget proposal plus another $16.4 billion to support the wars in Iraq and Afghanistan, from an overall request of $671 billion for the Defense Department.

That $135.4 billion for Air Force-specific programs grows to a total of $166.3 billion when factoring the $30.9 billion in joint initiatives—so-called "non-blue" programs funded from USAF accounts.

The $135.4 billion blue request is $4.5 billion less than USAF's Fiscal 2011 blue budget proposal of $140.4 billion. The majority of this difference is reflected in the decreased amount requested for overseas contingency operations since all airmen are expected to be out of Iraq by the end of December.

Of the $119 billion blue baseline request, 63 percent will be used to support day-to-day operations for airmen, such as the 1.2 million allocated flying hours, civilian pay, and restoration and support projects, said Maj. Gen. Alfred K. Flowers, USAF's deputy assistant secretary for budget.

President Obama's DOD request includes $553 billion in discretionary budget authority to fund base defense programs and $118 billion to support overseas contingency operations.

"This budget represents a reasonable, responsible, and sustainable level of funding, the minimum level of defense spending that is necessary, given the security challenges we are facing around the globe," said Defense Secretary Robert M. Gates.

The overseas contingency operations portion is $41.5 billion below the Fiscal 2011 request of $159.3 billion, reflecting drawdown in Iraq and a modest decline of operations in Afghanistan. See "Chart Page Special" p. 68.

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Air Force Takes Over MDA Satellite

The Air Force took over operational control of a Missile Defense Agency satellite on Jan. 31. The change gives USAF another tool for monitoring objects in space, and broadens its capabilities in space situational awareness.

The 1st Space Operations Squadron at Schriever AFB, Colo., took over MDA's Space Tracking and Surveillance System Advanced Technology Risk Reduction satellite.

The satellite STSS ATRR reached orbit in May 2009 for use in missile tracking experiments. After 20 months of testing that showed the satellite had operational utility, MDA last November announced plans to transfer the satellite to the Air Force.

The 1st SOPS was expected to assume operational control of the Air Force's Space Based Space Surveillance satellite in February.

No Home on the Range

Some members of the Colorado State House want to make it tougher for USAF to conduct low-level training with C-130s, CV-22s, and other aircraft in the Centennial State and nearby areas of New Mexico.

Colorado State Rep. Wes McKinley (D) and Rep. Edward Vigil (D) introduced a bill, HB 11-1066, seeking to define airspace below 500 feet above-ground-level as private property. The move would block the Colorado part of USAF's proposed low-altitude tactical navigation range, or LATN, through mountainous parts of the two states.

The draft bill, initiated in January, expands the "property owner's right to procedural due process" in eminent domain cases to include airspace, barring military aircraft from uncompensated use. Residents near the Telluride ski and climbing resort worry that aircraft may disturb "visitors and residents who come here to enjoy our tranquil mountain environment," reported the *Telluride Daily Planet.*

Under USAF flight regulations, aircraft are already required to avoid protected wilderness areas, population centers, and civil air traffic during low-altitude training.

Flight Medicine School Migrates

The Air Force School of Aerospace Medicine at Brooks City-Base in San Antonio is relocating to a new facility on the grounds of Wright-Patterson AFB, Ohio, courtesy of BRAC 2005.

The flight-nurse training program had been at Brooks since the early 1960s. In January, more than 300 guests attended the ceremony recognizing the last class of aeromedical evacuation crew members to graduate from flight-nurse training.

"As we go up north, we look forward to this new start as an opportunity to improve on what we already do well," said Capt. Shane House, an instructor at the school.

Crew member training will resume at Wright-Patterson in May.

Biofuel Cocktails for C-17

The Air Force has certified the C-17 to operate unconstrained on fuel blends containing biofuels known as hydrotreated renewable jet fuels, or HRJs.

"This certification marks the Air Force's first platform to be fully certified using an HRJ blend," said Kevin T. Geiss, USAF's deputy assistant secretary for energy.

C-17s may now operate using blends of up to 50 percent HRJ, cut with 50 percent traditional JP-8 aviation fuel

Boeing Wins KC-X Contest

Boeing won the Air Force's KC-X tanker competition in late February, as the Air Force chose its 767-based NewGen Tanker over the A330-based KC-45 that EADS North America proposed.

Now designated the KC-46A, Boeing's new tanker will replace the oldest KC-135s in USAF's inventory. The company received the initial development contract, valued at more than $3.5 billion, to supply the first 18 airframes by 2017. USAF intends to buy 179 KC-46As.

Air Force Secretary Michael B. Donley, announcing the decision Feb. 24, said both companies submitted "awardable" proposals. Deputy Defense Secretary William J. Lynn III, at the same Pentagon briefing, called Boeing the "clear winner." He said the evaluation was "a transparent and an open process" leaving no grounds for protest.

EADS executives announced the following week they would not dispute the Air Force decision, stating that the Air Force did not deviate from the selection process laid out in the KC-X request for proposals.

"While we are obviously disappointed, ... we will not take any action that could further delay the already overdue replacement of the Air Force's aging tanker fleet," stated EADS North America Chairman Ralph D. Crosby Jr. March 4. In a press conference, Crosby claimed Boeing had "significantly lowballed" its bid to achieve its "strategic objectives," and insisted USAF hold Boeing to its proposal. If it fails to do so, EADS "stands ready" with its tanker, Crosby said.

Sen. Patty Murray (D-Wash.), in whose state Boeing manufactures the 767, hailed the selection as right for "our military, our taxpayers, and our nation's aerospace workers."

USAF photo by A1C Katrina R. Menchaca

A search and rescue airman (r) in Sendai, Japan, helps a medical assistance team carefully offload Japanese disaster victims from an HH-60G Pave Hawk. March's catastrophic earthquake and following tsunami resulted in thousands of deaths and left hundreds of thousands injured, without power, and in need of food and water.

Operation Enduring Freedom—Afghanistan

Casualties

By March 15, a total of 1,495 Americans had died in Operation Enduring Freedom. The total includes 1,493 troops and two Department of Defense civilians. Of these deaths, 1,161 were killed in action with the enemy while 334 died in noncombat incidents.

There have been 10,622 troops wounded in action during OEF.

Afghan Air Force Surveys Flood Damage

The Afghan Air Force answered a call from the governors of Herat and Shindand districts in Afghanistan to conduct an aerial survey of the flood-damaged regions in the Zerko Valley, using Mi-17 helicopters.

Flooding in February inundated about 2,000 households, more than double initial estimates, according to USAF's 438th Air Expeditionary Wing, currently advising and mentoring the AAF. Rainwater caused substantial damage to local agriculture.

The Afghans' ability to execute this type of support is an example of the air arm's gradual growth and maturation, said Lt. Cmdr. Mario Salinas, an advisor at the AAF's Shindand Air Base. The Afghans stood ready "to support movement and delivery of humanitarian assistance."

The plan was to distribute blankets, tents, water, and food from the air base to displaced Afghan civilians.

The Importance of Being Civil

The Air Force and special operations community must build civil aviation expertise, Air Force Chief of Staff Gen. Norton A. Schwartz said at a conference on special operations and low-intensity conflict in Washington, D.C.

"Afghanistan sits in a very important place on the planet, and it's a place that, if properly orchestrated, becomes an aviation highway," Schwartz explained. This highway, he continued, might lead to potential income and offer an alternative to the fledging economy's dependence on the narcotics trade.

"This could be a real boon to the Afghan economy and the Afghan government," he said. Civil aviation "brings things to market. It allows people to coalesce. It allows governments to reach out from the center [of their country] to the periphery," said Schwartz.

The importance of civil aviation is well understood by the Afghan government, particularly its transportation minister, Schwartz noted, and US forces have previously aided Iraq in building such capacities, he said.

Less Fuel, More Payload

A combination of shifting cargo to cheaper sea transport and fuel-saving air mobility techniques helped speed delivery of new vehicles to Afghanistan, while saving from $110 million to $116 million a month, US Transportation Command chief Gen. Duncan J. McNabb said at the Air Force Association's Air Warfare Symposium in Orlando, Fla.

During the surge of troops into Afghanistan last year, Pentagon leaders tasked TRANSCOM to accelerate the monthly delivery rate of mine-resistant, ambush-protected all-terrain vehicles, or M-ATVs, from 500 to 1,000, McNabb said. TRANSCOM shipped the vehicles from the US to the Persian Gulf by sea, then sent them the rest of the way by C-17.

Sea transport is cheaper than airlift by far, and that saved substantial money, he said. For the remainder of the trip, "into Bastion or Kandahar or Bagram," C-17s carried less fuel, allowing them to up the M-ATVs per flight from three to five. The move reduced sorties and accelerated vehicle delivery.

or a 25-50-25 mix of HRJ, JP-8, and synthetic paraffinic kerosene, a third type of fuel proved for use in the C-17.

Officials expect to conclude HRJ flight testing on other platforms "within the next 12 months, supporting fleetwide HRJ certification within the next 22 months," confirmed Jeff Braun, head of USAF's alternative fuel certification office.

Actual Mileage May Vary

Air Mobility Command testers have completed an operational evaluation of a new fuel savings concept called Mission Index Flying, or MIF. By calculating optimal altitude and airspeed based on flight conditions, C-17 aircrews minimize flight time and fuel burn using mission software loaded into a laptop computer on the flight deck.

Beginning in mid-January, AMC test directors accompanied 6th Airlift Squadron crews from JB McGuire, N.J., on 15 sorties between the US and Europe.

Pilots assessed the system's effect on flight responsibilities. With data in hand, AMC officials are assessing whether MIF software is effective and suitable for incorporation into the C-17, estimating that the program could reduce fuel burn across the fleet by one to two percent annually.

Don't Wear Out Your PJs

The Air Force urgently needs more pararescue jumpers, but too many people have been washing out of training, so the service is revamping the course, said Gen. Edward A. Rice Jr., head of Air Education and Training Command.

Course improvements include: better preparing candidates before they arrive, standardizing the physical ability stamina test, and testing candidates' psychological state to make sure they have the mental toughness to graduate.

"We tried putting more in the front end, [but] that's not the answer, ... so we've broken down the pipeline ... [to] ensure that those who raise their hand and say, 'I want to do this,' really know what they are getting into and really want to do it," Rice told attendees of AFA's Air Warfare Symposium in Orlando, Fla., Feb. 18.

The command also is insisting that every candidate stay with the program for at least five days or risk getting kicked out of the Air Force altogether.

Please Use Other B-52 Base

The Air Force has dropped plans to re-establish a nuclear weapons storage area at Barksdale AFB, La., Chief of Staff Gen. Norton A. Schwartz said, citing higher funding priorities.

Reopening a nuclear WSA at Barksdale was one component of USAF's nuclear enterprise revitalization announced in 2008.

"We had other more pressing matters ... that required investment that out-prioritized the WSA," Schwartz told the House Armed Services Committee during Fiscal 2012 budget testimony.

Crews and nuclear-capable B-52s from Barksdale will continue regular training at Minot AFB, N.D., he said.

Like Barksdale, Minot is home to a combat-ready B-52 wing, and operates a nuclear WSA. "I don't deny that the optimal solution would be to have two WSAs," admitted Schwartz, adding, "The bottom line is that we think ... the current solution is workable."

A Stealthy New Nuke

The AGM-86 Air Launched Cruise Missile is nearly out of service life and "clearly, now's the time to begin that effort to do the follow-on missile," said

Senior Staff Changes

RETIREMENT: Maj. Gen. Erika C. **Steuterman.**

NOMINATIONS: To be Lieutenant General: Michael J. **Basla,** Ellen M. **Pawlikowski. To be Brigadier General:** Howard D. **Stendahl.**

CHANGES: Brig. Gen. Howard B. **Baker,** from Dir., Log., PACAF, JB Pearl Harbor-Hickam, Hawaii, to Cmdr., AF Global Log. Spt. Ctr., AFMC, Scott AFB, Ill. ... Brig. Gen. Charles Q. **Brown Jr.,** from Cmdr., 31st Fighter Wg., USAFE, Aviano AB, Italy, to Dep. Dir., Ops., CENTCOM, MacDill AFB, Fla. ... Brig. Gen. Arnold W. **Bunch Jr.,** from Dir. & PEO, Fighters & Bombers Directorate, ASC, AFMC, Wright-Patterson AFB, Ohio, to Cmdr., AF Security Assistance Ctr., AFMC, Wright-Patterson AFB, Ohio ... Lt. Gen. Eric E. **Fiel,** from Vice Cmdr., SOCOM, Pentagon, to Cmdr., AFSOC, Hurlburt Field, Fla. ... Brig. Gen. (sel.) Joseph T. **Guastella Jr.,** from Chief, Program Integration Division, DCS, Strat. P&P, USAF, Pentagon, to Dep. Dir., Prgms., DCS, Strat. P&P, USAF, Pentagon ... Brig. Gen. Scott M. **Hanson,** from Spec. Asst. to the Vice C/S, USAF, Pentagon, to Commandant, Air War College, AETC, Maxwell AFB, Ala. ... Maj. Gen. (sel.) James J. **Jones,** from Dep. Dir., Ops., CENTCOM, MacDill AFB, Fla., to Vice Cmdr., 9th Air Expeditionary Task Force, ACC, Southwest Asia ... Maj. Gen. Noel T. **Jones,** from Dir., Strat. Plans & Assessment, US Forces-Iraq, CENTCOM, Baghdad, Iraq, to Dir., Operational Capability Rqmts., DCS, Ops., P&R, USAF, Pentagon ... Brig. Gen. Michael A. **Keltz,** from Dep. Dir., Ops., Plans, Prgms., & Rqmts., PACAF, JB Pearl Harbor-Hickam, Hawaii, to Dir., Strat. Planning & Policy, PACOM, Camp H. M. Smith, Hawaii ... Maj. Gen. Charles W. **Lyon,** from Cmdr., 9th Air & Space Expeditionary Task Force-Afghanistan, Kabul, Afghanistan, to Dir., Ops., ACC, JB Langley, Va. ... Brig. Gen. (sel.) Patrick C. **Malackowski,** from Cmdr., 51st Fighter Wg., PACAF, Osan AB, South Korea, to Vice Cmdr., 13th AF, PACAF, JB Pearl Harbor-Hickam, Hawaii ... Brig. Gen. Jerry P. **Martinez,** from Dep. Cmdr., Political-Mil. Affairs, Combined Security Transition Command, Afghanistan, CENTCOM, Kabul, Afghanistan, to Dir., Jt. Integration, DCS, Ops., P&R, USAF, Pentagon ... Brig. Gen. Thomas J. **Masiello,** from Dep. Asst. Secy., Plans, Prgms., & Ops., Bureau of Political-Mil. Affairs, Department of State, Washington, D.C., to Dir., Special Prgms., Office of the Undersecretary of Defense, Acq., Tech., & Log., Pentagon ... Brig. Gen. Earl D. **Matthews,** from Dir., C^4, TRANSCOM, Scott AFB, Ill., to Dir., Network Svcs., Office of Info. Dominance & Chief Info. Officer, OSAF, Pentagon ... Maj. Gen. William N. **McCasland,** from Dir., Spec. Prgms., Office of the Undersecretary of Defense, Acq., Tech., & Log., Pentagon, to Cmdr., AF Research Lab., AFMC, Wright-Patterson AFB, Ohio ... Brig. Gen. (sel.) Mark M. **McLeod,** from Assoc. Dir., Program Integration, DCS, Log., Instl., & Mission Spt., Pentagon, to Dir., Log., PACAF, JB Pearl Harbor-Hickam, Hawaii ... Brig. Gen. (sel.) Linda R. **Medler,** from Dep. Chief, Info. Officer, Jt. Staff, Pentagon, to Asst. Dep. Dir., Netcentric Capabilities, Jt. Staff, Pentagon ... Brig. Gen. (sel.) Matthew H. **Molloy,** from Cmdr., 1st Fighter Wg., ACC, Langley AFB, Va., to Cmdr., 18th Wg., PACAF, Kadena AB, Japan ... Lt. Gen. (sel.) Ellen M. **Pawlikowski,** from Cmdr., AF Research Lab., AFMC, Wright-Patterson AFB, Ohio, to Cmdr., SMC, AFSPC, Los Angeles AFB, Calif. ... Brig. Gen. (sel.) Richard S. **Stapp,** from Chief, Aerospace Sustainment, Ogden ALC, AFMC, Hill AFB, Utah, to Dep. Dir., Rqmts., Jt. Staff, Pentagon ... Brig. Gen. (sel.) David R. **Stilwell,** from Spec. Asst. to the Dep. Undersecretary of the AF, Intl. Affairs, Washington, D.C., to Defense Attaché, Beijing, PACOM, DIA, Beijing ... Brig. Gen. David D. **Thompson,** from Vice Cmdr., USAF Warfare Ctr., ACC, Nellis AFB, Nev., to Dir., Air, Space, & Cyberspace Ops., AFSPC, Peterson AFB, Colo. ... Brig. Gen. Gregory J. **Touhill,** from Defense Attaché Kuwait, US Embassy, DIA, Kuwait, to Dir., C^4, TRANSCOM, Scott AFB, Ill. ... Brig. Gen. Jack **Weinstein,** from Dep. Dir., Prgms., DCS, Strat. P&P, USAF, Pentagon, to Dir., Prgms., DCS, Strat. P&P, USAF, Pentagon ... Brig. Gen. Scott D. **West,** from Vice Cmdr., 13th AF, PACAF, JB Pearl Harbor-Hickam, Hawaii, to Dep. Dir., Ops., Plans, Prgms., & Rqmts., PACAF, JB Pearl Harbor-Hickam, Hawaii ... Brig. Gen. Kenneth S. **Wilsbach,** from Cmdr., 18th Wg., PACAF, Kadena AB, Japan, to Dep. Dir., Ops., PACOM, Camp H. M. Smith, Hawaii ... Brig. Gen. Tod D. **Wolters,** from Dir., Air, Space, & Cyberspace Ops., AFSPC, Peterson AFB, Colo., to Cmdr., 9th Air & Space Expeditionary Task Force-Afghanistan, Kabul, Afghanistan ... Brig. Gen. (sel.) Scott J. **Zobrist,** from Cmdr., 388th Fighter Wg., ACC, Hill AFB, Utah, to Cmdr., 31st Fighter Wg., USAFE, Aviano AB, Italy.

SENIOR EXECUTIVE SERVICE CHANGES: Ava Sue **Dryden,** to Dep. Dir., Log., DCS, Log., Instl., & Mission Spt., USAF, Pentagon ... Gordon M. **Ettenson,** to Dep. Dir., Ops., DCS, Ops., P&R, USAF, Pentagon ... Michael A. **Gill,** to Exec. Dir., Ogden ALC, AFMC, Hill AFB, Utah ... Patsy J. **Reeves,** to Dir., Contracting, AFMC, Wright-Patterson AFB, Ohio. ▪

Lt. Gen. James M. Kowalski, Air Force Global Strike Command chief.

A future standoff cruise missile is planned "in the long-range strike family of systems," Kowalski told reporters at AFA's Air Warfare Symposium in Orlando, Fla., in February. He underscored that any new design must equally account for the unique demands of the nuclear as well as conventional missions.

Air Force officials need to "make sure it's matched with the right warhead ... [and] has command and control surety we need," he said. Though much will depend on the nature of the future aircraft that will carry the weapon, what is certain today is that it must be stealthy.

"We'll need to look at the anti-access, area-denial capabilities," he explained, adding the missile "needs to do some penetration, obviously."

Satellite Training Center Debut

Air Force Space Command's new satellite operator training facility is up and running at Schriever AFB, Colo.

The Standard Space Trainer Integrated Training Center, or SST, features large, high-definition monitors on the walls and multiple computer workstations dedicated to training airmen to operate USAF's satellites.

Col. Michael Mason, vice commander of Schriever's 50th Space Wing, said the center is a big improvement over the previous facility. It offers a common training architecture, versus the previous mix of different hardware, operating systems, and proprietary software.

"The flexibility and versatility of this system is absolutely amazing," said Mason. Instructors are already training Defense Satellite Communications System operators.

Next year commences Wideband Global Satellite Communications system training, followed by instruction on an ever-expanding roster of satellites over the next five years.

Work on the training center began in 2006, culminating in the ribbon-cutting Feb. 4.

Embraer Jumps Into the Fray

Brazilian aircraft maker Embraer has teamed with Sierra Nevada in the competition to supply the Air Force's Light Air Support platform.

Embraer's Super Tucano is pitted against the team of Hawker Beechcraft and Lockheed Martin on Hawker's AT-6. The Air Force wants an airframe with which to build a cadre of USAF instructors to train pilots of partner air forces in light attack and counterinsurgency.

The LAS contract award is expected in June; the Air Force will oversee the additional acquisition of 20 LAS airframes for the Afghan Air Force.

Flightglobal reported US-based Sierra Nevada would function as prime contractor, building Embraer's Super Tucano aircraft in Jacksonville, Fla., should the Air Force select the aircraft.

Hawker AT-6 Tests

The Air Force started flight testing a Hawker Beechcraft AT-6 light attack aircraft in late March to certify the type to carry precision guided ordnance, according to the company. Weapons trials are the second stage of a congressionally funded, $15.4 million evaluation led by the Air National Guard, according to Derek Hess, Hawker's director of light attack programs.

At the Gila Bend range in Arizona, testers assessed the aircraft's ability to employ laser- and GPS-guidance-aided munitions, using an onboard mission system provided by Hawker's industry partner and primary integrator, Lockheed

Martin. The gear was adapted from the company's A-10C suite.

Stage 1 evaluated the AT-6's combat sensors and communications, said Hess. He emphasized that the tests are separate from USAF's Light Attack Armed Reconnaissance competition.

Green Fuel

The Environmental Protection Agency recognized the Air Force in its Top 25 list of 2010 green power partners.

USAF purchased or produced a total of 243.9 million kilowatt-hours of so-called "green power" or renewable energy last year, according to the list, issued in February. That placed the Air Force at the top in the Defense Department, and No. 2 in the federal government, for buying renewable energy.

Among EPA's 1,300 green power partners, the Air Force ranked 15th for its use of renewable energy, with more than six percent of all energy that Air Force facilities consume coming from "green power." The percentage is expected to spike to 10 percent by 2015.

"This year we expect to begin construction on at least a dozen more renewable energy projects, including two new solar arrays in Arizona," said Ken Gray, Air Force Facility Energy Center rates and renewable energy branch chief at Tyndall AFB, Fla.

Air Force Works To Close Air Alert Gap

The Air Force and Air National Guard are working to alleviate the rapidly approaching shortfall of fighter aircraft to perform the air sovereignty alert (ASA) mission, the bulk of which falls to the Air Guard.

One of the solutions could be to procure new-build F-15 or F-16 fighters in the interim until the fifth gen F-35 Lightning II stealth fighter is fielded in the Air Guard in sufficient numbers, Lt. Gen. Harry M. Wyatt III, ANG director, said April 22 on Capitol Hill.

"Certainly, there are fourth generation, 4.5 generation options out there," Wyatt told the House Armed Services subcommittee on readiness. The Air Guard is preserving such options, he said.

Under current plans, the Air Force's purchase of F-35s to recapitalize much of the fighter force will not meet Air Guard needs since eight of the 11 ANG F-16 units conducting ASA missions have aircraft that reach the end of their service lives between 2015 and 2017, Wyatt said.

While the Air Guard had made "some progress" in working with Air Combat Command to accelerate the fielding of the F-35 and F-22 Raptor into ANG units, the prognosis is that the Air Guard will receive the new fifth gen fighters "about 10 years late to need," he said.

In Wyatt's view, the decision on the right platform "should be driven" by the importance of the ASA mission. It should also take into account that Air Guard units performing the ASA mission must also deploy overseas with their aircraft.

Secretary of Defense Robert M. Gates announced April 6 his decision to retire 250 legacy Air Force fighters in Fiscal 2010 and accelerate the fielding of the F-35. Boosting F-35 production rates would help address the upcoming shortfall, Air Force officials have said, but in the short term, F-35 buys are actually being cut to allow for additional testing.

Desert Way Point in Ethiopia

The Air Force is upgrading an Ethiopian airport such that it can accommodate USAF airlifters.

After signing an agreement with the Ethiopian government last November, the Air Force is helping to modernize Arba Minch Airport in the country's southwest, according to the *Addis Fortune* newspaper.

Workers are extending the airport's 9,170-foot, hard-surface runway, and

USAF photo by SSgt. Angelita M. Lawrence

C-130 pilot Capt. Ryan Wong performs a preflight walk-around check during exercise Cope North at Andersen AFB, Guam. Cope North is a bilateral training exercise between USAF, the Navy, and the Japan Air Self-Defense Force, designed to improve interoperability between the aerial forces of the US and Japan.

making facility and service improvements, according to the report. The airport is located about 300 miles south of the country's capital, Addis Ababa.

DFC for WWII Airman

A World War II B-24 bomber pilot narrowly missed receiving a long-delayed decoration in person in February.

William Wrenn posthumously received the Distinguished Flying Cross for a reconnaissance mission over the Philippines, prior to the Battle of Leyte Gulf in October 1944.

Wrenn and his crew braved antiaircraft fire to provide intelligence on the location of Japanese warships. The mission was until recently classified, long delaying Wrenn's rightful recognition.

Before Air Force officials from Offutt AFB, Neb., could present him the DFC, however, Wrenn died Feb. 7 in Columbus, Neb., reported the *Columbus Telegram.* Wrenn's wife, Evelyn, accepted the medal on her husband's behalf.

WWII Airmen Remains Recovered

The Defense Department announced that forensic specialists identified the remains of 11 airmen missing in action since 1943, returning the remains to family for burial with full military honors.

Members of a B-24D bomber crew were lost on a mission Nov. 20, 1943, from Jackson Airfield, Port Moresby, New Guinea. DOD recovered remains from the crash in Papua New Guinea's Morobe province between 1984 and 2004. They were recently ID'd.

Airmen identified are:

- 1st Lt. Richard T. Heuss, 23, Berkley, Mich.
- 2nd Lt. Edward R. French, 23, Erie, Pa.
- 2nd Lt. Robert A. Miller, 22, Memphis, Tenn.
- 2nd Lt. Robert R. Streckenbach Jr., 21, Green Bay, Wis.
- TSgt. Charles A. Bode, 23, Baltimore
- TSgt. Lucian I. Oliver Jr., 23, Memphis, Tenn.
- SSgt. Ivan O. Kirkpatrick, 36, Whittier, Calif.
- SSgt. James B. Moore, 21, Woburn, Mass.
- SSgt. James T. Moran, 21, Sloatsburg, N.Y.
- SSgt. William K. Musgrave, 24, Hutsonville, Ill.
- SSgt. Roy Surabian, 24, Medford, Mass.

Bode was buried Feb. 11 at Arlington National Cemetery. A group burial was planned for March 24 for the crew. ■

USAF photo by SrA. Brett Clashman

SSgt. Brett Hurley puts military working dog Rex through his paces at an obstacle course at Bagram Airfield, Afghanistan. Military working dogs train continuously. In 2000, Congress changed a law that required some working dogs be euthanized after "retirement age." Now, they may be adopted—and they often are by their handlers.

News Notes

■ Boeing delivered the 60th C-17 to JB Charleston, S.C. Assigned to the 437th Airlift Wing there, the aircraft flew from Boeing's C-17 assembly plant in Long Beach, Calif., Feb. 3, piloted by Pacific Air Forces commander Gen. Gary L. North.

■ Air Force senior leaders directed the US Air Force Academy to reduce its cadet population from 4,400 to 4,000 by October 2012, as part of personnel cuts to meet mandated force levels. For prospective cadets, the change will mean even tougher admissions criteria.

■ F-16s and a KC-135 of the Iowa Air National Guard 132nd Fighter Wing and 185th Air Refueling Wing joined the Royal Australian Air Force at Williamtown in New South Wales for three weeks of air combat exercises. ANG units arrived in Australia for Sentry Down Under Feb. 13.

■ The National Museum of the US Air Force received a $5 million donation from Boeing, allowing groundbreaking for a new 200,000-square-foot hangar this spring. The hangar will house the museum's Presidential, aerial refueling, and cargo aircraft and space gallery, opening in 2014.

■ Australia's Defense Ministry sent a letter March 1 to the US government, expressing interest in a fifth C-17 for the Royal Australian Air Force under a potential foreign military sale. Australia is considering the aircraft to fulfill a shortfall in combat and humanitarian airlift capacity.

■ The Air Force is repaving the 10,870-foot runway, taxiways, and associated overruns at Lajes Field in the Azores. USAF is funding the majority of the $7 million project, with Portugal contributing $1.26 million toward the effort. Flight operations are slated to continue unimpeded.

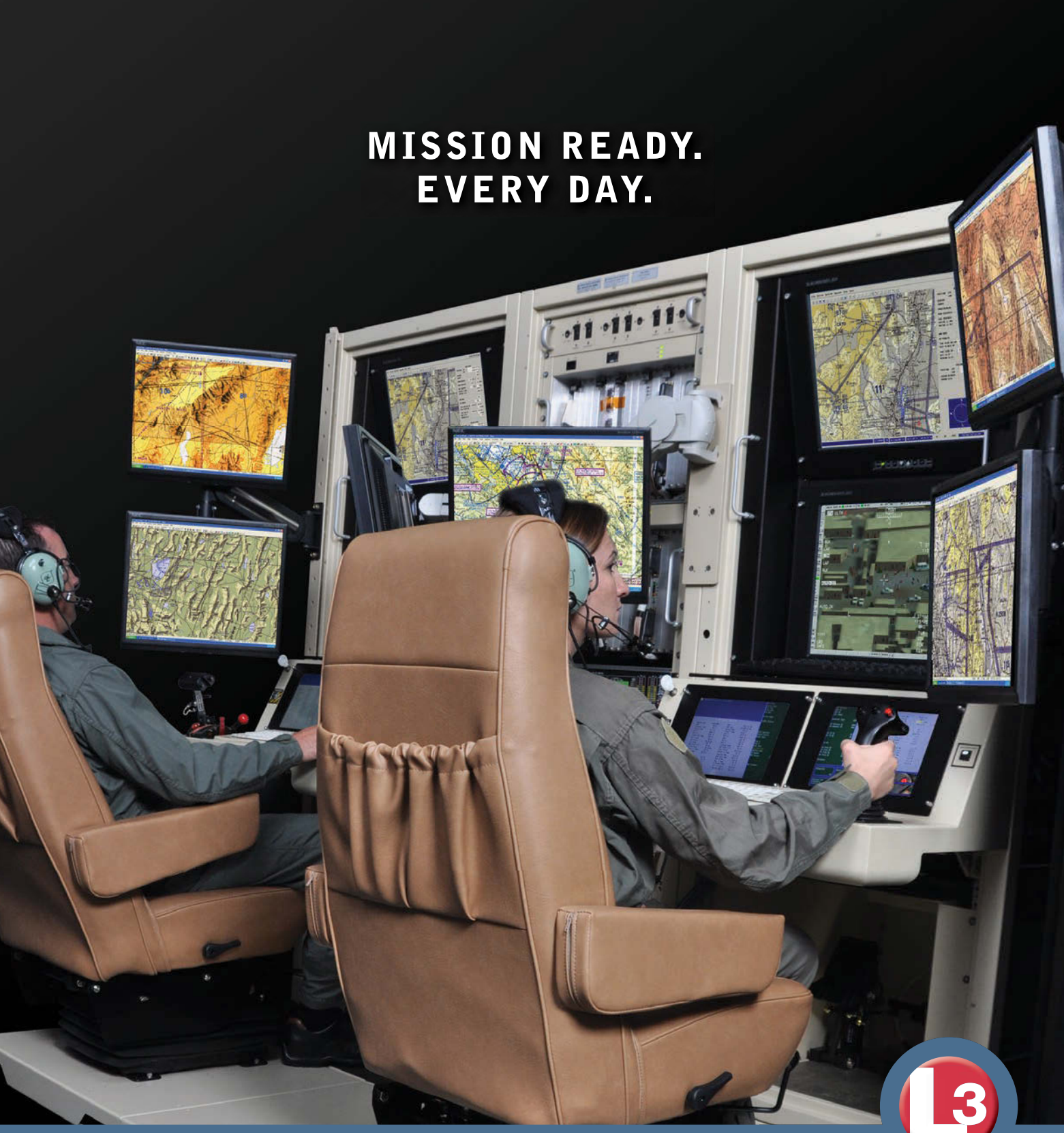
■ AF-6, the first F-35A production aircraft, made its inaugural flight from Lockheed Martin's assembly plant in Fort Worth, Tex., Feb. 25. The one-hour flight evaluating basic flight maneuverability and engine performance was "rock solid," according to the company's test pilot.

■ Three Air Force Academy graduates led space shuttle *Discovery* on its final scheduled mission, STS-133, lifting off from Cape Canaveral AFS, Fla., Feb. 24. Flying the International Space Station support mission were pilot Col. Eric A. Boe, mission commander Col. Steven W. Lindsey, and mission specialist Col. Alvin Drew, along with three other crew members.

■ First Lt. Candice Killian became the first qualified female CV-22 pilot in the Air Force in February. A graduate of the Air Force Academy and the 97th CV-22 pilot overall, Killian was to be assigned to Hurlburt Field, Fla.

■ Northrop Grumman's X-47B naval unmanned combat demonstrator aircraft flew for the first time, at Edwards AFB, Calif., Feb. 4. The Navy will commence carrier trials with the aircraft in 2013, testing if shipboard operations with a tailless fighter-sized aircraft are feasible.

■ General Atomics Aeronautical Systems announced it had signed a memorandum of understanding in February to sell its export version Predator XP remotely piloted aircraft to the United Arab Emirates. The US government approved export licensing of the RPA last year. ■



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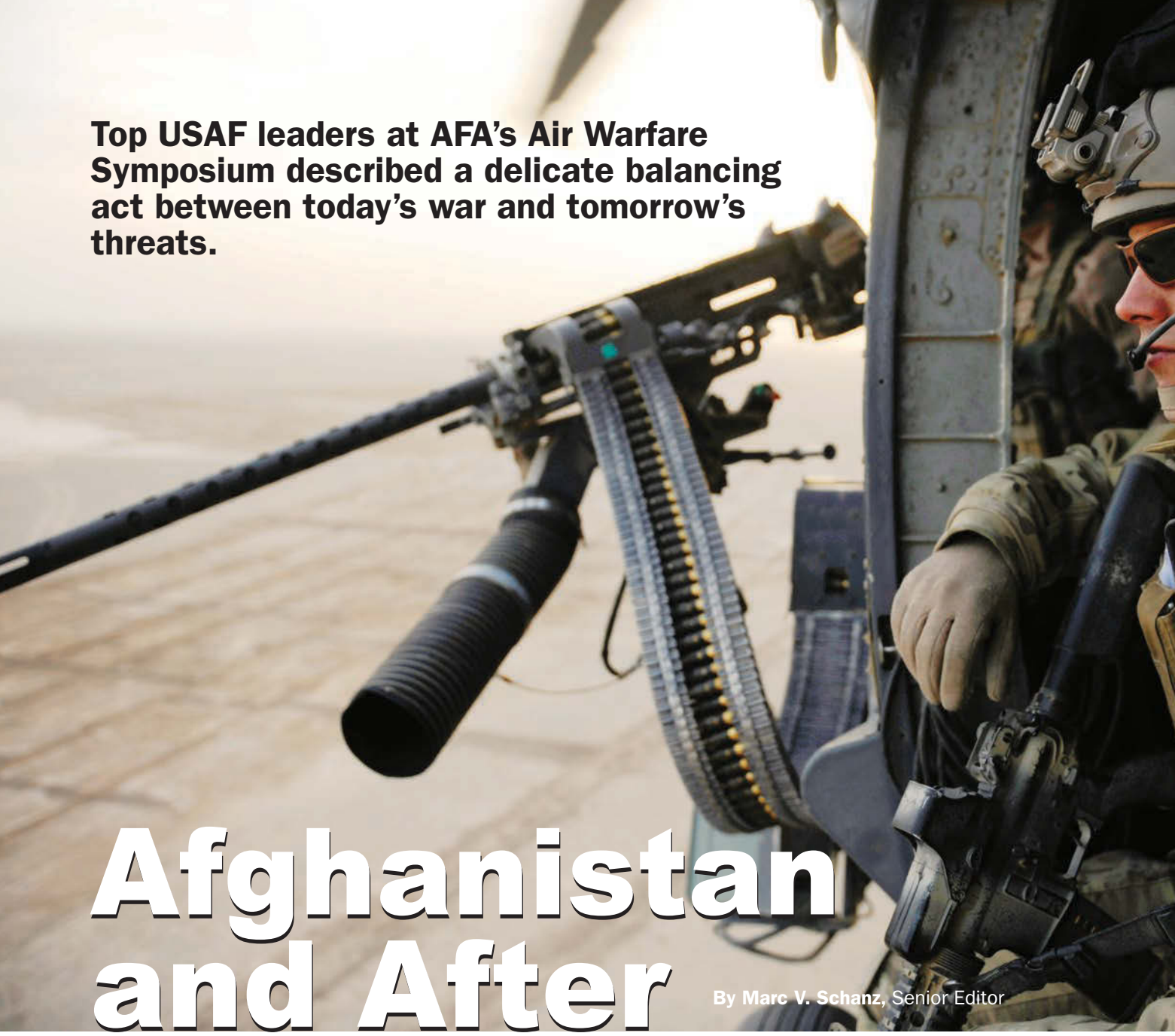
Top USAF leaders at AFA's Air Warfare Symposium described a delicate balancing act between today's war and tomorrow's threats.



Afghanistan and After

By Marc V. Schanz, Senior Editor

The Air Force is closing in on 10 years at war in Afghanistan, and the unrelenting combat operations tempo actually stretches back much further—to the days of Operation Desert Storm in 1991. This is not a steady state, however—top Air Force leaders speaking at the Air Force Association's Air Warfare Symposium in Orlando, Fla., this February said airpower is busier than ever in the ramped-up Operation Enduring Freedom campaign.

Air strikes and close air support sorties are reaching record highs, as US and NATO forces pound Taliban and militant sanctuaries across Afghanistan. In January 2011, NATO aircraft fired guns and dropped munitions during 387 sorties—up from 157 similar sorties in January 2010.

In the six months leading up to February 2011, allied air units flew 3,723 weapons sorties, while special operations raids increased and captured or killed thousands of militants. Airdrops and airlift routinely broke new records, as the raw airdrop poundage over Afghanistan has nearly doubled every year since 2006.

Attention to Afghanistan is balanced by the Air Force leadership's desire to find a proper "balance" between investment tailored for current or future threats. This often manifests itself in debates over how to best address the problems with USAF's beat-up legacy force structure.

Various commanders made clear they are dealing with a daunting range of new and emerging threats and strategic difficulties. The concerns range from instability and drug-, weapon-, and human-trafficking in South America, to missile defense cooperation in Europe, to the proliferation of anti-access and area denial weapons by "near peers" in the Pacific.

"It's a critical time [for the Air Force], both operationally and fiscally," said Air Combat Command's Gen. William M. Fraser III. The Air Force must be prepared to win any manner of conflict, build lasting partnerships, and bring "unique and ... tailored" effects to its different theaters of operation.

USAF photo by SSgt. Eric Harris

Afghan operations are performed in a permissive environment, several leaders noted, allowing US and allied forces to leverage their mastery of air and space. "Our ability to establish air dominance has been so powerful that it's created expectations that are going to be difficult to back away from," said Gen. Mark A. Welsh III, commander of US Air Forces in Europe.

Proliferating Threats

The proliferation of advanced technology raises concerns about how long the Air Force will enjoy air dominance. Within the last year, both Russia and China have unveiled stealth fighter variants publicly—first the Russians with the PAK FA beginning test flights in January 2010, then this past January, the Chinese with flight testing of their J-20 advanced fifth generation fighter.

"I don't know what the actual capability of either of those new stealth platforms ... is," said Welsh. "It took us a long time to get from rollout to where we are today, so I suspect it will take them at least that long, if not longer. I know people can say that's a dangerous assumption, but you have to make assumptions when you're prioritizing resources."

With both high end and low end budget demands, Welsh said prioritizing is key. The Air Force's fighters must be capable of operating in an environment where they face advanced threats, and even legacy assets such as fourth generation fighters must have upgraded tools such as radars to survive.

"The force structure mix we have in the future is going to have to be based on the realities of today," Welsh said. "I think we need fifth generation capability. I don't think we can afford 100 percent of our fleet to be fifth generation in the near term."

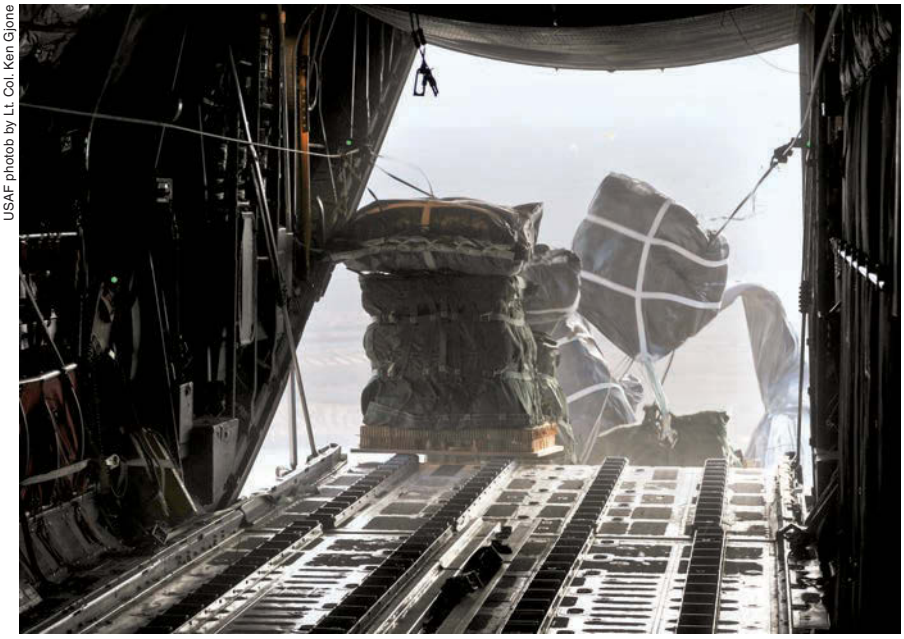
Welsh, however, does not see his theater as posing the greatest need. "I believe the Pacific theater ought to drive the prioritization for investment," he said.

The fastest proliferating threat to US forces in the Pacific is cheap ballistic missiles which can threaten forward bases thousands of miles from mainland Asia, noted Gen. Gary L. North, commander of Pacific Air Forces. Potential adversaries in the region can make missiles faster than "we [can] make anything," North said, and if you can't match these weapons, you must be able to counter them.

Improving USAF's F-22s becomes even more vital in this context, as does bilateral and multilateral interoperability in the Pacific. North noted he arrived in Florida from Guam, where

Left: Capt. Nick Morgans, a pararescueman, scans his sector during a mission near Kandahar, Afghanistan. Below: Pararescuemen pick up a wounded soldier. As a career field, pararescue is seeing personnel shortages, despite being considered high priority.

USAF photo by SSgt. Eric Harris



USAF photob by Lt. Col. Ken Gjone

to become as modern as they can be," North added.

USAF modernization, meanwhile, is stagnating. "How do we do our mission with a fleet that is aging, and frankly, a fleet we are flying much more than projected?" he asked.

The Air Force's fleet age is hovering around 25 years, and even the C-17 fleet (which will close out with 221 airframes) has already racked up more than two million flight hours.

The airlifter is prized for its versatility and reliability, and has often been at the forefront of responses to various contin-

Left: Supply pallets are dropped to ground forces in Afghanistan from a C-130. Below: A1C Jeffery Westmoreland communicates by satellite radio with the tactical operations center during New Horizons Panama 2010, a medical and humanitarian exercise.

USAF photo by TSgt. Sean Worrell

PACAF had just launched the bilateral exercise Cope North with Japanese forces. One of the reasons USAF has based Global Hawk ISR aircraft on Guam is because there are nations in the region that are interested in improving their ISR capabilities. The ability to share intelligence with allies will be very important in the years ahead.

"There are nations that are rapidly outsizing our numbers," North said. "So training and technology [are] very important."

A Modern China

Future threat environments would not be as permissive as what the US sees in Afghanistan, and the Air Force must be prepared to operate in them.

Potential "strategic adversaries" have taken advantage of their own tailored investments and have designed forces and tools to challenge the ability of the US to project military power and maneuver, North said.

As the US focused on Iraq and Afghanistan, Chinese military forces modernized significantly, he noted. In 2000, less than 10 percent of the Chinese air forces were considered "modern," North said, as in fielding fourth generation equivalent fighters and double-digit surface-to-air missiles such as the SA-10, SA-20, and HQ-9.

By 2009, the People's Liberation Army Air Force boasted a fighter force considered 25 percent modernized, with aircraft such as the Su-27, the F-10, and the FB-7, and 45 percent of Chinese air defense systems considered modern. "As they structure into the next 10 to 15 years, their goal obviously is

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contingencies across the Pacific and the world.

Part of the surge in C-17 use came because of last year's Iraqi drawdown and the force buildup in Afghanistan. "We've really maximized our asset and ... that pays big dividends," said US Transportation Command's Gen. Duncan J. McNabb, who noted that all sensitive war materiel is flown in to Afghanistan by military airlift.

The sheer amount of movement through Iraq and Afghanistan required new and expanded overland logistics lines as well, McNabb said.

Utilizing routes from the Baltics down to the Caucasus known as the Northern Distribution Network, TRANSCOM has rerouted cargo heading into Afghanistan away from volatile Pakistani land routes. The amount of cargo going by land through Pakistan has been greatly reduced, McNabb noted. The northern network now carries 35 percent of cargo, up from 30 percent last spring.

Creative Employment

Pakistan is an ally in the war effort, but al Qaeda and the Taliban have been able to hide and operate from the vast, largely ungoverned tribal areas near the border with Afghanistan.

"The question right now is, what are we going to do to sustain the security of the United States as we work with emerging threats … while not allowing a guy to end up in Times Square with a homemade bomb?" Lt. Gen. Donald C. Wurster, head of Air Force Special Operations Command, asked rhetorically. "It doesn't take a lot of money in certain places, but it takes some," he added, saying USAF needs focused investment in areas such as ISR and cyber warfare capabilities.

"And we've got to count on the people we have to creatively employ this stuff," Wurster said. AFSOC's air commandos must operate in "enemy seams," he added.

The CV-22 program, he noted, is roughly halfway through its 50-airframe production run, and is altering the ability of special operators to carry out missions due to its speed and range. Special operators don't "knock down" integrated air defenses, he noted, but for the 85 percent of places AFSOC needs to go, it is developing a good fleet to carry out the mission. AFSOC's 16-airframe-strong CV-22 fleet (as of February) is receiving a tough trial in Afghanistan, Wurster noted, calling the conflict "probably the most difficult environment for any vertical lift platform," due to its altitudes, the corrosive dirt's effects on compressor blades and power turbines, and other difficulties.

At the other end of the spectrum, USAF must keep its focus on security cooperation activities and irregular conflict outside of Southwest Asia. Wurster noted special operations forces growth has continued unabated, in the Army, Navy, and Marine Corps special operations groups. With this expansion, once the troop levels in Afghanistan begin to come down, these forces will gradually return to their traditional missions—partnering with nations around the world to hunt terrorists and other low-visibility missions. This has spurred AFSOC to examine forward basing certain key assets in Europe and the Pacific in the near future, such as the CV-22, he said.

"The question for us is, will we have the right amount of air—and the right amount postured in the right places?" he said.

"In the 20 years I've been doing this, I've never heard any [SOF customer] come up to me in the past and say 'You know, I've just got too much air.'"

The Nuclear Force Needs Are Known

The average age of Air Force Global Strike Command's three main bomber and ICBM fleets, consisting of two nuclear-capable bomber types and the Minuteman III missile, is more than 40 years old. This age "includes our 'new' 22-year-old B-2s," AFGSC commander Lt. Gen. James M. Kowalski said at AFA's Air Warfare Symposium in Orlando, Fla., Feb. 18.

Critical items such as Minuteman launch facilities are even older, with most systems and equipment dating to the early 1960s, he noted. Modernizing the Minuteman III fuse system is AFGSC's highest funding priority over the next five years, though maintaining the edge of the B-52 and B-2 fleets is close behind, Kowalski said.

Minuteman III modernization is under way to extend its viability through 2020, he noted, and GSC is working with Air Force Materiel Command to make it last until 2030, as required by Congress. During the second phase, "ICBM facilities are going to be a major focus," assured Kowalski.

The Air Force expects the B-52 and B-2 to serve through 2040 at least, when the B-52 will have been in service almost 80 years.

"The B-52's an amazing aircraft, but we're going to need to manage the modernization and sustainment closely to keep it effective," extending from "airspace access upgrades" such as new radar, to mundane items such as a remediated anti-skid braking system, Kowalski explained.

To remain potent, the B-2 requires an extremely high frequency satellite communications upgrade to maintain proper nuclear command and control, and a modernized defensive management system. The latter is deemed "critical" to holding at threat targets considered "most dear to any adversary," Kowalski emphasized.

Continued substantive investment in the US nuclear stockpile is essential, said Gen. C. Robert Kehler, head of US Strategic Command, because the reliability of the nation's warheads depends on the stockpile complex.

From the STRATCOM commander's perspective, "My No. 1 concern is to make sure the stockpile is safe, effective, and able to support the deterrence needs, ... and that's where, in my view, we need to make sure that the investment is going to continue," Kehler said.

It will take more than just funding some new weapons or infrastructure improvements to bring the nation's nuclear capability back to where it needs to be, according to Kehler, who said the recent New START has put some welcome political attention on the nation's atrophied nuclear weapons infrastructure, but just adding money will not bring the strategic deterrent up to par.

"We've got to restore the scientific and intellectual edge and attract our best and brightest talent to this field," Kehler adjured, noting that successful deterrence demands a "keen and current knowledge of our potential nuclear adversaries," as well as a hearty intellectual base.

US strategic forces face a wide variety of traditional and nontraditional adversaries, Kehler said. Dealing with them will demand that the neglected nuclear sustainment enterprise be refurbished at the same time nuclear forces be modernized such that they are "equipped and capable of deterring future threats."

Despite the monumental task ahead, "I am one of those people who believes that with challenge comes opportunity," he asserted. "I am encouraged by the opportunities that we have."

New START provides a path ahead, Kehler added.

—Aaron Church

USAF photo by TSgt. Chad Chisholm

An A-10 lands at Kandahar Airfield, Afghanistan. Air strikes and close air support sorties are reaching record highs.

A good deal of personnel and resources are tied up in Afghanistan, though. Fraser said the Air Force still has a near-term ISR focus, and is pushing to grow to 65 combat air patrols of MQ-1 Predator/MQ-9 Reaper aircraft by 2013—with the 48th CAP having stood up in February. Despite developmental issues with the Air Force's Gorgon Stare sensor package, Fraser said he did not expect any delay in deploying the system to theater by March—and USAF anticipates learning more about the system once it deploys.

The service is normalizing MC-12 operations, Fraser said, and is examining basing options around Beale AFB, Calif., for a portion of the fleet. Upgrades to the aircraft's ISR sensors are also needed, in order to match up with improved distributed mission operations on the ground.

Fraser also noted the Air Force is pushing replacement combat search and rescue HH-60 Pave Hawks into the theater, though they are arriving "late to need." The Air Force just received the first two combat-loss replacement UH-60M airframes in February, and they must still undergo modifications to make them combat search and rescue capable.

The Air Force's reserve components have become a fully operational reserve over the last 10 years. The Air National Guard and Air Force Reserve are responsive, equal partners with the active duty in Southwest Asia. "The phone never stops ringing, and it's a worldwide commitment," said Lt. Gen. Harry M. Wyatt III, ANG director.

He noted the Air Guard now provides 31 percent of USAF's fighter force structure, 31 percent of its airlift, and 15 percent of its ISR capability—a number creeping higher due to the Guard's growing involvement in the remotely piloted aircraft mission.

The Guard is able to leverage its volunteer force in emerging missions such as RPA operations which directly contribute to combat today, he noted, particularly if their civilian jobs have a fair amount of crossover. He noted that US Customs and Border Protection is paying attention to where the Air Guard is bedding down RPA units, as the civilian agency establishes its own RPA force for the purpose of border protection.

Critical Career Fields Hit

Both the Reserve and ANG depend on high volunteerism to fill their ranks and maintain their role in the Total Force. The heavy operations tempo is straining the manpower of the reserve components, and the Air Force's move to a standard 179-day air and space expeditionary force rotation won't affect mobilizations adversely, but some flexibility must be accounted for, both Wyatt and AFRC head Lt. Gen. Charles E. Stenner Jr. said.

Maintaining a one-to-five deployment-to-dwell ratio would be ideal, since dropping below this damages retention in critical career fields. Also, since both AFRC and ANG have benefited from supplemental war funding for operations in Iraq and Afghanistan, the influx of money has masked real shortfalls in operations budgets. Stenner said AFRC leaders are attempting to readjust, as these contingency funds gradually diminish.

High demand is straining manning for RPA operations, which is why USAF

USAF photo by A1C Julian North

Airmen at Andersen AFB, Guam, greet the crew and pilots of F-22s deployed from Elmendorf AFB, Alaska. The F-22s are part of a rotating theater security package for the Pacific region.

USAF photo by SSgt. Andy M. Kin

Maintenance technicians in Southwest Asia prepare an RQ-4 Global Hawk for a mission. High demand for ISR in the region is straining manning for RPA operations.

will increase crew ratios once the 65 CAP target is hit, Fraser said.

Gen. Edward A. Rice Jr., head of Air Education and Training Command, told reporters the Air Force has stood up a new office within AETC to act as a "learning office," which will help ensure the command's processes, courses, and curriculum are up-to-date, particularly with preparing and grooming the growing ranks of RPA operators and analysts.

AETC is currently five percent shy of meeting its throughput requirements, Rice said in February. This creates a disproportionate problem, however, because the shortages are in high priority career fields such as pararescue jumpers, cryptologists, cyber systems operators, and other career fields with long training pipelines and tough entrance requirements.

Across the enlisted force, there are signs a decade at a war footing is taking a toll, CMSAF James A. Roy said. He cited statistics, such as alcohol-related incidents hovering around 7,000 and 3,600 ground safety incidents recorded in Fiscal 2010, as well as a rise in divorce rates and abuse cases. The 2011 suicide rate has already surpassed the 100 airmen suicides recorded in Fiscal 2010, he warned.

"People matter. [A resiliency] culture is the right thing to do for our airmen, our families, and our United States Air Force," Roy said. "Our airmen and their families are the most important resource, asset that we have. We've got to take that into consideration."

US Southern Command's Gen. Douglas M. Fraser said while he does not see a traditional military threat to the United States in his region, trafficking networks dealing in drugs, weapons, and people generate $394 billion each year and create great instability in areas of Latin America. While US assistance to Colombia over the last 10 years has helped the country clamp down on drug smuggling routes, many networks have shifted to Venezuela and other areas.

USAF must work to close the capability gap between American forces and those of the countries it is attempting to assist. Guatemala, for example, has a 1,000-man air force, but 90 percent of its expenditures are on manpower and the nation has limited air assets. For those places, we "need high reliability, low-cost systems," such as light airlift and ISR aircraft, Fraser said. There is also opportunity in the region to use platforms such as the MC-12, an aircraft Fraser wants to see in his region.

Data Sharing Is Critical

Welsh said it is clear the Air Force must pay close attention to international integration, cooperation, and data sharing—especially, in Europe, for efforts involving missile defense.

"There are very few people who understand all the pieces of it very well," Welsh said of missile defense. For NATO and its allies to achieve success in this mission, there needs to be better understanding of basic concepts of operations, timelines, and authorities to carry out missile intercepts. Data sharing, between the US and its allies, between allied ministers and their military leaders, is critical for missile defense to succeed in Europe, he added.

USAF photo by Capt. Thomas Crosson

An F-16 from the 23rd Expeditionary Fighter Squadron taxis after a flight in Lithuania. The squadron participated in NATO's Baltic air policing mission, which provides 24-hour security over Lithuania, Latvia, and Estonia.

Improving operations with allies will require revision or elimination of many of the limitations allies place on the use of force. "The NATO air policing mission that's been going on so successfully for so many years is still impacted every day by these caveats and restrictions," Welsh noted.

Cooperative air policing activities and more sophisticated efforts such as missile defense are closely related, he added. "The success of the NATO integrated air defense system ... [makes] it very clear to me that missile defense cannot be a stand-alone mission in NATO," Welsh said. "It has to be part of an integrated air and missile defense architecture, and that's what we're driving toward." ■

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There are only ugly budget choices ahead.

Flatline Dan

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ger

By John A. Tirpak, Executive Editor

An F-35 soars over the Arizona Meteor Crater during a test flight. Both Russia and China have flown prototype fifth generation fighters that could someday pose a challenge to the Lightning II.

The message from top Air Force leaders at AFA's Air Warfare Symposium in February was straightforward: Flat or declining budgets are conspiring with escalating costs to sharply narrow the Air Force's financial options over the coming years. Excellent management will therefore be needed to get through a protracted period of financial austerity.

Air Force Secretary Michael B. Donley said he and Chief of Staff Gen. Norton A. Schwartz "have noted a distinctly different budget climate this year," so Pentagon wishes to grow the defense budget in real terms for a few years—before leveling off—are probably unrealistic.

"We're living with flat budgets," Donley told reporters. "They may go down a little bit. We don't know if or when those budgets will increase." The money expected to be available is already spoken for, Donley asserted: With the KC-X tanker to build, a new-start bomber, a backlog of satellites, and large upcoming buys of the F-35 fighter, "we have a very full plate of acquisition priorities."

Moreover, several urgently needed programs "are not funded," he said, such as the T-X program to replace the T-38 trainer, a Minuteman ICBM successor, and other, "niche, smaller fleet kinds of assets that will eventually need to be replaced."

The austerity could persist for a decade or more, and may not improve until the "out-years [or] beyond the out-years." As a result, new starts will be few and far between, and even critical needs—such as extending the service lives of F-16s to accommodate delays in the F-35 program—will be done highly selectively, so as not to spend any more money on obsolescing systems than is absolutely necessary.

The Air Force recently conducted a drill to find savings from overhead and structural costs, and identified $33 billion Pentagon leaders will allow the service to plow back into combat capability. Donley said the drill would not be "a one-time event" but one step in a continuum of efforts to find greater efficiency.

The list of immediate needs is so great, next generation capabilities are on the back burner. Although Russia and China have flown prototype fifth generation fighters to challenge the F-22 and F-35, USAF has not yet begun a sixth generation program. Asked about this, Donley said, "I don't think you're going to see a sixth generation fighter program anytime soon. We do not have the resources available

USN photo by Mass Comm. Spc. 3rd Class Leonard Adams

Sailors inspect an EA-18 Growler aboard an aircraft carrier. Burgeoning threats are compelling USAF and the Navy to collaborate in new and intensive ways, such as through the AirSea Battle concept of operations.

to ramp up and begin a sixth generation fighter. We're still working on the fifth."

The Air Force is conducting research and development on technologies to apply to a sixth generation fighter—"advanced components, avionics, weapons," Donley said—but this work will be conducted "at a relatively low level on an extended timeline."

Nevertheless, the Air Force cannot take air superiority for granted, Air Combat Command chief Gen. William M. Fraser III said. In his remarks at the symposium, Fraser said USAF is taking seriously the appearance of China's J-20 fifth generation fighter prototype, and ACC is exploring a mix of capabilities to maintain air superiority in the future. One method will be to fully develop all the capabilities resident in the F-22, he said, insisting, "we must complete the planned upgrades" to the Raptor. Other ideas include a mix of "kinetic [and] nonkinetic" approaches, manned and unmanned, standoff and direct-attack methods, he reported.

In the meantime, Fraser said it is essential USAF equip its F-15s and F-16s with active electronically scanned array (AESA) radars and vigorously pursue the new Dual-Role Air Dominance Missile.

For the immediate future, the Air Force's top priority is winning the war in Afghanistan. The Air Force will put its full strength behind the war effort, but "we have had several platforms and career fields that are so critical to the current fight that they have been kept at surge rate for years and years," said Gen. Philip M. Breedlove, vice chief of staff. "Obviously, this is not sustainable for the long term."

Operators of remotely piloted aircraft, for instance, have had their "assignments extended, leaves canceled, test and training sorties foregone" in order to fulfill "never-ending" combat needs, Breedlove said. Eventually, he explained, such capabilities will have to be incorporated into a "normalized" rotational structure, to give airmen a modicum of predictability in their lives.

Stressing Our Airplanes

Fraser agreed the pace of RPA deployments is unsustainable.

"This pace has got to slow down," Fraser insisted. The only thing that will help is building up to the mandated level of 65 combat air patrols as fast as possible and increasing crew ratios.

Getting more airmen into these overstressed career fields is easier said than done, and it comes with a financial cost. "Our airmen are becoming more and more expensive day by day," Breedlove observed. "And we do not see a topline increase for any of our services in the future, so the purchasing power of our Air Force is going to shrink."

Breedlove said wartime operations are "stressing our airplanes." The Air Force is "flying them hard—and flying them hard in some very tough environments and at much higher rates than we had ever thought or dreamed." Sustainment costs are up across the board, especially for legacy fighters showing an increasing number of age-related problems. Delays in fielding the F-35 mean legacy fighters will have to be retained, which means spending money to extend their service lives and add capabilities such as new radars to keep them relevant.

Gen. Donald A. Hoffman, head of Air Force Materiel Command, said aircraft sustainment is one of the two things he's working hardest on, the other being nuclear weapons sustainment. The Air Force's fleet, he said, is "going to continue to get older, no matter how many Predators and Reapers and trainers we add." The average age of the combat force is masked by the acquisition of the RPAs and trainers, which lowers the overall fleet average to about 25 years. Hoffman said fleet age won't decline to a "more reasonable number" until "the last" KC-135 tanker and the current bombers retire, around 2040.

Still, the Air Force could conceivably get more combat-coded F-22s into service by fielding a new trainer to replace the T-38, Air Education and Training

USAF photo by Scott M. Ash

Air Force Secretary Michael Donley speaks at the Air Force Association's Air Warfare Symposium in February. The budget has flatlined, he said, and USAF has a full plate of acquisition demands.

Command chief Gen. Edward A. Rice Jr. reported. He wants a trainer relevant to the most sophisticated USAF types.

"If we do this right, we'll be able to free up additional fifth generation assets from the training environment and put them back in the hands of the operators," Rice told reporters at the symposium, and this "should be one of the objectives of the T-X" program. Air Force plans now call for as much as a third of the ultimate 186-aircraft F-22 fleet to be devoted to training.

The Air Force will buy 48 new MQ-9 Reaper RPAs every year for the next few years, but Breedlove said the service must diversify its portfolio of capabilities to be able to operate not only in benign airspace, but against "other ... higher-end threats."

Donley said the Air Force is conducting a sweeping review of its intelligence-surveillance-reconnaissance capabilities, the better to understand what will be needed for the long term. He said it should be completed this month.

Living Within the Budget

"We're thinking a little bit past Afghanistan," he said, about how much of the massive ISR force developed for this war will be applicable to future needs. While Predator and Reaper vehicles work well in a "permissive" environment such as Afghanistan, he said, they won't be appropriate in areas with "sophisticated IADS," or integrated air defense systems.

Service officials acknowledged there is heavy demand from other regional commanders for assets such as the MQ-9, but these have been held in abeyance in order to keep as much capability in combat as possible. Likely, the assets will be reallocated rather than retired.

Donley said the Air Force is trying to decide what the future "steady state" of ISR demand will be.

Room for Improvement in Space and Cyberspace

The Air Force needs to get control of skyrocketing acquisition costs for space and use lessons learned to normalize cyber operations quickly and efficiently, said Gen. William L. Shelton, Air Force Space Command boss.

Shelton outlined his top three strategic priorities in February at the Air Force Association's Air Warfare Symposium in Orlando, Fla. He said although space programs are not the only programs that go over budget and are delivered late, they "certainly ... have become the poster child for things that are late and expensive."

To tackle the problem, USAF needs to develop better requirements, be willing to trade requirements, and know when to say enough is enough, he said.

"[If] we've got a requirement that is gold plated that causes the program cost to go up astronomically, we've got to get rid of that requirement," Shelton said. "If it's good enough to win, we ought to go with the good enough to win."

The Air Force also needs to execute its programs better and write contracts that hold contractors responsible for performance, said Shelton. "We have a tough time finding ways to hold our contractors accountable right now because of the kinds of contracts we're writing."

The contract with Lockheed Martin for the Advanced Extremely High Frequency satellite, which suffered a propulsion system malfunction that significantly delayed the first AEHF military communications satellite from reaching its intended orbit, is the perfect example. Shelton told reporters at the conference that the Air Force is still in negotiations with Lockheed and the anomaly remains under review, but it's not yet clear who will pick up the tab for the extra costs.

Similarly, the Air Force is going to have to come up with an acquisition strategy that is unique to cyber.

Brig. Gen. Charles K. Shugg, vice commander of 24th Air Force at Lackland AFB, Tex., said things "happen in seconds, minutes, hours" in the cyber domain, and the normal acquisition process just isn't going to work if the Air Force needs to make changes.

"When we have to make changes, ... it has to be done at that kind of speed," Shugg said during a cyber operations panel at the conference. The goal should be to discover a game-changing cyber war technology, which Shugg compared to stealth technology for the air domain.

In the cyber domain, Shelton said he wants to see cyber tasking orders carry the same weight as air or space tasking orders.

"Normally our cyber tasking orders are meant to plug holes in our network, to get our defenses up to the level that they need to be. So if a commander out there decides, well, that cyber tasking order is kind of optional, ... that leaves a vulnerability in our network, and unfortunately, ... that's a vulnerability that everybody gets to share because it just leaves a hole in our network that can be penetrated," said Shelton.

The cyber domain is "ripe for research and development," and the service needs to make "huge strides forward in order to stay up with our adversaries and to get to the point where we can neutralize them with [our] strategies," Shugg concluded.

—Amy McCullough

USAF photo by SSgt. Andy M. Kin

Another aspect of the ISR review is future ground moving target indicator capability. Some of it is resident in E-8 JSTARS and RQ-4 aircraft, but the unmanned Global Hawk's chronic cost issues have persuaded the Air Force to reduce the planned inventory.

"We had not been satisfied with … the attention to technical and maintenance challenges across the [RQ-4] fleet, and so we made a decision to pay those bills by truncating the Block 40 procurement to 11 instead of 22," Donley told reporters. The overall Global Hawk fleet will

Maintainers perform a preflight inspection of an RQ-4 Global Hawk. Donley says the planned fleet of 66 RQ-4 aircraft should remain sufficient.

USAF photo by SrA. Michael Means

Gen. Donald Hoffman, AFMC commander, climbs into a QF-4 Phantom during a visit to Holloman AFB, N.M. Hoffman said aircraft sustainment is one of the two hardest things he is working on.

still number about 66 aircraft, he said, which should be sufficient.

"At some point, … you have to live within the budget … and you make the appropriate adjustments inside it," Donley said. The extra operating costs will be paid for with money that would have bought more of the airplanes.

Legacy aircraft, both new and old, are coming into depot "with more and more problems," noted AFMC's Hoffman. Many of the problems haven't been seen before because USAF hasn't operated such old aircraft before.

Hoffman said his command "in many cases" gets "a no-bid" when it advertises work available on the old aircraft. Many parts are no longer made, or because the run of parts is so small, it is not economical for vendors to produce them. "Parts are still our single biggest limitation on meeting our depot output and the expectations of our customers."

A useful new approach is the idea of a "leading indicator," Hoffman said, which tracks aircraft in smaller batches, or even by tail number, anticipating whether they'll be in a rough or benign operating environment and adjusting planned work accordingly. There were about 10 engines in the "red" on charts inventorying war reserves just half a year ago; now, by tracking usage in a more detailed way, the number is down to three, Hoffman reported. Nevertheless, "we've been surprised, over and over again" by how things are breaking, he said, and sustainment costs overall continue to rise.

Given the worsening condition of its fleet, tighter funds, and no expected relief from any of its missions, the Air Force is seeking new ways of doing business, Breedlove said. One approach will be an unprecedented level of interdependence with the Navy.

For over a year, the two services have been exploring a concept called AirSea Battle, in which USAF and the Navy will aim not only to better coordinate their wartime operations, but align their procurement, R&D, and other efforts to reduce duplication and exploit each other's capabilities.

"We can no longer invest in single-purpose, expensive, or service-centric capabilities," Breedlove said. Every new system will be acquired with an eye for how it can help the other service perform its air and sea missions.

Stark Contrast

The interdependence will go beyond simply the combat air forces, he said, involving doctrine, investment strategies, tactics, training, and procedures. A year's worth of effort produced more than 200 initiatives on ways the services can cooperate, Breedlove noted, even to the point of granting a select group of officers from each service access to the other's most secret projects, "to find out where the redundancies were, where the gaps were, etc."

Lt. Gen. Herbert J. Carlisle, deputy chief of staff for operations, plans, and requirements, said AirSea Battle is focused on defeating anti-access threats, and as a result, "a lot of the meat" of the construct "is in the classified network." Even so, Carlisle said a book-sized paper on the concept would be issued imminently, and would explain as much as possible about what the Navy and Air Force have in mind.

The subject comes into sharp focus, he said, in light of Iran's and Venezuela's intention to buy state-of-the-art air defense missile systems from Russia. In Venezuela's case, such missiles could "range Miami," meaning aircraft flying above Miami could be targeted by the system. Proliferation is making the issue of anti-access an urgent one, Carlisle said.

There are certainly cultural barriers to overcome in AirSea Battle, Carlisle said.

"There is a blue-water Navy mentality," he said. Sea-service doctrine states that "from the bottom of the ocean to as far up in space as you can go, they are in charge. That's their mentality, that's the way they were raised, and that's the way they work."

This stands in stark contrast with the "culture of the 500-knot Air Force," which has its own view of things.

"We provide speed, range, and flexibility. We go anywhere. We do it fast. We cover vast areas. We have not always

USAF photo by SrA. Giang Nguyen

An F-16 is put through its every-400-hours phase inspection. The service lives of some F-16s will have to be extended to accommodate delays in F-35 delivery.

Sukhoi photo

The second prototype of the new Russian T-50 fifth generation fighter takes off on March 3, 2011. Despite such challenges, USAF won't be fielding a sixth generation fighter anytime soon.

spent a lot of time worrying about something [going] 20 knots," Carlisle said.

AirSea Battle is not an operations plan, he explained, but is oriented to working inside an enemy's decision loop.

"Whether it's kinetic or nonkinetic, they don't know where the next blow is going to come from, and they can't react to it because we're already there," he said. The concept has the "thumbs up" from Schwartz, the Chief of Naval Operations, and the Marine Corps Commandant, he added.

There was no pressing need for an AirSea Battle concept in the various wars the US fought after the Cold War. Now, however, there is the "pacing threat" of China at a time of profound austerity, compelling the Air Force and Navy to collaborate intensively.

USAF's new long-range strike family of systems will interlock with Navy capabilities, Breedlove said. "Both rely on unprecedented integration to capitalize on our unique strengths … over a wide range of scenarios."

He gave the most detailed picture yet offered of what the new family of systems will involve. The centerpiece will be a penetrating bomber, a "maintainable and affordable" stealth aircraft with global range and the ability to be "tactically relevant" in a variety of scenarios. It will be able to operate alone against lesser threats, or as part of a system against the worst anti-access threats. It will initially be designed for conventional operations, but later made nuclear-capable.

The new bomber is to be delivered and "become relevant" in the mid-2020s, Breedlove said. Importantly, the airplane will have to be adaptable, able to incorporate new technologies and capability for new missions as they emerge.

The Air Force is hard at work on the Massive Ordnance Penetrator, a 30,000-pound behemoth of a bomb meant to provide a quick solution to the problem of hardened and deeply buried targets, Breedlove noted. However, the next generation bomber will not be designed to deliver it.

"Why would we build that aircraft to carry the weaponry of today?" Breedlove asked. "If we try to drive a future bomber to carry weapons the size of the MOP," it would require a huge and cost-prohibitive aircraft. He asked industry to explore weapons "smaller, lighter, but [with] the same tactical effect" as the MOP.

Realistic Expectations

Breedlove expects another element will be a conventionally armed silo- or submarine-based ballistic missile able to strike anywhere in the world within 30 to 40 minutes of a launch order.

Yet another piece of the LRS family will be a "longer range air-to-surface attack missile," able to hit deeply buried targets with great precision. He did not say whether this would be the same system as a new air-launched cruise missile to replace today's aging inventory of AGM-86s, or something like the Joint Air-to-Surface Standoff Missile-Extended Range, or JASSM-ER.

Breedlove said the family of long-range strike systems will include "one or two enablers, … very stealthy aircraft that will do any number of missions." He called these aircraft "utility infielders" available for electronic attack, intelligence-surveillance-reconnaissance, or target designation for other aircraft.

ACC's Fraser said it is important to recognize that the need for global precision attack "has not diminished." It is therefore important to get the new bomber going, because existing bombers are getting old and are "increasingly at risk" from adversary IADS, making them more and more reliant on standoff weapons. He echoed Breedlove's description of the new aircraft, adding it will likely make use of the JASSM, the Small Diameter Bomb, and in a later iteration, directed energy weapons.

USAF photo by SrA. Kenny Holston

Aircrews ready T-38 Talons at Whiteman AFB, Mo. A program to replace the T-38 trainer remains unfunded.

Asked what message he might have for industry, Breedlove said it is critical USAF get reliable cost and schedule information in order to devise workable plans.

"Give us realistic expectations," he said. "Deliver what you've said you're going to deliver" and at the quoted price. "Those are the programs that will continue to be funded and the ones that don't are going to ... face the squeeze when the squeeze comes."

Still, service officials agreed more hard requirements will go unanswered if future budgets decline as expected.

A senior Air Force official privately summed up the situation, saying, "There are only ugly choices ahead." ■

The marker is 65 orbits, but USAF is already looking for what's next.

The Reaper Harvest

By Marc V. Schanz, Senior Editor

USAF photo by TSgt. Chad Chisholm

A deployed airman marshals an MQ-9 Reaper on the landing strip at Kandahar Airfield, Afghanistan.

Intelligence collection from the air has become a defining mission for the Air Force in Iraq and Afghanistan over the last decade.

The Air Force is confronting a dispersed, elusive enemy who often blends in with populations in dense urban areas or remote mountainous terrain. The task of gathering near-real-time information on these militants and terrorists has fueled USAF's massive expansion of its remotely piloted aircraft fleet.

Since 2005 when demand for full-motion video from ground commanders ramped up along with combat operations in Iraq, the aircraft associated with this mission—the Predator and Reaper remotely piloted vehicles—have proliferated.

Col. James R. Gear Jr., the head of the Air Force's Remotely Piloted Aircraft Task Force, said that as of Jan. 5, the Air Force operates 50 combat air patrol equivalents in the US Central Command region. This consists of 48 MQ-1 Predator and MQ-9 Reaper orbits and two orbits of the high-altitude RQ-4 Global Hawk. These aircraft primarily perform intelligence-surveillance-reconnaissance collection missions and communications relay tasks.

The end state for the current RPA force structure, Gear told the crowd at a defense industry conference in Washington, D.C., on Feb. 2, will be 65 CAPs by the end of Fiscal 2013, a gradual acceleration of a program that as recently as a year-and-a-half ago aimed to hit 65 CAPS by 2015.

Mushrooming Demand

"When I started in this business [in 2003], … we were planning how we were going to get to 24 CAPs by 2010," Gear said. The Air Force had initially underestimated demand, he recalled, but as the mission grows, the service has poured resources into ISR.

In January, Secretary of Defense Robert M. Gates announced the Air Force will apply a portion of its slice of the efficiency savings generated over the course of the Future Years Defense Program to buy more Reapers and move essential ISR programs from the temporary war budget to the permanent baseline budget.

Gear noted another metric USAF tracks closely: combat hours for the service's RPA fleet. It took 14 years to amass a million combat hours with the Predator and Reaper fleet, Gear noted, a milestone the Air Force projected it would hit in March. It will likely only take another two-and-a-half years to reach the two million combat hour mark, he added, as the RPA fleet expands toward its 65 CAP goal. According to the service's 2009 unmanned system flight plan, the Air Force anticipated a force objective of 319 MQ-9 Reapers, with the eventual phase out of the Predator and a path to achieve an all-Reaper force by Fiscal 2016.

As of December 2010, USAF boasted a total active inventory of 161 MQ-1B Predators and 55 MQ-9 Reapers. The final Air Force Predator was delivered in March. This year, the service will shift its resources to procuring Reapers and plans on backfilling MQ-1s as they slowly age out of the inventory. (USAF leadership anticipates the Reaper line will soon accelerate to producing four airframes a month.)

Less than two years after the Air Force laid out a unified vision for integrating its unmanned systems into ISR operations, the demand for information continues to

mushroom, even as new challenges loom in the near future, in post-Afghanistan ISR scenarios.

As the service sprints toward its goal of 65 CAPs, it is now in the process of shifting emphasis from its iconic MQ-1 and MQ-9 aircraft to the capability and effectiveness of the sensors and the processing, exploitation, and dissemination (PED) of imagery and intelligence. The service is also grappling with how to collect intelligence in airspace less "permissive" than the skies over Iraq and Afghanistan, as requirements are solidified and defined for the "MQ-X" Reaper follow-on aircraft.

Moving beyond CAPs isn't easy, as the wars in Southwest Asia have reinforced perceptions of the RPA fleet, and what it can and can't do. "These are the defining metrics that we became used to," said retired Lt. Gen. David A. Deptula, formerly head of the Air Staff's ISR directorate.

"It was not too big of a deal when all CAPs produced the same amount of motion video," he said. Until recently, a Predator or Reaper would produce one streaming video feed per CAP. Now, with the development of the Gorgon Stare wide-area surveillance sensors, a given aircraft will be able to produce 10 streams, and with additional processing, can go up to 65. "Folks tended to focus on the number of orbits, when in fact that's just a means to an end. ... What we ought to focus on [is] the output on what the systems provide," Deptula noted.

The assumptions laid out in the 2009 UAS blueprint are now being debated regarding the future of the Air Force's ISR fleet.

Accelerated Technologies

Manned and unmanned systems must be integrated to increase capability, automation of manpower-heavy tasks must be accelerated, and systems must become more "modular" with standardized interfaces, better sustainability, and reduced costs.

The desired ISR effect is a product of the "integrated system"—and less a particular "truck," or aircraft, according to the 2009 brief accompanying the UAS flight plan.

Gen. Philip M. Breedlove, vice chief of staff of the Air Force, observed that the acceleration of technologies such as wide-area surveillance, multiple aircraft control, and automation of certain PED processes will not only improve the effectiveness of the RPA fleet, but help shrink the personnel footprint of the RPA mission.

"The No. 1 manning problem in our Air Force is manning our unmanned platforms," Breedlove said last November while leading the Air Staff's operations, plans, and requirements directorate. "About 180 to 200 people are required for a CAP," he noted, including maintenance, launch and recovery, flying, and a large PED tail. "The intel take that we bring off of these things, to then break that out into the useable intelligence that informs our ground forces, that is a manpower intensive piece."

The promise of new tools, such as the Gorgon Stare effort, is technology to improve collection abilities and cut down on the manpower required to glean valuable intelligence from the sensors collection.

"What we need to do is train machines to know rule sets, so that this machine is looking at this [type of intelligence], ... and this analysis machine is looking at [full-motion video]," Breedlove said. Technology can help find patterns and frequency, which can then be examined by a human.

As airframes proliferate, and sensors grow more advanced, new problems must

SrA. Gale Passe (l) and SrA. Jason Atwell (r) lift an inert AGM-114 Hellfire missile from its shipping case as they prepare to load it onto an MQ-9 Reaper. The load crew members are wearing gas masks to simulate loading procedures in a hostile environment.

USAF photo by SrA. Larry E. Reid

Illustration by Erik Simonsen

An artist's conception of the future MQ-X, a follow-on to the Reaper. Various requirements for the new UAV are being considered, including stealth and an upgraded capability to operate in extreme weather conditions.

be confronted, Gear said in February. More bandwidth is required to facilitate ISR, and the pressure will increase as wide-area surveillance tools grow more capable and new high definition sensors, advanced radars, and "multi-INT" tools are integrated onto RPAs.

The Air Force will seek to move some of its collection activity to military satellites, but also use compression schemes on bandwidth-heavy data such as full-motion video and improve onboard processing tools. "We have to stop pushing all of the data from our aircraft to the ground and then have it collected," Gear said. The concept of multi-aircraft control, where a single pilot could operate several RPAs at one time, is an idea that is "continuing to go well," he said, and both the MQ-1 and MQ-9 are on a path to achieve this capability in the near term.

Referencing the Air Force's recent "Technology Horizons" study, Gear said the Air Force in the coming years will move to invest in automation and autonomy technology, which will have large implications for RPA operations. At the same time, these new tools will present new problems to solve, such as policy, validation, and verification issues, as well as protecting aircraft from cyber intrusion.

The boom in ISR demand has pushed up the timeline on new technologies, but there have also been growing pains as the Air Force seeks to put the most advanced sensors possible into battle over Afghanistan.

Gorgon Stare, a high-power airborne sensor pod capable of wide-area surveillance is one of USAF's latest ISR advances. (The program's existence was first reported just two years ago.) The sensor is a critical element of the service's ISR transformation efforts, and will enable a Reaper to gather multiple video feeds, each of a different area of interest. Gorgon Stare is slated to deploy this year after a stop-and-start development.

No More Guess Work

Independent of an increase in aircraft, the Air Force would be able to add to the amount of ISR support with the pods, multiplying by a factor of 10 the amount of video and sensor data available on a single airframe, said Deptula in December 2009. This should put an end to one of the common criticisms of UAV surveillance: that they offer a limited, "soda straw" view of the battlefield.

The first set of three pods was scheduled to deploy in spring 2010 to Afghanistan, with three more sets of more advanced increment pods destined for theater by fall. By 2011, according to those initial plans, a single Reaper could gather 30 simultaneous feeds on a Gorgon pod, and in 2012, another increment could enable 65 feeds per aircraft.

Since then, the pod's deployment date has slipped as testing difficulties beset the project. In January, a draft December memo from the Air Force's 53rd Wing at Eglin AFB, Fla., leaked to the press, indicating the Eglin testers recommended against fielding the sensor until several fixes are in place. Air Force testers said the program had "significant limitations that degrade its operational utility" such as deficient infrared performance, remote video terminal interoperability problems, and unpredictable system reliability, including a delay in imagery transmission between the pod and the ground station.

The Air Force's senior leadership remains committed to the program. With Gorgon, intelligence analysts will not have to guess where to direct a sensor on a given aircraft, but instead will be looking at an entire area, said Maj. Gen. James O. Poss, the acting head of the Air Staff's ISR directorate, in a January interview with the *Washington Post*. "There will be no way for the adversary to know what we're looking at," he added.

"This system is being fielded to meet a combatant command requirement for a persistent, wide-area surveillance capability that allows multiple users to access the data from one platform,"

Illustration by Erik Simonsen

A Reaper carries a set of Gorgon Stare sensor pods in this artist's illustration. The wide-area surveillance sensors will enable the UAV to produce 10 video streams, and up to 65 in later increments.

added Air Force spokesman Lt. Col. Richard Johnson, in a Jan. 25 statement.

The program is in the first increment of a multi-increment program, with the second segment due to increase range and resolution capabilities of the sensor. Problems identified last year include three issues the Air Force has identified and moved to put fixes in place, Johnson said.

The first involved addressing a critical tech order shortfall, the second was Gorgon Stare's ground station image and grid coordinate generation, and the third was the remote video terminal compatibility.

"We're working all three issues and do not believe they will affect the deployment schedule," Johnson said.

Service leadership understands the importance of providing quick and actionable ISR to troops in the field, but the Gorgon Stare will not be fielded until the theater commander accepts the system, he noted. With advanced capability, and the urgency of combat in Afghanistan pressing these tools into service, USAF needs to make sure its force structure can handle the sheer volume of ISR it is tasked with gathering and exploiting. To a large degree, the most manpower intensive piece of the puzzle in the near term is the analysis and dissemination, Deptula noted, and how all this ISR is utilized in a netcentric environment. "There is going to be a lot of information; we can't just throw more people at it," he added. Automated analysis, better managing the tasks marked for human scrutiny, and deciding which pieces of information are prioritized are important aspects of managing the rising tide of ISR.

Permissive and Contested Arenas

"We are swimming in sensors; we need to make sure we don't drown in data," Deptula said.

As technology improves, USAF leadership is also showing concern about conducting ISR operations in hostile air environments. "One has to remember that the current ISR fleet … is absolutely a permissive fleet," said Breedlove. "The Predator, the Reaper, the Global Hawk will not fly in contested [airspace] and will certainly not fly in denied airspace," he told reporters in November.

These requirements need to be addressed in the development of long-range systems, particularly the "family of systems" long-range strike concept currently favored by OSD leadership. "The ISR capability of that has to be able to exist, operate, and pair with the other parts of that system in a contested and denied environment," Breedlove said. Any future "air breathing" capability needs to be able to operate in permissive and contested arenas equally. "We need to look at that broad swath of capability and make sure there are no holes in it."

"The vulnerabilities are out there, and we've assessed them," Gear said in February, noting Reapers and Predators "are not well-suited" for future scenarios in elevated threat environments. USAF is evaluating a range of requirements for MQ-X, including jam resistance, electronic authentication, and ability to operate in varied weather conditions. Predator and Reaper aircraft have experienced operational difficulties in cold and icy conditions downrange, Gear noted.

"We probably do not need added capacity of the same capability," Breedlove said in November, when asked about growing the ISR fleet beyond 65 CAPs. "What we need is capacity in that area between permissive and that tougher denied environment, and I think the MQ-X is a good place to have that conversation."

In challenged airspace, Reapers and Predators would "start falling from the sky like rain," Deptula said, which is why interoperability is critical in the construction of the long-range strike system and the MQ-X program. They will need to disseminate information and interface with other advanced systems: Deptula said gathering ISR while facing integrated air defenses will be next to impossible without all the parts working together. ■

The Air National Guard is acquiring the C-27J. It is also training initial crews and preparing to deploy with Army units in Afghanistan.

Spartan Beginnings

By Amy McCullough

USAF photo by Bekah Clark

A C-27 Spartan configured for an aero-medical evacuation mission is prepped for a production qualification test in June 2010.

Most new weapons systems are in the fleet for a few years before they deploy, giving pilots ample time to fly while allowing most of the kinks common to newly acquired assets to be worked out. That's not likely to be the case with the C-27J Spartan, one of the first airframes in Air Force history acquired solely for the Air National Guard.

Seven Guard wings are designated to fly the C-27J, but the program was definitely still ramping up as of the end of January. The Air Force had received six aircraft, with two more due for delivery in the coming months. Sixteen pilots and 16 loadmasters were certified. Also as of the end of January, eight more pilots and eight more loadmasters were going through the training pipeline at Robins AFB, Ga.

Even though the program remains in its infancy, the C-27 mission is still a priority in Afghanistan. The high operational tempo in theater is taxing the Army's aging helicopters, which are significantly slower and smaller than the new fixed-wing aircraft. Combatant commanders are looking to the Air Force for help.

The C-27J is a propeller-driven tactical airlifter often referred to as a "mini-Herc" because it has a similar cruise performance to the C-130 with slightly less range and cargo-carrying capability. It was originally intended as a joint Army-Air Force combat aircraft, with the Army as the program lead, but the Pentagon made an about-face in its 2010 budget request, giving the aircraft and the "last tactical mile" mission to the Air Force alone, while reducing the buy from 78 to 38 aircraft.

The Air Force handed the reins over to the Air National Guard, which is now feeling "a lot of pressure" to deploy the first Spartans this spring, officials said. But in order for this to happen, there are many obstacles that need to be tackled, including rewriting doctrine and flight publications, originally designed for the Army, to conform to Air Force instructions.

"Our two greatest challenges are bringing out a brand-new weapon

system [and] training for that, and the other one is implementing that weapon system overseas," said Lt. Col. Todd K. Thomas, commander of the operations group under the 179th Airlift Wing at Mansfield Lahm Airport in Ohio. The Ohio ANG wing was first to receive the new aircraft in August and it—along with an Air Force crew from Baltimore and two Army crews from Oklahoma and Georgia—was expected to be the first to deploy with it in March.

Putting the Airplanes Together

Like any new aircraft, the C-27J has experienced its share of growing pains. The avionics packages "aren't quite up to speed," Thomas said, and the Mansfield crews are constantly "finding out different equipment on the airplane is not working as advertised."

The entire fleet was grounded in December after a routine inspection found metal shavings in the fuel cells of all eight aircraft, including the two in predelivery. As of late January, it wasn't yet clear what caused the problem, but "there is an assumption" it was something left over from the manufacturing process since that is the apparent common thread, said Col. Gary L. Akins, lead of the C-27 integration team. All six operational aircraft were cleared to fly as of mid-February, although two C-27s at Mansfield remained grounded for routine maintenance issues.

"Who would have thought we would have the entire fleet, although small, have to go through the same piece of maintenance work … at the same time? It's kind of hard to fault anybody for not having all the spare parts right there," Akins said in January.

Spartan manufacturer Alenia, based in Italy, and US-based L-3 Communications told officials they are "confident" they can solve the problem and are working to "make sure it doesn't happen again," Akins said.

USAF photo

Capt. Garrett Caponetti in a Spartan during a familiarization flight over New England. Training on a brand-new weapon system is a challenge for the ANG.

USAF photo by SrA. Joseph Harwood

Airmen of the 179th Airlift Wing greet a new C-27 (right) at Mansfield Lahm Airport in Ohio and say goodbye to a C-130 (left). The 179th was the first unit to receive the new C-27s.

USAF photo

A C-27J lands in Fargo, N.D., last October after a familiarization flight. The Spartans are expected to deploy to Afghanistan this spring.

The issue has caused the Air Force to take note of another challenge—spare parts—so officials are in the process of building up a stockpile of spares to take downrange while sending more parts to home units, he added.

Synergy of the Beddown

The grounding also has slowed training and put more pressure on an already tight deployment deadline. Mansfield officials said the wing ideally would like its pilots to accumulate an average of 100 flying hours in the C-27J before deploying, although they acknowledge that might not be possible because of the grounding. Still, even that number is a significant departure from the flight hours accumulated during nearly four decades of flying C-130s.

The 179th AW made its last C-130 flight on Aug. 12, 2010, just days before accepting the first C-27J into the Air Force inventory. Officials there are drawing on those years of experience to make sure the upcoming deployment is a success.

USAF photo

Airmen of the 103rd Airlift Wing familiarize themselves with the cargo section of a C-27J that was visiting Bradley Arpt., Conn. The 103rd at Bradley is slated to receive C-27s as well.

"We have people in our unit who have been here for years. We have crews and staff that have done this pretty much their whole lives," Thomas said. "What we have to fall back on is our experience and our situational awareness, the way we fly, and the way we carry on flight operations. ... That's the one thing we can count on right now."

Col. Gary A. McCue, the wing commander, said his crews would be ready to deploy in March, but he acknowledged the aircraft's capabilities may still be limited. The head-up display, or HUD, was decertified as of January. Though that would not prevent crews from deploying, it would prohibit them from conducting airdrops or tactical maneuvers such as assault landings until the HUD is fixed, he said. Representatives from Alenia visited the Ohio base in December

and are working on a fix for the HUD as well. "We hope it's quick," but we can go either way, McCue said. "We are on the razor's edge right now, and we are the unit to do it. We have all the experience necessary. We've flown [tactical airlift missions for] 36 years. If anyone can do it, this unit can, and [we can] do it safely."

The Air National Guard is not only working to bed down a new aircraft, it's also taking on a new direct support mission. Unlike most Air Force assets downrange, which are assigned to air bases such as Bagram or Kandahar in Afghanistan, the C-27Js will be embedded directly with Army aviation brigades or divisions. Deployed C-27J crews, therefore, will receive their assignments directly from an Army commander—an arrangement that has only been done once since the Vietnam War.

From October to December 2009, the 179th sent two C-130s to Tikrit Air Base in Iraq, an Army-run outpost. At the time, the buzzwords were "synergy of the joint force beddown," said Lt. Col. Robert Dunlap, executive officer of the 179th AW. The idea was to take out a piece of the administrative puzzle and put full control of assignments in the hands of the Army colonel in charge of the aviation brigade, ensuring "time sensitive" or "mission critical" supplies could be moved immediately. The deployment was to be used as the template for future C-27 missions.

"Initially everybody thought it was going to be very, very difficult," said Thomas. "I won't say it didn't come with enormous challenges, but it was well-received. … By the end of the 60 days, we had incredible buy with both sides because the Army was getting a great capability and at the same time we were building our own little mission."

That relationship continued Stateside during the multiservice operational test and evaluation period, which concluded last summer. Air Force and Army crews worked together as they attempted to determine the aircraft's capabilities in an operational environment. Akins said none of the issues that came up in the testing would preclude fielding the airplane, but he said the service intends to conduct some follow-on tests after the final report on the MOT&E is released in late January or early February.

Lessons Learned

"Some [of the additional testing items] may be able to be accomplished in a day or two," Akins said. None will "preclude us from flying the airplane, but to ultimately have a good long-term system and have all the accurate data, we need to do a little bit more testing."

The location of that testing had not yet been determined as of late January, but Akins said one of the things officials will look at will be aeromedical evacuations. More than 20 airmen took part in tests at Scott AFB, Ill., in June 2010 to ascertain whether the aircraft allows for medical personnel to evacuate ambulatory and littered patients quickly and safely. Akins said the additional tests will be designed to ensure all the equipment is fully compatible with the aircraft.

Officials also intend to look at the aircraft's digital map system, which is similar to the one in the C-130J, he added. "We have to make sure that all the software is compatible for [incorporating the system on the aircraft]. It's not just plug-and-play. We need to make sure ... there are no performance issues, and then if all goes well, get certified for flight," said Akins.

There are going to be many lessons learned as more aircraft enter the fleet and the first crews return from deployment. One quality of life issue that has yet to be determined for C-27 units is the deployment battle rhythm.

The aircraft will fall under Army command while deployed, and soldiers typically have a much more rapid deployment-to-dwell time ratio, so C-27 crews aren't likely to fall into an average air and space expeditionary force (AEF) construct. "It's going to be a little more fluid than normal, but hopefully, within about two years, we can get to a level of normalcy in the tour length and find something similar to an AEF rotation cycle," Akins said. "It may ultimately fit into one, but we haven't figured that out yet."

Long term, the Air Force intends to add two more wings to the preferred basing plan. Air Force leaders from top brass down to unit commanders say they also hope to one day see an active component associate with the C-27. The National Guard gets its funding from the active duty and without some active duty buy-in, there always will be concerns about the long-term health of the fleet, especially with the flattening budgets of future years.

"I think that most of us who wear this uniform would tell you that whenever it's inherently an only-Guard mission, we don't do it as well as if it's a combined mission with our Air Force," Gen. Craig R. McKinley, chief of the National Guard Bureau, said in September 2010. "And so, [we are] trying to figure out a way by which the Air National Guard is in total ownership of this, [because] it never does us any good. We are not equipped. We are not sized. We are not resourced properly to do it all in any single area." ■

USAF photo

A Spartan taxis on the ramp at the Army's Redstone Arsenal, Ala., during flight testing before the program was turned over to the Air Force. Eventually, C-27s—and ANG crews—will be embedded directly with Army brigades or divisions.

The Century

From F-100 to F-106, USAF's legendary "Century Series" of fighters performed a wide range of missions with distinction.

Photo by Robert Mason

Series

Photos via Warren E. Thompson
Text by June Lee

Four F-106 Delta Darts with the Florida Air National Guard's 125th Fighter Group fly in formation. The delta-wing fighters were capable of Mach 2 in operational service, and they served as America's premiere interceptors for nearly three decades.

The Air Force's "Century Series" of fighters—so called because they ranged from the F-100 to the F-106—marked many firsts for the service: the first supersonic, then double-sonic fighters; the first aircraft conceived as "weapon systems" matching radars, aircraft, and weapons; and the first tactical aircraft designed to carry nuclear weapons. ***|1|*** *Beginning in the early 1950s, the Air Force experimented with a concept called "zero-length launch." The aircraft was mounted on a trailer and equipped with a rocket pack to get it airborne and up to speed; the rocket was jettisoned once the fighter was moving under its own engine power. This photo was taken at George AFB, Calif., in 1961.* ***|2|*** *An F-100 Super Sabre refuels over Europe in 1961. More than 2,000 F-100s were built between 1953 and 1959—a figure almost incredible given the sparse fighter production lots of today.* ***|3|*** *Front view of an F-100D.* ***|4|*** *This two-seat version, wearing the typical Southeast Asia camouflage scheme, was assigned to the 352nd Tactical Fighter Squadron at Phan Rang AB, South Vietnam, in 1971.*

Photo by Robert Terbet 1

Photo by Frank Street 2


3 USAF photo


Photo by John O'Donnell 4

USAF photo 1

|1| *An F-100 flies chase with an Army "Blue Goose" drone.* *|2|* *Originally designed as a long-range escort for bombers, the F-101 Voodoo was modified into a tactical fighter-bomber with nuclear capabilities. Early armed versions included the F-101A and B; the reconnaissance model, RF-101C, distinguished itself in low-level passes over Cuba during the Cuban Missile Crisis and in Vietnam. This shot is of an F-101B in 1959. Note the deployed speed brakes under the T-tail.* *|3|* *An F-101B (right) and F-102 at Tyndall AFB, Fla., in 1960. In front of the F-102 are AIM-4 Falcon missiles; in front of the Voodoo, AIR-2 Genie missiles. The Genie and some versions of the Falcon, which were air-to-air weapons, carried nuclear warheads.* *|4|* *Iconic Cold War interceptors, two Voodoos fly in formation. More than 800 F-101s were built.*

Photo by Jim Lionberger 2

3 Photo by Al Wimer

USAF photo 4

1 Photo by Bruce Gordon

USAF photo 2

3 Photo by Bob Donaldson

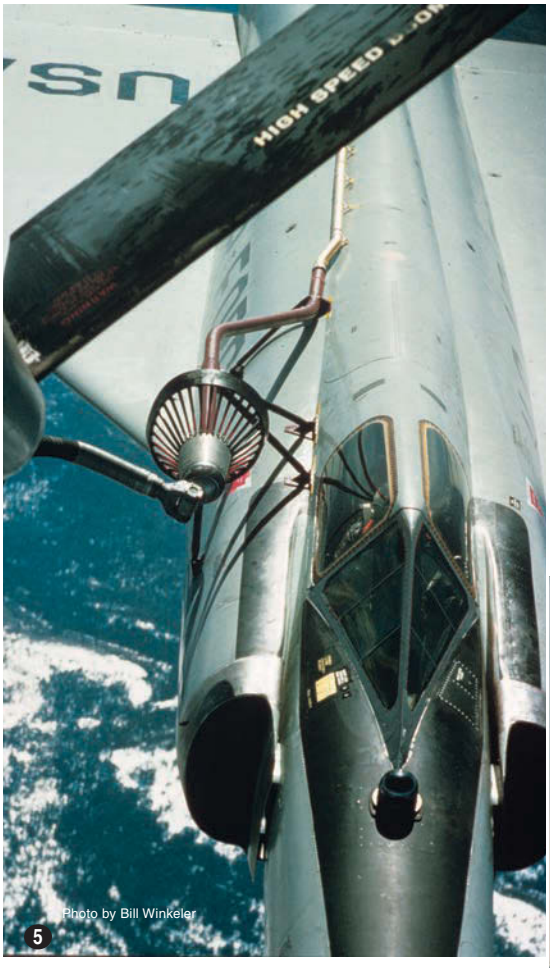


Photo by Bill Winkeler 5

Photo by James Cobb 4

I1I *An F-102 Delta Dagger assigned to Air Defense Command flies past the eruption of Augustine Volcano in Alaska in 1964.* ***I2I*** *An F-102 takes off from NAS Keflavik, Iceland, during the Cold War. As interceptors, F-102s were positioned at the periphery of North America; this one was assigned to the 57th Fighter-Interceptor Squadron in Iceland.* ***I3I*** *F-102s of the 509th FIS stand alert in South Vietnam during September 1964. These Daggers deployed with their standard interceptor gray, but F-102s in theater eventually wore the Southeast Asia camouflage scheme.* ***I4I*** *F-102s from the 64th FIS, assisting the 509th FIS, in a revetment at Da Nang AB, South Vietnam, in 1968. Many would keep the camouflage in Air National Guard service back in the US. Next to the aircraft are the "caskets" bearing their missile armament.* ***I5I*** *An F-102 pilot from the 64th FIS, Paine Field, Wash., practices refueling before deploying on the long flight to South Vietnam in the mid-1960s. The F-102 was the first USAF aircraft to employ the "area rule," smoothing supersonic aerodynamic performance by using a wasp-waist fuselage. The F-102 employed many radar and electronic firsts, as well.*

Photo by Mike Korte 1

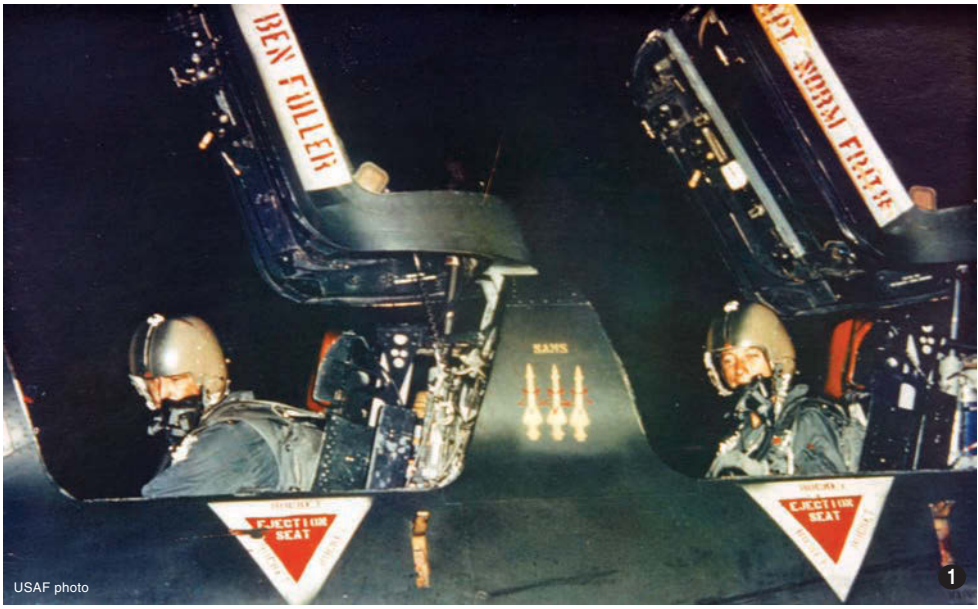
USAF photo 2


3 Photo by Bobby Bedsworth

Photo via Howard Johnson 4

I1I *An F-104 banks near Luke AFB, Ariz., in 1971. The F-104 was designed for quick-climbing, supersonic air superiority. The "missile with a man in it," it was sometimes called. The fuselage provided the basis for the U-2 spyplane.* ***I2I*** *A Starfighter at Taeyan AB, Taiwan, during the Quemoy Crisis in 1958. The US sent aid to Taiwan after communist China shelled its offshore island of Quemoy.* ***I3I*** *This F-104 photo was taken on the flight line at Udorn AB, Thailand, in 1967. The F-104's speed and stubby wings made it adept at high-speed, slashing attacks, but it could not turn with an agile opponent.* ***I4I*** *Lt. Col. Howard Johnson, wearing his "moon suit" helmet and G-suit, steps into the cockpit of an F-104 at George Air Force Base in 1965. Some NF-104 test versions of the Starfighter were used to set time-to-climb records. One such attempt was immortalized in the Oscar-winning film, "The Right Stuff."*

|1| *The F-105 Thunderchief was meant to be a fighter, but its bomb bay and heavy-weapons-carrying ability, driven by a need to carry nuclear bombs, turned it into a dedicated strike platform in Vietnam. Here, Maj. Ben Fuller and Capt. Norm Frith in a two-seat F-105 complete their 100th mission in April 1967. Note the three SAM kill marks.* *|2|* *An F-105 sits on the flight line at Korat AB, Thailand, in January 1973.* *|3|* *A crew member works on an AGM-45 Shrike missile on an F-105G. Along with the Standard ARM, also mounted on this wing, the Shrike homed in on enemy radar emitters and was the typical weapon of anti-radar missions.* *|4|* *An F-105 from the 80th Tactical Fighter Squadron is shown here operating out of Korat in 1965.*



USAF photo 1

USAF photo 2

3 USAF photo

Photo by Robert Pielin 4

Photo by Frank Street

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Photo by Dennis Kelsey

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USAF photo

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__I1I__ F-105s from the 18th Tactical Fighter Wing fly near Okinawa in this 1964 photo. __I2I__ A pair of F-106s fly over the Pacific Northwest. Originally intended as a modification to the F-102, the Dart eventually became different enough to warrant its own designation. __I3I__ An F-106 at Great Falls, Mont., in 1987. __I4I__ An F-106 from the New Jersey Air National Guard's 177th Wing in the 1970s doing what it did best: intercepting a Soviet Tu-95RTs Bear. The Dart was the last Century Series fighter to serve, being retired to drone duty beginning in the early 1980s. Other Century fighters were felled by being too technically ambitious or by changing missions. ■

Lifesaving Liberty

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

The MC-12 quickly added a valuable niche intelligence capability in Afghanistan.

USAF photo by SSgt. Eric Harris

An MC-12 Liberty lands at Kandahar Airfield, Afghanistan. The platform aircraft for the Liberty is the Hawker Beechcraft Super King Air 350.

Ground troops in Afghanistan have come to rely heavily on a rather unglamorous-looking airplane flying thousands of feet above. The small, unarmed aircraft listens for enemy signals and watches the blind curves ahead of the troops, looking for signs of planted bombs or contacts with people who may—or may not—be the enemy.

The eye in the sky is the MC-12 Liberty, a relatively recent addition to the Air Force's inventory, which serves a unique, niche role in the service's intelligence-surveillance-reconnaissance effort in Afghanistan. The Liberty—a converted civilian turboprop crammed with sensors, radios, surveillance gear, and perhaps most importantly, a crew—flies directly over troops on the ground, who are often making their way along the perilously narrow mountain passes that offer no view of the terrain or hazards ahead.

MC-12 crews also watch over takedown operations, looking for the motion in the window, the escape out the back door, or the arrival of enemy reinforcements. The MC-12 crews consistently win the thanks and praise of the land forces: Ground troops routinely report that they prefer working with an actual crew overhead.

The common alternative is communicating with an analyst who may be thousands of miles removed from the fight and is watching the proceedings through the lens of a Predator or Reaper unmanned aircraft, via satellite link.

The MC-12 will offer unique capability until medium-altitude remotely piloted aircraft can operate in all weather, achieve more in-depth situational awareness, and offer ground forces a much more user-friendly interface—preferably with real people somewhere in the information processing, exploitation, and dissemination chain.

The Liberty aircraft was literally rushed into service. In the spring of 2008, Defense Secretary Robert M. Gates publicly and sharply criticized the Air Force for not moving fast enough to satisfy the ever-growing demand for ISR in Iraq and Afghanistan—specifically, for airborne, full-motion video surveillance—and directed the service to find quicker ways to meet the need.

USAF photo by SrA. Larry E. Reid Jr.

USAF photo by SrA. Tiffany Trojca

General Atomics Aeronautical Systems, the maker of the Air Force's and Army's principal medium-altitude remotely piloted aircraft, was at the limit of its capacity to make those airplanes.

"We were producing [MQ-1] Predators and [MQ-9] Reapers as fast as we could, but the company was maxed out," a former senior intelligence official said. "So we had to look elsewhere."

Within a couple of months, the Air Force decided it could rapidly field a new, supplemental capability that would complement the unmanned Predators and Reapers, as well as bigger platforms such as the E-8 JSTARS. Gates approved the plan and set in motion an effort to acquire 37 of the aircraft under the sobriquet Project Liberty. The name was inspired by the World War II effort to rapidly build an inventory of cargo ships, based on designs that were cheap and quick to assemble.

Full-Motion Video

The platform chosen for the Liberty was the Hawker Beechcraft Super King Air 350, and later the Super King 350ER. The airplane was picked because it was already in the US military inventory, in a variety of incarnations based on the militarized C-12 Huron. It could hold the necessary amount of gear, was simple to operate, could self-deploy, and could be obtained in the needed time frame. Moreover, because of its civil aviation track record and simplicity, it was potentially a good platform on which to partner with emerging air forces, such as in Iraq and Afghanistan.

The Air Force's Big Safari office—which specializes in rapid prototyping and fielding of equipment needed for combat—took the lead in acquiring the system.

The principal sensor around which the MC-12 was built is a full-motion video system—the Wescam MX-15—since FMV was the No. 1 demand of ground forces in combat. However, the MC-12 would supplement video with a variety of radios able to listen in on cell phones, walkie-talkies, and other types of communications, as well as its own communication gear that was completely secure. In addition, the crew could talk with offboard sensor specialists, imagery analysts, and other locations via secure chat.

All sensors would have a recording and playback capability, as well as the ability to transmit sensor takes and FMV to a variety of offboard recipients.

The aircraft would also offer something that Predators and Reapers could not: human eyes on the target. The MC-12 has a cockpit compatible with night vision goggles, so the crew, with a sensor as simple as binoculars, can

An MC-12 Liberty aircraft prepares for takeoff on the ramp at Kandahar. The full-motion video system prized by ground forces is supplemented with a variety of radios and other communications gear.

USAF photo by SSgt. Eric Harris

Northrop Grumman photo

L-r: A Predator takes off on a training mission; an MC-12 Liberty aircraft; an E-8C JSTARS aircraft in the air. Liberty aircraft augment other intelligence-surveillance-reconnaissance assets.

USAF photo by SSgt. Eric Harris

USA photo by Spc. Gary Silverman

Above: An airman marshals a Liberty as it prepares for a mission in Afghanistan. Right: Army Spec. Thomas Unangst radios coordinates. The MC-12 serves as the "eyes" for dismounted troops.

also add four sets of eyes to understand what's happening down on the ground.

Five-Person Crew

Because it would take the airframe contractor some time to spin up production, the first MC-12s were low-time civilian aircraft, bought from "doctors and dentists," one USAF official said. He spoke on condition of anonymity because the Air Force declined repeated interview and information requests for this article.

After getting the initial go-ahead in July of 2008, the Air Force received the first mission-ready MC-12 less than a year later, and in June 2009, the first MC-12 arrived in Iraq and began promptly flying combat missions. Six months later, MC-12s began flying in Afghanistan.

A total of 37 aircraft have been acquired; seven are kept at Key Field in Meridian, Miss., for training, although Beale AFB, Calif., is the Air Force's stated preferred permanent base for the MC-12. Hawker Beechcraft builds the airplane; L-3 Communications of Texas is the system integrator.

The MC-12 crew consists of five people: four in the airplane and one who monitors its sensors on the ground. The crew has a pilot, who is the mission commander; a copilot, who assures that the aircraft is properly positioned for the mission; a sensor operator who runs the FMV, other sensors, and a laser target designator; and a cryptological operator, who collects other kinds of information. The ground member of the team is an imagery analyst who monitors all the feeds and provides observations on what it all means.

Crews can use laser-like pointers that ground forces, wearing special eyewear, can see. That allows an MC-12 crew member to point out a threat the ground troops can't see from their vantage point, and without the ground troops having to look at—and interpret—a digital aerial image on their field laptops.

The crews of the MC-12 are forward deployed, and live and eat with the ground troops they support. They will be heavily involved in mission planning for ground action, and will know well

USAF photo by SSgt. Manuel J. Martinez

Lt. Col. Rob Weaver (l) briefs an MC-12 aircrew. The Air Force has 37 of the aircraft, which entered service less than a year after the program was approved.

the joint terminal attack controllers with whom they may be working to call down air strikes.

Seeking a Permanent Cadre?

The MC-12 is not armed, however. The aircraft, with its full load of sensors and crew, cannot carry munitions. The laser target designator has been deemed sufficient to point out targets for other aircraft, such as fighters or RPAs loitering in the area.

Crews have been drawn from all over the Air Force, and as yet, a permanent MC-12 cadre has not been created. Unlike those who have been assigned to operate RPAs, and may remain assigned to that specialty for an open-ended period, MC-12 pilots go back to their previous specialties after their tours, typically, a six-month deployment.

Unlike many systems, crews for the MC-12 go through training together—12 missions are flown as a team before deployment—and they stay together through their tours. It is critical, according to one former MC-12 crew member, that they work effectively as a team, and know exactly how much to say—and when to keep silent—in a fast-unfolding combat situation, where irrelevant chatter can cost lives.

The MC-12, however, was always seen as an "80 percent solution" to the need to rapidly field a complement to RPAs and other ISR platforms. Rushed from the factory to combat with not much testing, the airplane has yet to be fully certified for operations. Crews are a little skittish that they don't know, for example, how their engine noise could be heard by the enemy in mountainous terrain, or at what altitude they truly become "invisible" to the enemy, which is crucial to mission success.

Senior Air Force leaders have said the MC-12 will be retained in the inventory indefinitely, even after US forces withdraw from Afghanistan, because it could have a significant value in counterinsurgency operations elsewhere in the world, in Africa, South America, or Southeast Asia, for example. However, one former top intelligence official said the MC-12 was intentionally limited to 37 airframes, and doesn't see the fleet growing beyond that.

Since the upbraiding by Gates, the Air Force has been aggressively building MQ-9 Reapers, toward an ultimate objective of achieving 65 "orbits" of 24-hours-a-day capability by 2013. That will satisfy all requirements in Afghanistan, and likely be more than enough for the post-Afghanistan environment.

Moreover, "we'll be putting all these kinds of sensors on RPAs that are coming down the pike," and potentially retrofitting them on Reapers, "so you'll have that capability on an unmanned platform with days-long persistence," as opposed to the MC-12, which can only stay aloft for five or six hours, one intelligence official noted.

The tradeoff, of course, is that an RPA—even an advanced one with lots of automated processing, exploitation, and dissemination capability—won't have four sets of human eyes onboard, each trained to know when to offer the right information to help combat troops.

"It's an issue of manpower," the official said. "We don't have it. That's why we're having to pull people off all these other platforms. We've had F-22 pilots flying the MC-12."

The Army fields its own version of the Liberty, called the Medium Altitude Reconnaissance and Surveillance System, or MARSS. Like other Army airborne ISR assets, it is assigned to certain ground units, rather than apportioned by the joint force air component commander. ■

USAF photo by SSgt. Quinton Russ

USAF SSgt. Aaron Pickering checks over the forward-looking infrared (FLIR) ball on an MC-12 Liberty before a mission at Joint Base Balad in Iraq. The first Liberty aircraft arrived in Iraq in June 2009.

Every four years, the Quadrennial Defense Review is supposed to offer a clean-sheet look at military strategy. Recent versions have disappointed, but the next one could be big.

On QDRs

By Rebecca Grant

Quadrennial Defense Review Report

Every four years the Air Force and sister services run a gantlet of major Pentagon processes that dissect missions and reprioritize and amputate programs: the Quadrennial Defense Review, best known as the QDR. Although Secretary of Defense Robert M. Gates has pushed to reduce the number of Pentagon studies, the QDR isn't one of them.

The next QDR in 2013 or 2014 will mark two decades for the banner strategy exercise.

That dates the process back to the Bottom-Up Review of 1993, widely regarded as the root of the family tree. Since then, four QDRs have appeared: 1997, 2001, 2006, and most recently, the QDR of 2010. Along the way, they have consumed countless hours of analysis and created more than a few headlines on weapons systems cuts.

The impact on the Air Force has been dramatic. Past reviews have cut fighters, repositioned new programs, advocated a bomber, and pushed for more unmanned and special operations aircraft, to name a few initiatives.

The QDR's purpose is noble. According to the National Defense Authorization Act for Fiscal Year 2000, the goal of the QDR is to delineate a military strategy consistent with the most recent national security strategy, define the defense programs to successfully execute the full range of missions assigned to the military by that strategy, and identify the budget plan necessary to successfully execute those missions at a low-to-moderate level of risk.

Yet the QDR is not a beloved beast. "Every QDR disappoints," said Center for Strategic and Budgetary Assessments expert Jim Thomas in February 2010. "Appetites are way too great for what the QDR delivers," said Mark A. Gunzinger, who worked on three QDRs and is now also at CSBA.

Longtime Center for Strategic and International Studies analyst Anthony H. Cordesman heaped the most scorn on the QDR. "If God really hates you, you may end up working on a Quadrennial Defense Review—the most pointless and destructive planning effort imaginable," Cordesman said in a 2009 paper. "You will waste two years on a document decoupled from a real-world force plan, from an honest set of decisions about manpower or procurement, with no clear budget or FYDP, and with no metrics to measure or determine its success."

The QDR was never supposed to be popular. The 1993 Bottom-Up Review was helmed by Secretary of Defense Les Aspin. This document, carried out for the new Clinton Administration, was the watershed in downsizing the US military after decades of focus on the Soviet Union. Its boldness set high expectations.

"The questions we face in the Department of Defense are: How do we structure the armed forces of the United States for the future? How much defense is enough in the post-Cold War era?" the review stated in its opening.

The Bottom-Up Review delivered clear answers, and was the first document to focus on regional dangers as the primary drivers of US defense strategy.

The review put "major regional conflicts" at the top of the list of potential military operations. While other operations such as small-scale contingencies and overseas presence

September 30, 2001

were important, the major regional conflicts were the primary guideline. In a unique move, the review actually spelled out levels of land, sea, and air forces opponents in a major regional conflict might possess. It also stated the logic for sizing US forces to fight two major regional conflicts.

"We decided early in the Bottom-Up Review that the United States in effect makes simultaneous wars more likely by leaving an opening for potential aggressors to attack their neighbors, should our engagement in a war in one region leave little or no force available to respond effectively to defend our interests in another," the review read.

Strategy in place, the review made significant force structure cuts to Army divisions, Air Force wings, and Navy ships. The Marine Corps structure of three wings and three divisions was set in law and left largely alone.

The speed and success of the Bottom-Up Review reflected consensus on the broad strategic direction of US policy. It had been two years since Operation Desert Storm put regional conflict in the spotlight and four years since the fall of the Berlin Wall. In a sense, most of the strategic thinking by Aspin and others had already taken place. Hence the BUR was debated more on programs than on grand strategy.

For its part, Congress wanted the services to seek out efficiencies and eliminate duplication wherever possible.

To that end, even as the BUR was reporting out, Congress prepared legislation for what became the Commission on Roles and Mission of the Armed Forces. This group of 10 independent commissioners was tasked with looking at many areas of service overlap in their basic roles prescribed under DOD statutes. Their 1995 report included a recommendation for a "quadrennial strategy review," with the name later switched to quadrennial defense review, or QDR.

"It was to be the BUR over and over every four years," recalled Gunzinger. Fundamentally, it was the key dialogue between a Secretary of Defense and Congress, the body ultimately responsible for funding the common defense.

Secretary of Defense William S. Cohen guided the first QDR. He also started the tradition of minimizing expectations, introducing his 1997 QDR as a "cautious approach" with "more emphasis on continuity than on change."

To its credit, QDR 1997 presciently discussed the possibility of terrorism, but its authors still felt a need to speak out against the specter of American isolationism. This QDR also crystallized the framework for force sizing. The 1997 QDR did go beyond the BUR by adding the operational concept of the "halt phase"—using rapid power projection to stop an invading army—and approving forces for it. It also defended maintaining the ability to fight in two places at once. Without it, "our standing as a global power, as the security partner of choice, and as the leader of the international community would be called into question," the report said.

A Major Departure

The 1997 QDR echoed the BUR with some major force structure moves such as cutting bombers and submarines. "In a nutshell, tactical airpower (Tacair) dominated the QDR. Conventional wisdom held that current budget projections did not support the desired amount of Tacair assets. As such, the Air Force challenged the Navy's request for 1,000 F/A-18E/Fs, while defending its requirement for four fighter wings of F-22s," said Paul Nagy, an analyst involved in the first QDR.

Both lost out in the end. The F-22 was cut to three wings and the Super Hornet slashed in favor of Navy Joint Strike Fighter procurement.

Congress liked the process. In August 1999, the 106th Congress moved to make it a permanent Title 10 requirement. Official language chartered the Secretary of Defense to "conduct a comprehensive examination ... of the national defense strategy, force structure, force modernization plans, infrastructure, budget plan, and other elements of the defense program and policies of the United States with a view toward determining and expressing the defense strategy of the United States and establishing a defense program for the next 20 years."

The QDR was here to stay. Next time, the services wanted to be prepared. The Institute for National Strategic Studies at the National Defense University convened a group of handpicked military officers chaired by Michele Flournoy. They spent more than a year producing "intellectual capital" and a full book of studies intended to guide the 2001 QDR.

The Bush Administration's SECDEF, Donald H. Rumsfeld, arrived with few kind words for the QDR process. It all came out in testimony before the House Armed Services Committee in June 2001 when Rumsfeld was asked by Rep. Roscoe Bartlett (R-Md.) about progress on the next QDR.

"There's only been one QDR prior to this," Rumsfeld answered. "As you know, it's not my idea; it's mandated by Congress. There was one in 1997. It seemed not to be impressive in its outcome, when one asks the various people who participated. Whether this one will be, I don't know."

The attacks of Sept. 11, 2001, occurred as the 2001 QDR was days from release. A hasty rewrite acknowledged the tragic events before release on Sept. 30, 2001.

The 2001 QDR dove deeply into a definition of the Rumsfeld strategy for military transformation in the 21st century. "Transformation results from the exploitation of new approaches to operational concepts and capabilities, the use of old and new technologies, and new forms of organization that more effectively anticipate new or still emerging strategic and operational challenges and opportunities and that render previous methods of conducting war obsolete or subordinate," explained QDR 2001.

The essay on transformation marked a major departure from reviews of the 1990s by using the QDR as a philosophical showcase.

Its other unique trait was a longer list of specific recommendations on the day-to-day business of the Pentagon. Navy carriers went back up to 12. The Air Force was tasked to get to work on contingency basing in the Pacific. The Army was told to hurry up on introducing its interim brigade combat teams. Policy markers like these became standard with the 2001 QDR and would cause much dread and anticipation in the next two reviews.

By 2006, the QDR release was synchronized with the budget, in February. It was again undersold by Rumsfeld and his deputy Gordon R. England. England termed it a "midcourse correction" while Rumsfeld cautioned against it being seen "as some sort of a new menu for program adjustments," he said.

However, a dilemma arose. There had been no change of Administration. Transformation was still a goal, yet the embroilment in Iraq and Afghanistan brought counterinsurgency operations to the forefront.

"The expectation was that as the cost and the difficulty of the Iraq and Afghan campaigns mounted, that this

Photo illustration by Erik Simonsen

The F-22 buy was slashed from four wings to three in the 1997 QDR, while the Navy's Super Hornet buy was cut in favor of additional F-35 procurement.

QDR would end up being a forcing function that would compel a choice," said Stephen Biddle, at the time an Army War College professor. "The great irony of the QDR that we got, of course, is that they decided they'd do both," he added.

Defense budget expert Steven Kosiak found little to praise. "The Defense Department has made a few choices that might, potentially, move us in a better direction, such as the decision to accelerate the fielding of a new bomber. Unfortunately, the QDR did very little to make the department's long-term plans more realistic and affordable," Kosiak told a Council on Foreign Relations roundtable in February 2006.

Kosiak was proved right. The budget was on an uphill climb to a 2008 topline that was the highest since World War II, but the bomber program survived only three years. Cordesman termed the 2006 QDR a "morass of half thought-out ideas," with calls for further study and deferred decisions.

One lasting legacy was the Deputy's Advisory Working Group or DAWG, established during the 2006 QDR process. The group was originally convened to tee up forthcoming recommendations and stayed active afterward.

The DAWG meets twice a week, under the chairmanship of the deputy secretary of defense and the vice chairman of the Joint Chiefs of Staff, and includes senior civilian and military leaders. Supporting the DAWG is a system of boards and committees, chaired by senior civilian and military officials, each focused on a broad functional area. The new creation became a central forum for debate at the highest levels—and gave the QDR legs.

"DAWG after DAWG, people had to explain how it fit the QDR," Gunzinger recalled.

Despite the elaborate process, the QDR was spinning off course. By 2010, the next QDR would find itself badly out of alignment, with major budget decisions coming a year in front of it and the new national strategy showing up months later. "April 2009 was the beginning of the QDR," said Gunzinger, referring to the long list of program cancellations Gates announced in April 2009.

A Game of Catch-up

In this case, the new Obama Administration wanted to make a break with the past. Cutting spending, rebalancing the force with more irregular warfare capabilities, and scoring some early executive branch wins were all part of the package. The "reform budget" for Fiscal 2010 did all that—a year ahead of the QDR.

This QDR was a game of catch-up rather than a clean-sheet review. Flournoy, now the undersecretary of defense for policy, said, "You saw this vision first expressed in the FY '10 budget. The QDR builds on the momentum from that period."

There was another major schedule problem. Congress wrote in law that the QDR should take place after delivery of the national security strategy. The Obama Administration instead put off this task until May 2010, nearly four months after the QDR's unveiling.

This was not due to the unimportance of the national strategy. When the NSS was released, the A-list rollout put the Pentagon QDR in the shade. Secretary of State Hillary Rodham Clinton amplified the need for American leadership, while then-National Security Advisor James L. Jones briefed on military aspects. QDR 2010 ended up sandwiched between early budget cuts, a late strategy, and other initiatives such as the 2010 effort to trim defense overhead costs.

It still drew criticisms—including a fiscal warning not heard in reactions to previous QDRs. Retired Air Force Lt. Gen. Lawrence P. Farrell Jr. criticized the QDR and budget documents for being "virtually silent on the dire fiscal straits the country finds itself in, huge federal deficits as far as the eye can see, and the consequences this will have on future defense budgets."

Looking to the QDR to set out a new strategy is a tough task. But some believe this is what the next QDR must do. Change in the economic foundation of American security policy is one major shift; the rise of China is another. Recent developments have also de-emphasized relationships with longtime NATO allies.

According to Gunzinger, the broad assumption of a relatively permissive, regional conflict environment dated from the BUR and "worked for the last 20 years." Many observers "think the next QDR should revisit these assumptions" because the permissive environment is slipping away as peer threats re-emerge.

The QDR Independent Panel last summer called for a much more thoughtful, long-term view to grapple with issues like these. "The Department of Defense needs to look past the QDR and its focus on today's conflicts and today's planning needs to the broader set of defense challenges our nation will face in the next 20 years."

Under those conditions, the next QDR could be make-or-break for the Air Force. It is likely to contain further policy and budget decisions on cyberspace, for example. It will either push forward or throttle back the new long-range strike efforts. Most of all, it will be a QDR largely free of the necessary preoccupation with Iraq and Afghanistan. Peer threats will be real and present. The next QDR, too, can hardly avoid a close look at manpower in the ground forces and, perhaps, in all services.

These are the things the review should do. As critics will quickly point out, however, previous results have been less impressive. ■

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Verbatim

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Smoke Signals

"Deliver what you promise. Period. Dot. Don't blow smoke up my ass. There is no time for it. There is no money for it. There is no patience for it."***—Gen. Norton A. Schwartz, USAF Chief of Staff, in remarks to defense contractors at an industry conference in Washington, D.C., Feb. 9.***

Forrest Gump in Washington

"We are analyzing the speech of Saif al-Islam Qaddafi to see what possibilities it contains for meaningful reform."***—Unnamed senior administration official, responding to a Feb. 20 speech in which Muammar Qaddafi's son vowed to fight "to our very last man, woman, and bullet."***

No War-less War

"Let's just call a spade a spade. A no-fly zone begins with an attack on Libya to destroy the air defenses. That's the way you do a no-fly zone. And then you can fly planes around the country and not worry about our guys being shot down, but that's the way it starts."***—Defense Secretary Robert M. Gates, in remarks to the House Appropriations subcommittee on defense, March 2.***

Unassailable Logic ...

"Because it is principally our Air Force and Navy that deter both China and Iran, ground force cuts would not directly affect our ability to deal with these two powers."***—Michael E. O'Hanlon, a senior fellow at the Brookings Institution, writing in*** **Politico,** ***Feb. 18.***

... Almost Anyone Can Grasp

"In the competition for tight defense dollars within and between the services, the Army also must confront the reality that the most plausible, high-end scenarios for the US military are primarily naval and air engagements—whether in Asia, the Persian Gulf, or elsewhere. ... In my opinion, any future Defense Secretary who advises the President to again send a big American land army into Asia or into the Middle East or Africa should 'have his head examined,' as General MacArthur so delicately put it."***—Defense Secretary Robert M. Gates, in remarks to cadets at West Point, N.Y., Feb. 25.***

Was That Really the Fat Lady?

"Much is promised by our competitor, whom we congratulate. However, should they fail to deliver, we stand ready to step in with a proven and operating tanker."***—Statement by EADS North America Chairman Ralph D. Crosby Jr., announcing there will be no protest of the KC-X tanker contract to Boeing, March 4.***

Go Ahead, Make My Day

"We still preserve our right to self-defense and to respond in whatever means we think is appropriate. ... I mean, we would respond to attacks in space in the same way that we would respond to other attacks. So it's not any different."***—Deputy Secretary of Defense William J. Lynn III, news conference on the new National Security Space Strategy, Feb. 4.***

In Short, Thoroughly European

"Some here in Europe ... maintain that Europe is consolidating its place as one of the world's top providers of humanitarian and development aid. They suggest a division of labor within NATO—with the United States providing hard power, while its European allies increasingly turn to soft power assignments like training and institution-building. As a committed European I find this suggestion at best naive, and, at worst, dangerous."***—Anders Fogh Rasmussen, NATO Secretary General, remarks in Brussels, Feb. 7.***

Cyber Perspective

"Although we cannot dismiss the threat of a rogue state lashing out [against US networks], most nations have no more interest in conducting a destructive cyber attack against us than they do a conventional military attack. The risk for them is too great."***—William J. Lynn III, deputy secretary of defense, in remarks to the RSA Conference in San Francisco, Feb. 15.***

Turning the Taliban Tide?

"This is really the heart of the insurgency. I believe they [the Taliban] have been beaten. ... They've suffered defeat after defeat on the battlefield."***—Marine Corps Maj. Gen. Richard P. Mills, commander of US forces in Afghanistan's Helmand province, as quoted Feb. 15 in*** **USA Today.**

The Worm Turns

"Nations need to pause before diving into cyber war against nuclear facilities. Stuxnet is now a model code for all to copy and modify to attack other industrial targets. Its discovery likely increased the risk of similar cyber attacks against the United States and its allies."***—Feb. 15 report of the Institute for Science and International Security, referring to the Stuxnet computer "worm" that struck Iran's nuclear facilities.***

Rummius Horribilis

"Oh, the poor people. I terrified them. My goodness. Come on. These are people with stars on their shoulders. They're people who are patriots. They are people who've fought battles. And they weren't terrified or intimidated. My goodness gracious. I ask tough questions. There's no question about it. And if someone doesn't know the answer, it's not fun for them."***—Former Secretary of Defense Donald H. Rumsfeld, ABC "Nightline," on claims that he browbeat senior military officers, Feb. 7.***

Absolution

"I do not agree with the conclusion that General Cartwright maintained an 'unduly familiar relationship' with his aide. Nor do I agree that General Cartwright's execution of his leadership responsibilities vis-a-vis his aide or any other member of his staff was inconsistent with the leadership requirements."***—Navy Secretary Ray Mabus, final judgment of inquiry into whether USMC Gen. James E. Cartwright, vice chairman of the Joint Chiefs of Staff, did something improper with a female officer, in*** **New York Times,** ***Feb. 24.***

Comprehensive Concerns

"We remain concerned about the extent and strategic intent of China's military modernization and its assertiveness in space, cyberspace, in the Yellow Sea, East China, and South China Sea."***—New National Military Strategy of the United States of America, released Feb. 8.***

Japan at a Crossroads

By Richard Halloran

A USMC CH-53 helicopter lands at Okinawa, Japan. Military bases on Okinawa have been a sore spot in US-Japanese relations.

USMC photo by Cpl. Patricia D. Lockhart

Mil-to-mil relations are strong, but the US needs Japan's politicians to deliver what they've promised.

When Secretary of Defense Robert M. Gates was in Tokyo this past January, he admonished the Japanese to do more for their common defense and insisted they render greater support for US forces in Japan.

He persisted in urging Japan's leaders to resolve the issue of relocating a US Marine air station in Futenma on Okinawa. It has become an open sore in the US-Japan alliance.

Given the scope, complexity, and lethality of the challenges to regional security in Asia, Gates asserted in an address at Keio University, "I would argue that our alliance is more necessary, more relevant, and more important than ever." To modernize the force posture of the US and Japan, he said, "we need a committed and capable security partner in Japan."

In response, Prime Minister Naoto Kan a week later delivered an address billed as a major foreign policy statement but that turned out to be laced with platitudes and promised little in support for US forces in Japan. Kan brushed off the turmoil in the relationship with the US, saying: "I think that by now there is little need to speak on this at length." He did acknowledge US

USMC photo by SSgt. Andrew D. Pendracki

Marine Corps Lt. Gen. Terry Robling (r) and Maj. Gen. Peter Talleri head to a meeting with Japanese Prime Minister Naoto Kan (c) at MCAS Futenma, Okinawa. Kan has downplayed the increasingly bumpy relationship between the US and Japan.

marines might be called on "to shed their own blood should a contingency arise." On Futenma, Kan gave no specifics about healing the wound which has steadily weakened the US-Japan partnership. Kan said the situation was "deeply regrettable for the people of Okinawa, and I feel a deep sense of shame at this situation."

The Futenma dispute has arisen from a realignment of US forces in the Pacific and Asia, beginning in the 1990s, to revise command lines and force structure left over from the war in Vietnam, the Korean War, and World War II. Reducing the presence of US troops and relocating their bases was intended to ease the friction that arises when American troopsare stationed on someone else's sovereign soil.

The recent emergence of China as a potential adversary has lent urgency to the realignment. US forces in Korea are being consolidated and assigned an expeditionary mission and air and naval bases on Guam are being expanded. But efforts to get Japan to contribute more have stalled. The devastating earthquake and tsunami on March 11 has set them back even further.

In 2006, Defense Secretary Donald H. Rumsfeld and Secretary of State Condoleezza Rice joined Foreign Minister Taro Aso and Defense Minister Fukushiro Nukaga of Prime Minister Junichiro Koizumi's Cabinet in signing an agreed roadmap to realign US forces in Japan.

Among the roadmap's initiatives, much of the cost of which was to be borne by Japan, was the movement of a Marine helicopter base from Futenma to the rural town of Henoko on Okinawa, and shifting 8,000 marines and 9,000 dependents from Okinawa to Guam (with Japan paying $6 billion of the $10 billion cost).

After the new helicopter base was constructed and the marines moved to Guam, the remaining US forces on Okinawa would be consolidated and significant parcels of land would be returned to the Okinawans.

Elsewhere in the country, a US Army command post at Camp Zama, south of Tokyo, would be modernized, and a Japanese Central Readiness Force would be posted alongside. A US battle command training center would also be constructed with US funds. At Yokota Air Base, west of Tokyo, a Japanese Air Defense Command unit would be set up next to a USAF facility, with a joint operations coordination center established, with each nation funding its equipment. A US Navy carrier wing would be moved from Atsugi, a crowded town southwest of Tokyo, to a Marine air station in Iwakuni, on the southern tip of Honshu island (with some Marine helicopters moving to Guam). The agreement also stipulated Japan and the US would continue to develop anti-missile defensive capabilities.

USAF photo by SSgt. Darnell T. Cannady

A Japan Air Self-Defense Force F-15J flies off the wing of a USAF aircraft during refueling training between the two countries. Kadena Air Base, USAF's airpower hub in the western Pacific, is a prime target for those who want US forces out of Japan.

After the roadmap agreement, the Army command post at Zama was refurbished and the air defense center constructed at Yokota. Work on most of the initiatives came to a halt, however, when Yukio Hatoyama of the Democratic Party of Japan (DPJ) became Prime Minister in September 2009. By saying he wanted to revisit the roadmap agreement, particularly the relocation of the Futenma helicopter base, Hatoyama in effect reneged on the agreement.

Okinawa's Anti-base Movement

Hatoyama's stance on the Futenma question gave anti-US activists on Okinawa a wide opening, and they demanded that the Marine air station be removed from Okinawa altogether. Confronted with the Futenma debacle, a financial scandal, and other domestic opposition, Hatoyama lasted only nine months in office and was forced to resign in June 2010. Kan, also of the DPJ, replaced him.

Even though the Japanese were jolted by Chinese and North Korean belligerence in recent months, Kan and his government have done little to persuade the Americans that Japan intends to be a reliable ally. "Kan hasn't done anything to stop the bleeding," said one American official.

In particular, there is no discernible progress on settling the Futenma issue. Kan plans to visit Washington sometime this year but needs to have what the Japanese call an o-miyage, or present, to take with him. It remains to be seen whether the Prime Minister can arrange for one on Futenma.

Looking beyond Futenma, American officials say privately the long-range objective of Okinawa's anti-base movement is to drive out the US air base at Kadena on Okinawa, home of the 18th Wing, USAF's largest combat wing and the hub of American airpower in the western Pacific. Nearly 18,000 Americans and 4,000 Japanese employees serve there. "There is no substitute for Kadena," said an American defense official. "But it will be a target if the US and Japanese governments cave in on Futenma."

Consequently, some Japanese diplomats have begun to wonder aloud whether Japan can continue to be a trusted partner in securing US strategic interests in Asia.

American military officers and civilian officials have become so exasperated they will not discuss Japanese politicians in public and will speak in private only with assurance they will not be named. "The Japanese have got to pull their socks up," said one senior officer. "They've got to spend more on

USAF photo by SrA. Daniel McKittrick

A JASDF C-1 takes on cargo at Yokota AB, Japan. Despite the political tensions, officers describe US-Japanese military relations as strong.

defense, and they've got to take more responsibility for their own security."

A small but telling point came in the January State of the Union address by President Barack Obama. He mentioned China, India, Russia, South Korea, and 10 other nations—but made no mention of Japan. "Japan is, at best, an afterthought and, at worst, has become a laughingstock following a sequence of hapless prime ministers," one American officer noted.

American officers, however, are quick to assert military-to-military relations between US forces, particularly US Pacific Command and its Air Force, Army, Navy, and Marine Corps components and the Japan Self-Defense Forces, are firm. "It's a high-maintenance alliance," said an Air Force officer in Japan, citing cultural and language differences, "but it works."

As evidence, American officials point to the Japan Air Self-Defense Force's operations center deep underground in its modern headquarters in the Ichigaya district of Tokyo, where spots are set aside for American liaison officers who will report for duty in a crisis.

Japanese military officers, encouraged in recent years as their nation emerged from the post-World War II pacifist cocoon, express impatience with their political leaders. But they seem resigned to waiting out the current politicians in hopes something better will come along.

Some officers and defense strategists have even rallied around Gen. Toshio Tamogami, who was forced to retire as Chief of Staff of the Air Self-Defense Force in 2008 after he published a controversial essay contending the US war against Japan in 1941 was instigated by President Franklin Roosevelt after he was secretly influenced by Soviet agents.

In the ensuing two years, however, Tamogami has become a popular speaker and writer who has influenced public thinking on security. In a best-selling book published in October, he asserted Japan should establish the right to collective self-defense, assemble sufficient forces to defend itself, and acquire nuclear weapons.

Outrageous North Korea

"What is the US strategy in Asia, including Japan?" Tamogami asked. "What is the US going to do with China? And what is the real intention of [the] US in keeping Japan as an ally?"

He contended, "Japan should not just be subordinate to the US but use the alliance for Japan's national interest, and the first step is to understand American strategy."

The fundamental problem with the Japanese government is systemic, not partisan politics. From the end of the American occupation in 1952, Japan was governed by a stable "establishment" of politicians led by Shigeru Yoshida, the towering figure of the postwar period, business executives, and government officials.

This consensus lasted until 1993, when Prime Minister Kiichi Miyazawa, the last of the Yoshida deshi, or followers, left office. He was followed by a string of leaders who, with one exception, were in office for only about a year. Japan drifted, as successive governments had no strong foreign policies and spent less than one percent of gross national product on defense, by far the least of any industrial nation.

The exception was Koizumi, who served from April 2001 to September 2006. During his tenure, the roadmap was negotiated with the US, the JASDF sent airlift to Kuwait during the war in Iraq, the ground self-defense force deployed a peacekeeping battalion to Iraq, and the Maritime Self-Defense Force deployed ships to the Indian Ocean and Persian Gulf on anti-piracy and refueling duty.

After Koizumi left office, however, those missions were gradually discontinued. Gates, in his January address, sought to revive Japan's contributions, however modest, to operations outside of Japan. He called on Japan "to take on even greater regional and global leadership roles that reflect its political, economic, and military capacity."

Gates asserted the deployment of US forces to Japan, which some Japanese want to end, was critical to the common defense. "Without such a presence," he argued, "North Korea's military provocations could be even more outrageous or worse. China might behave more assertively towards its neighbors." Tamogami, the retired general, favors Japan's alliance with the US but questions whether the US could be counted on to defend Japan in a conflict against China.

"Japan should not be manipulated by those two states," he said. "Therefore it is necessary to understand American thinking in its security relations with Japan." He advocates a major buildup in Japanese military capabilities.

"Tamogami was wrong about Japan's role in World War II," said an American official who analyzes trends in Japan. "But he was mostly right about what Japan needs to do today." ■

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The legendary and controversial airpower theorist is debated to this day.

Douhet

By Robert S. Dudney

In 1911, Italy went to war with the fading Ottoman Empire. Rome's target was Libya, a Turkish province. It was a forgettable war but for this fact: The Italian Army brought its fledgling force of nine aircraft, which flew history's first reconnaissance and bombing missions.

For military airpower, it was the Genesis 1:1 moment.

This long-ago war also had a historic indirect effect: It helped to launch a new career for an obscure Italian officer, Maj. Giulio Douhet. Douhet, long an artilleryman, had just gone on aviation duty. The Libyan war convinced the Army to form a true aviation unit, and Douhet got the command.

The rest is history, and controversy. Over the decades, Douhet has been called many things: airpower "prophet," theorist, evangelist, visionary, charlatan. He is viewed by many as the "father of airpower," the first to see its true strategic potential.

Phillip S. Meilinger, the airpower historian and analyst, called him "the first great air theorist" and "perhaps the most important air theorist." Douhet's basic work, *The Command of the Air,* published in 1921, was the first comprehensive analysis of airpower.

To critics, the name "Douhet" is synonymous with a dark side of airpower. They say he articulated a vision glorifying the "knockout blow" with fleets of bombers prowling the skies, burning cities, and causing mass death.

His book, to critics, stands as the last word on airpower extremism—the idea that airpower alone could win wars.

For decades, the writings of Douhet have generated intense debate. The clash of opinion goes on unabated, even though he went to the grave in 1930.

"Clearly, Giulio Douhet was a visionary," said military historian I. B. Holley. "With only the scantiest empirical evidence to go on, he visualized the concept of strategic air war. By sheer imagination, he also recognized the necessity of air supremacy or what he called 'command of the air.'"

He did all of this by 1915, Holley noted, almost before there even was such a thing as military aviation.

Douhet was born on May 30, 1869, in Caserta, near Naples, into a family with a history of military service. Young Douhet was an excellent student, standing first in his class at Genoa Military Academy. At 19, he was commissioned into the artillery corps.

Douhet soon took up advanced studies at the Polytechnic Institute in Turin, a bastion of science and engineering.

In 1900, the Army assigned Douhet—then a captain—to the general staff, where he explored technological issues. The young officer lectured widely on

Italian dirigibles bomb Turkish forces in Libya. Douhet predicted the skies would become as important as land or sea.

military mechanization. By all accounts, Douhet's technological interest kicked into high gear with the arrival of aircraft in Italy.

In 1905, Italy built its first lighter-than-air dirigible. The military potential of such craft struck him instantly, and he buried himself in studies of air technology. Douhet followed aeronautical events closely, and was fascinated by the first flight of an Italian fixed-wing aircraft in 1908.

In a 1910 essay, he predicted, "The skies are about to become a battlefield as important as the land or the sea. ... Only by gaining the command of the air shall we be able to derive the fullest benefit" of combat in this realm.

Then came Libya, and Douhet was tasked with identifying its aviation lessons. His final report dwelled on the organizing, training, and equipping of an air force. He observed that the airplane was well-suited for "high altitude bombing." On the sensitive matter of command, Douhet showed a streak of daring, noting there was nothing preventing "the formation of independent air units" under certain circumstances.

In 1912, Douhet assumed command of Italy's new air unit, based at Turin. There, he wrote what was probably the first air doctrine manual, "Rules for the Use of Airplanes in War."

His aviation stint proved memorable—and short. He had become a true believer; he viewed the airplane as a potentially dominant weapon, but only if it could be pried out of the hands of uncomprehending ground commanders. He soon began preaching the need for an independent air force, created by, of, and for airmen.

Army officers were irritated by his untraditional ideas. They were outraged when, in early 1914, he dispensed with budgeting formalities and ordered a three-engine bomber from his friend and fellow airpower enthusiast, industrialist Giovanni "Gianni" Caproni. For that, the Army exiled Douhet to an infantry division at Edolo, near the Austrian border.

He was there in July 1914, serving as division chief of staff and pondering airpower, when the Great War erupted in Europe.

A Turning Point

Now a colonel, Douhet badgered the Army with ideas about national preparedness. Italy should build an air force potent enough "to gain command of the air," he declared in a December 1914 essay, so as to render the enemy "harmless." He advocated production of 500 bombers capable of dropping 125 tons of ordnance per day on "the most vital, most vulnerable, and least protected points" of Austrian or German soil.

In 1915, Italy finally entered the war. Douhet was shocked by the Army's poor condition and leadership. He wrote scathing letters, advocating use of airpower. He was arrested in September 1916 and court-martialed for spreading false news and agitation. Military judges sentenced him to a year in prison.

Then, in October 1917, came Italy's disastrous battle at Caporetto, with some 300,000 casualties. It more than vindicated Douhet's acid remarks about the Army. As a result, he was released from jail and returned to duty as director of aviation at the General Air Commissariat.

Things did not go well, and in June 1918 he left military service. The Army overturned Douhet's conviction and promoted him to brigadier, yet he declined to return and focused on his writing about airpower.

It is clear Douhet was profoundly affected by the carnage of World War I, appalled at the murderous result of years of stagnant trench warfare. More deeply, he saw what happened when a force using outdated tactics and illogical plans went up against modern weapons.

In 1921, Douhet completed *The Command of the Air,* his principal treatise on the concept of strategic airpower. While in time it would become hugely influential, initial response was muted.

Things were different in 1926 when he published a revised and more strident version. The book drew harsh attack, especially from army and navy partisans. Small wonder, as it openly claimed their forces to be obsolete.

Douhet devoted his final four years to intellectual combat with such foes. In this, as one historian put it, he proved to be "tireless, blunt, impatient, and very self-confident."

What, exactly, did Douhet preach? The main assumptions of his airpower concept, all contained in *The Command of the Air* and other writings, can be summarized briefly.

- Wars are no longer fought between armies, but between whole peoples, he believed, and future wars would be total and unrestrained, with civilians as legitimate targets.
- Wars are won by destroying "the enemy's will to resist"—and only this produces "decisive victory." Defeat of enemy forces is a poor indirect route. It is far better to strike directly at "vital centers" of power inside an enemy nation.
- World War I was a turning point, showing armies and navies can no longer end wars; the power of the defense—poison gas, machine guns—makes offensive action futile.
- The airplane, though, is revolutionary, "the offensive weapon par excellence," able to bypass surface defenses and carry out massive attacks on cities, destroying the enemy's will to resist.
- For national defense, command of the air is necessary *and sufficient.* The army's job is to mop up after air attacks. The navy is of even less use.

The centerpiece of Douhet's theory was what he saw as the airplane's potential to devastate an enemy's indus-

Photo from National Archives

Children in London perch on the ruins of their home after a German bombing raid in 1940. World War II was the first test of Douhetian theory, and the reviews are mixed. Attackers were able to inflict massive damage, but did not break the will of the people.

trial heartland in relatively short order. However, he believed that an air force's first task was to achieve command of the air, similar to today's concept of air supremacy.

Douhet did not argue for air battle, but rather for attacking airfields, parked aircraft, and aircraft factories—"destroying [the enemy's] nests and eggs on the ground" rather than having to "hunt his flying birds in the air."

With enemy air capabilities neutralized, Douhet reasoned, the foe would be unable to attack. One's own bombers could then be freed to unleash a storm of aerial bombardment against critical targets.

Attacks were to feature use of high-explosive, incendiary, and poison gas bombs, in that order. Explosives would knock down big structures, incendiaries would set them aflame, and poison gas would thwart efforts to put out the fires.

Douhet identified five basic types of targets: industrial centers, transportation infrastructure, communications, key buildings, and civilian morale. To Douhet, this last category was the most important.

He bluntly advised heavy use of urban bombing, which would kill and terrorize the civilian population. He famously predicted air attack would turn European cities into "unapproachable, flaming braziers" in a matter of hours.

J. F. C. Fuller, a British confrere, went so far as to write that bombing could turn a city into "one vast raving Bedlam; the hospitals will be stormed, traffic will cease, the homeless will shriek for help, the city will be in pandemonium. [Government] will be swept away by an avalanche of terror."

That this would ultimately force surrender was never doubted by Douhet. "How could a country go on living and working under this constant threat," he asked, "oppressed by the nightmare of imminent destruction and death?"

An Apocalyptic Vision

Answering his own question, Douhet predicted a kind of popular revolt. "The time would soon come when, to put an end to horror and suffering, the people themselves, driven by the instinct of self-preservation, would rise up and demand an end to the war," he wrote. This would take "very few days."

It was a truly apocalyptic vision. Squeamish politicians and civilians were invited by Douhet to "avert their eyes."

He saw little use for "auxiliary aviation" (that is, fighters). In later years, he even maintained these forms of aviation were "worthless, superfluous, harmful," as they were defensive. "Viewed in its true light, aerial warfare admits of no defense, only offense," he said.

The 1920s and 1930s were years of relative peace, so Douhet's theories did not face the test of war for two decades. The true extent of his influence on actual military doctrine remains a subject of controversy.

It appears American airmen were among the more receptive. In 1922, Brig. Gen. Billy Mitchell met several times with Douhet in Europe. Translated excerpts of *The Command of the Air* appeared at US Army Air Service headquarters in 1923. Some historians profess to see traces of Douhet's work in Air Service texts on strategic air war.

By the mid-1930s, detailed articles about Douhet began turning up in US military publications, and a translation of the second edition of *The Command of the Air* circulated around the Air Corps in 1933.

However, individual strategy officers disclaimed any Douhetian influence. And Meilinger has noted that when USAAF entered World War II, it did so without the "Douhetian" concept of area bombing and attacks on civilians. No one in the 1930s air hierarchy advocated such an air strategy, he said. For military, legal, and humanitarian reasons, it was expressly rejected in favor of high-altitude, daylight, precision, formation bombing of industrial targets.

It appears, in the United States, Douhet's work served to reinforce the views of Air Corps officers who had already come to the same conclusions by other routes.

Douhet's convictions, as Gen. Henry H. "Hap" Arnold reported in his book, *Global Mission,* provided ideological ballast to US Army Air Forces doctrine. "As regards strategic bombardment, the doctrines were still Douhet's ideas modified by our own thinking in regard to pure defense," said Arnold.

World War II, with its great Allied and Axis air fleets, presented the first real-world test of the Italian airman's basic concepts. How did they fare?

The record is decidedly mixed. Bernard Brodie, the Rand airpower analyst, put it this way in "The Heritage of Douhet," his classic 1952 study: "If we disregard the overall vision and consider only specific assertions, it is clear that in World War II Douhet was proved wrong on almost every important point he made."

According to Meilinger, "His basic precepts—that the air would become a violent and crucial battlefield; that the country controlling the air would also control the surface; that aircraft, by virtue of their ability to operate in the third dimension, would carry war to all peoples in all places; and that the psychological effects of air bombardment would be great—have proven accurate."

Unfortunately, Meilinger added, Douhet was prone to exaggerate the capabilities of airpower. He said that the war was not kind to Douhet's specific assumptions, "many of which, quite simply, were wrong."

Bombs dropped by AAF B-17s fall toward a railroad center at Bolzano, Italy, in 1943. Douhet overestimated the physical effects per ton of bombs dropped because he did not account for poor accuracy or improved defenses.

Among the errors cited by Meilinger and other historians is Douhet's overestimation of "terror." Douhet put great store in the psychological effects of bombing, yet neither the German nor Japanese people buckled under air attack, and civilian morale did not decline notably. Indeed, there is evidence it hardened their resolve.

Douhet also exaggerated physical damage. The Allied bomb tonnage exceeded by many multiples that specified by Douhet, yet with far less effect than predicted. Serving to undercut the effectiveness of bombing were poor accuracy, bad weather, faulty equipment, better-than-expected firefighting, and so forth.

Douhet virtually ignored the potential threats to airborne bombers and the efficacy of air defenses. The advent of radar, high-performance fighters, and accurate air defense guns proved him wrong. In operations over Germany, the USAAF and RAF each lost some 80,000 air crew members and hundreds of bombers. In the Battle of Britain, radar stripped away the German bombers' surprise factor.

Douhet also failed to see or even grant as possible advances in surface war capabilities—on land or at sea. Tanks are not even mentioned in *The Command of the Air.*

Land fronts were far from static, shifting rapidly on the western and eastern fronts. This was aided in no small part by aircraft used in a tactical role.

Douhet Rehabilitated?

Douhet backers had a different view. They argued that Allied command of the air was vital to victory in the war, that German and Japanese economies were destroyed, and that civilian morale suffered. They also note a key point: While Douhet banked heavily on use of poison gas bombs to intensify the impact of air attack, they were not used, with (militarily, at least) undesirable results.

In short, when it came to Douhet's theories, many things went wrong but many others went right. The high expectations themselves have to be considered in the equation.

"Strategic bombing was a failure only by the standards of its arch-proponents," wrote historian John Buckley in *Airpower in the Age of Total War,* his 1999 book. "Clearly, bombing did not win World War II by itself. ... But it did contribute greatly to the economic collapse of the Axis powers."

Oddly, Douhet's reputation flourished in the wake of World War II, and for a specific reason: the atomic weapon.

Brodie, who was perhaps the most significant nuclear strategist of the era, claimed in 1952, "Time has rescued [Douhet] from his first and gravest error—his gross overestimate of physical effects per ton of bomb dropped."

That was because one bomber with a single atomic bomb could surpass the damage caused by a whole fleet of conventional bombers. In Brodie's view, the bomb had salvaged Douhet's concept of strategic war. "He was able to create a framework of strategic thought which was ready-made for the atomic age," wrote Brodie.

Unquestionably, the test of experience has forced significant changes and redirections in the concept of "strategic airpower," and few if any today would accept Douhet's ideas in unadulterated form.

Paradoxically, some have argued that, as the air weapon has become steadily more capable, a byproduct has been rehabilitation of Douhetism. One USAF officer wrote, "Each technical advance, from early bombsights to more powerful aircraft to the atomic bomb, brought airpower closer to the Douhetian ideal."

In recent years, the emergence of stealth, precision bombs, and space support has produced similar claims.

"It was notable," wrote Buckley, "that in the aftermath of the Gulf War of 1991, many airpower advocates were claiming that the air campaign ... proved Douhet ... correct."

Douhet, if he was indeed a prophet, was something of an accidental one, wrong in many particulars but right when it came to the big stuff. His accomplishment was flawed, but real.

"Considering that it took over two thousand years of warfare on land and sea to produce Henri de Jomini, Carl von Clausewitz, and Alfred Thayer Mahan," observes Meilinger, "we should not be overly critical of the airman who began writing a theory of air war scarcely one decade after the invention of the airplane." ■

Robert S. Dudney is a former editor in chief of Air Force *Magazine (2002-2010). His most recent pieces were "Hard Lessons at the Schriever Wargame" and "Rise of the Cyber Militias" in the February issue.*

Chart Page Special

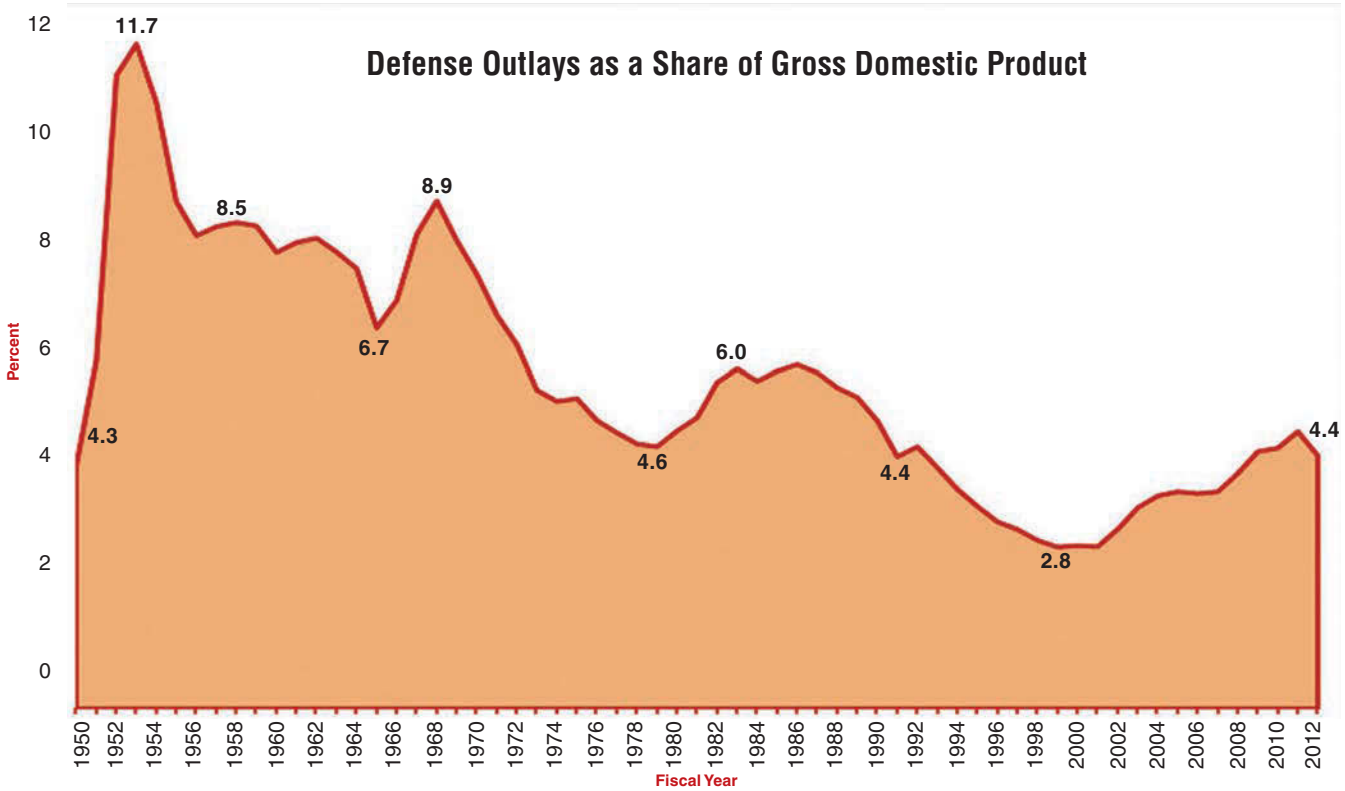
Defense Budget at a Glance

President Obama on Feb. 14 presented a DOD budget request for Fiscal 2012. It seeks $553.1 billion in budget authority not including war costs and $670.9 billion in BA counting war costs. Funding most often is stated in BA—the value of new obligations DOD can incur. (Some are paid in future years.) Figures can also be expressed in outlays—actual checks written in a given year. "Current dollars" contain no adjustment for inflation. With "constant dollars," inflation has been factored out. Charts address only the Defense Department program.

Defense Budget Authority

($ billions)

	2010	2011	2012	Planned 2013	2014	2015	2016
No War Costs, Current dollars	$527.9	$526.1	$553.1	$570.7	$586.4	$598.2	$610.6
No War Costs, Constant FY 2012 dollars	$541.7	$532.9	$553.1	$563.3	$567.2	$567.0	$567.2
With War Costs, Current dollars	$690.2	$685.1	$670.9	$620.7	$636.4	$648.2	$660.6
With War Costs, Constant FY 2012 dollars	$708.3	$694.0	$670.9	$612.6	$615.6	$614.4	$613.7



Defense Outlays

($ billions)

	2010	2011	2012	Planned 2013	2014	2015	2016
Current dollars	$663.7	$733.9	$701.6	$643.0	$632.5	$639.0	$646.4
Constant FY 2012 dollars	$681.1	$743.4	$701.6	$634.6	$611.8	$605.7	$600.5

Service Shares

(Budget authority in billions of constant FY 2012 dollars)

Dollars	2010	2011	2012	2013	2014	2015	2016
Air Force	146.1	145.1	150.0	151.1	154.4	156.9	153.8
Army	142.4	138.6	144.9	149.3	147.9	146.6	148.6
Navy/Marine Corps	159.4	157.6	161.4	166.1	165.2	167.1	165.5
Defense agencies	93.9	91.7	96.8	111.6	114.7	117.3	99.3
Total	**541.7**	**532.9**	**553.1**	**563.3**	**567.2**	**567.0**	**567.2**
Percentages							
Air Force	27.0%	27.2%	27.1%	26.8%	27.2%	27.7%	27.1%
Army	26.3%	26.0%	26.2%	26.5%	26.1%	25.9%	26.2%
Navy/Marine Corps	29.4%	29.6%	29.2%	29.5%	29.1%	29.5%	29.2%
Defense agencies	17.3%	17.2%	17.5%	19.8%	20.2%	20.7%	17.5%

Note: FY 2013-15 estimates from FY 2011 National Defense Budget Estimates; FY 2016 based on FY 2012 shares.

Cutting the Pie: Who Gets What

(Budget authority in billions of constant FY 2012 dollars)

	2010	2011	2012	2013	2014	2015	2016
Military personnel	139.3	137.0	142.8	145.4	146.4	146.4	146.4
O&M	188.7	186.9	204.4	208.2	209.6	209.6	209.6
Procurement	105.9	106.2	113.0	115.1	115.9	115.8	115.9
RDT&E	81.4	81.4	75.3	76.7	77.2	77.2	77.2
Military construction	21.0	16.1	13.1	13.3	13.4	13.4	13.4
Family housing	2.4	2.3	1.7	1.7	1.7	1.7	1.7
Other	3.2	3.1	2.7	2.7	2.8	2.8	2.8
Total	**541.7**	**532.9**	**553.1**	**563.3**	**567.2**	**567.0**	**567.2**

Note: FY 2013-16 estimates are based on actual shares for FY 2012.

Manpower

(End strength in thousands)

	1990	2009	2010	Est. 2011	Est. 2012	Change 1990-2010
Total active duty	2,065	1,419	1,431	1,432	1,423	-634
Air Force	535	333	334	332	333	-201
Army	751	553	566	569	562	-185
Navy	582	329	328	329	326	-254
Marine Corps	197	203	202	202	202	5
Selected reserves	1,128	846	849	846	847	-279
Civilians (FTE)	997	703	741	755	748	-256

Operational Training Rates

	1990	2000	2009	2010	Est. 2011	Est. 2012
Air Force						
Flying hours per crew per month, fighter/attack aircraft	19.5	17.2	17.0	19.4	11.4	11.0
Army						
Flying hours per tactical crew per month	14.2	12.7	11.6	12.0	12.3	12.3
Annual tank miles/FSTM	800	669	547	427	583	675/1,479
Navy						
Flying hours per tactical crew per month	23.9	20.9	14.7	16.6	20.1	18.1
Ship steaming days per quarter						
Deployed fleet	54.2	50.5	58.0	58.0	58.0	58.0
Nondeployed fleet	28.1	28.0	24.0	24.0	24.0	24.0

Acronyms

AEHF	Advanced Extremely High Frequency
AOC	Air & Space Operations Center
AFRC	Air Force Reserve Command
AMRAAM	Advanced Medium-Range Air-to-Air Missile
ANG	Air National Guard
AWACS	Airborne Warning and Control System
BCT	Brigade Combat Team
BUR	Bottom-Up Review
CSAR-X	Combat Search and Rescue Replacement Vehicle
CVLSP	Common Vertical Lift Support Platform
DCGS	Distributed Common Ground System
DMSP	Defense Meteorological Satellite Program
EELV	Evolved Expendable Launch Vehicle
FSTM	Full Spectrum Training Mile
FTE	Full-Time Equivalent
FWE	Fighter Wing Equivalent
GPS	Global Positioning System
Helo	Helicopter
JASSM	Joint Air-to-Surface Standoff Missile
JDAM	Joint Direct Attack Munition
JSpOC	Joint Space Operations Center
JSF	Joint Strike Fighter
MEF	Marine Expeditionary Force
MLV	Medium Launch Vehicle
NPOESS	National Polar-orbiting Operational Environmental Satellite System
O&M	operation and maintenance
ORS	Operationally Responsive Space
PAA	Primary Aircraft Authorized
QDR	Quadrennial Defense Review
RDT&E	research, development, test, and evaluation
SATCOM	Satellite Communications
SBIRS	Space Based Infrared System
SDB	Small Diameter Bomb
SOF	Special Operations Forces
STARS	Surveillance Target Attack Radar System
UAV	Unmanned aerial vehicle

Major USAF Programs RDT&E

(Current million dollars)

	Program	2010	2011	2012
Bombers	B-1B	178.3	33.2	33.0
	B-2	351.6	260.5	340.8
	B-52	101.9	146.1	133.3
	Long-range strike	0.0	199.0	197.0
Fighter/Attack	A-10	11.9	5.7	11.1
	F-15	0.0	0.0	0.0
	F-15E	240.0	222.7	207.5
	F-16	118.5	129.1	143.9
	F-22A	559.5	576.3	718.4
	F-35	2,033.5	1,101.3	1,435.8
Helos	CVLSP	3.9	0.0	5.4
	HH-60G	0.0	12.6	94.1
	HH-60M	0.0	0.0	0.0
ICBM	Minuteman III	127.6	138.6	225.7
ISR/BM/C3	AOC	88.5	93.1	121.9
	DCGS	82.1	93.4	90.7
	E-3 AWACS	138.1	239.8	136.0
	E-4	25.2	12.5	5.9
	E-8 Joint STARS	180.7	168.9	121.6
	Endurance UAV	0.0	0.0	125.4
	JSpOC	87.5	132.7	119.0
	MC-12W	0.0	0.0	0.0
	MQ-1 Predator	23.7	28.9	14.1
	MQ-9 Reaper	104.2	125.4	146.8
	RQ-4 Global Hawk	309.2	251.3	423.5
Mobility	C-5	82.3	59.0	24.9
	C-17	156.2	177.2	128.2
	C-27J	9.0	26.4	27.1
	C-130	105.4	113.1	24.5
	C-130J	29.1	26.8	39.5
	KC-10	35.3	56.7	30.9
	KC-135	11.8	20.5	6.2
	KC-X (KC-46A)	14.9	863.9	877.1
Munitions	AGM-158A JASSM	28.5	20.0	5.8
	AIM-9X Sidewinder	5.9	6.0	8.0
	AIM-120 AMRAAM	49.8	62.9	77.8
	GBU-31/32/38 JDAM	50.0	0.0	0.0
	GBU-39 SDB	150.1	153.5	132.9
	Hellfire	0.0	0.0	0.0
Space	AEHF	456.2	351.8	421.7
	Counterspace systems	60.1	40.3	31.9
	DMSP	0.0	0.0	0.0
	EELV	44.0	30.3	20.0
	GPS	182.1	200.4	151.5
	GPS III	698.9	828.2	854.0
	MilSatCom	239.4	186.6	238.7
	NPOESS	395.0	325.5	444.9
	ORS	133.8	94.0	86.5
	Polar MilSatCom	246.7	164.2	123.0
	SBIRS	521.5	530.1	621.6
	Space control technology	99.2	45.0	45.8
	Spacelift range system	11.0	9.9	9.9
	Space situation awareness	211.3	238.4	426.5
	Wideband Global SATCOM	29.5	70.7	36.1
SOF	CV-22	19.0	18.3	20.7
	HC/MC-130	20.5	15.5	27.1

Major USAF Programs Procurement

(Current million dollars)

Program	2010	2011	2012
B-1B	102.7	206.9	202.8
B-2	291.2	89.6	90.7
B-52	61.3	72.5	93.9
Long-range strike	0.0	0.0	0.0
A-10	261.7	165.4	153.1
F-15	167.9	323.8	224.5
F-15E	0.0	0.0	0.0
F-16	273.6	185.0	77.9
F-22A	271.7	650.2	336.2
F-35	2,358.0	4,110.2	3,664.1
CVLSP	0.0	6.4	52.8
HH-60G	191.5	191.0	213.6
HH-60M	95.0	104.5	144.0
Minuteman III	198.9	123.4	126.0
AOC	53.9	58.3	15.5
DCGS	376.9	271.0	215.2
E-3 AWACS	78.9	195.2	135.0
E-4	72.8	37.5	57.8
E-8 Joint STARS	74.8	188.5	29.1
Endurance UAV	0.0	0.0	0.0
JSpOC	0.0	0.0	0.0
MC-12W	176.8	10.8	34.1
MQ-1 Predator	174.8	210.2	164.3
MQ-9 Reaper	586.5	1,089.9	1,072.3
RQ-4 Global Hawk	800.2	859.2	484.6
C-5	717.5	907.5	1,035.7
C-17	2,931.5	519.2	396.9
C-27J	318.1	351.2	479.9
C-130	546.3	312.1	503.9
C-130J	472.9	591.5	139.0
KC-10	13.5	19.5	32.9
KC-135	146.9	44.2	62.2
KC-X (KC-46A)	0.0	0.0	0.0
AGM-158A JASSM	52.5	215.8	236.2
AIM-9X Sidewinder	78.5	64.5	88.8
AIM-120 AMRAAM	272.7	355.4	309.6
GBU-31/32/38 JDAM	190.4	104.6	110.8
GBU-39 SDB	141.7	134.9	19.8
Hellfire	86.6	44.6	63.0
AEHF	1,836.7	246.6	552.8
Counterspace systems	29.7	18.8	20.7
DMSP	96.6	88.7	101.4
EELV	1,094.8	1,154.0	1,740.2
GPS	130.6	69.9	69.7
GPS III	0.0	122.5	515.3
MilSatCom	139.9	221.6	104.7
NPOESS	3.9	26.3	0.0
ORS	0.0	0.0	0.0
Polar MilSatCom	0.0	0.0	0.0
SBIRS	465.9	995.5	374.5
Space control technology	0.0	0.0	0.0
Spacelift range system	74.4	91.0	126.0
Space situation awareness	0.0	0.0	0.0
Wideband Global SATCOM	212.4	575.7	468.8
CV-22	589.6	544.7	577.6
HC/MC-130	513.0	898.6	1,133.2

Historical Force Structure

	Cold War Base 1990	1990 Base Force	1993 BUR Plan	1997 QDR Goal	2002 Defense Budget
Air Force					
Active FWEs	24	15	13	12+	12+
ANG/AFRC FWEs	12	11	7	8	7+
Army					
Active divisions	18	12	10	10	10
Army National Guard	10	8	8	8	8
Navy					
Active Aircraft Carriers	15	12	11	11	12
Reserve Aircraft Carrier	1	1	1	1	0
Active Air Wings	13	11	10	10	10
Reserve Air Wings	2	2	1	1	1
Marine Corps					
Active MEFs	3	3	3	3	3
Marine Reserve Air Wing	1	1	1	1	1

Current Force Structure

	2008	2009	2010	2011	2012
Air Force					
Active PAA strike aircraft	1,336	1,281	1,077	1,068	1,060
ANG PAA strike aircraft	488	462	429	446	414
AFRC PAA strike aircraft	101	104	98	105	105
Army					
Active BCTs	42	44	45	45	45
ARNG BCTs	25	28	28	28	28
Navy					
Aircraft Carriers	11	11	11	11	11
Active Air Wings	10	10	10	10	10
Reserve Air Wing	1	1	1	1	1
Marine Corps					
MEFs	3	3	3	3	3
Marine Reserve Air Wing	1	1	1	1	1

Rumsfeld's "Parade of Horribles"

Before Operation Iraqi Freedom, Donald H. Rumsfeld wrote a secret memo to President George W. Bush listing 29 possible calamities in the war. The former Pentagon chief himself described it as a "parade of horribles." It was recently declassified.

"Iraq: An Illustrative List of Potential Problems"

Secretary of Defense Donald H. Rumsfeld
Memo to President George W. Bush
Washington, D.C.
Oct. 15, 2002

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

Oct. 15, 2002, 7:45 a.m.

SUBJECT: Iraq: An Illustrative List of Potential Problems to be Considered and Addressed

Following is an illustrative list of the types of problems that could result from a conflict with Iraq. It is offered simply as a checklist so that they are part of the deliberations.

1. If US seeks UN approval, it could fail; and without a UN mandate, potential coalition partners may be unwilling to participate.

2. A failure to answer this question could erode support: "If the US pre-empts in one country, does it mean it will pre-empt in all other terrorist states?"

3. US could fail to restrain Israel, and, if Israel entered the conflict, it could broaden into a Middle East war.

4. Syria and Iran could decide to support Iraq, complicating the war.

5. Turkish military could move on the Kurds or the Northern Iraqi oil fields.

6. The Arab street could erupt, particularly if the war is long, destabilizing friendly countries neighboring Iraq—Jordan, Saudi Arabia, GCC states, Pakistan, etc.

7. While the US is engaged in Iraq, another rogue state could take advantage of US preoccupation—North Korea, Iran, PRC in the Taiwan Straits, other?

8. While preoccupied with Iraq, the US might feel compelled to ignore serious proliferation or other machinations by North Korea, Russia, PRC, Pakistan, India, etc., and thereby seem to tacitly approve and acquiesce in unacceptable behavior, to the detriment of US influence in the world.

9. Preoccupation with Iraq for a long period could lead to US inattentiveness and diminished influence in South Asia, which could lead to a conflict between nuclear armed states.

10. Oil disruption could cause international shock waves, and with South America already in distress.

11. Iraqi intelligence services, which have a global presence, including in the US, could strike the US, our allies, and/or deployed forces in unconventional ways.

12. Countries will approach the US with unexpected demands in exchange for their support (an Israeli request for us to release Jonathan Pollard, Russia asking for free play in the Pankisi Gorge, etc.), which, if the US accepts, will weaken US credibility.

13. US could fail to find WMD on the ground in Iraq and be unpersuasive to the world.

14. There could be higher-than-expected collateral damage—Iraqi civilian deaths.

15. There could be higher-than-expected US and coalition deaths from Iraq's use of weapons of mass destruction against coalition forces in Iraq, Kuwait, and/or Israel.

16. US could fail to find Saddam Hussein and face problems similar to the difficulty in not finding UBL [Osama bin Laden] and [Mullah] Omar.

17. US could fail to manage post-Saddam Hussein Iraq successfully, with the result that it could fracture into two or three pieces, to the detriment of the Middle East and the benefit of Iran.

18. The dollar cost of the effort could prove to be greater than expected and the contributions from other nations minimal.

19. Rather than having the post-Saddam effort require two to four years, it could take eight to 10 years, thereby absorbing US leadership, military, and financial resources.

20. US alienation from countries in the EU and the UN could grow to levels sufficient to make our historic post-World War II relationships irretrievable, with the charge of US unilateralism becoming so embedded in the world's mind that it leads to a diminution of US influence in the world.

21. US focus on Iraq could weaken our effort in the Global War on Terrorism, leading to terrorist attacks against the US or Europe, including a WMD attack in the US that theoretically might have been avoided.

22. World reaction against "pre-emption" or "anticipatory self-defense" could inhibit US ability to engage in the future.

23. Adverse reaction to the US could result in the US losing military basing rights in the Gulf and other Muslim countries.

24. Recruiting and financing for terrorist networks could take a dramatic upward turn from successful information operations by our enemies, positioning the US as anti-Muslim.

25. The US will learn, to our surprise, a number of the "unknown unknowns," the gaps in our intelligence knowledge, for example: Iraqi WMD programs could be several years more advanced than we assessed; Iraqi capabilities of which we were unaware may exist, such as UAVs, jamming, cyber attacks, etc.; others one might imagine!

26. Fortress Baghdad could prove to be long and unpleasant for all.

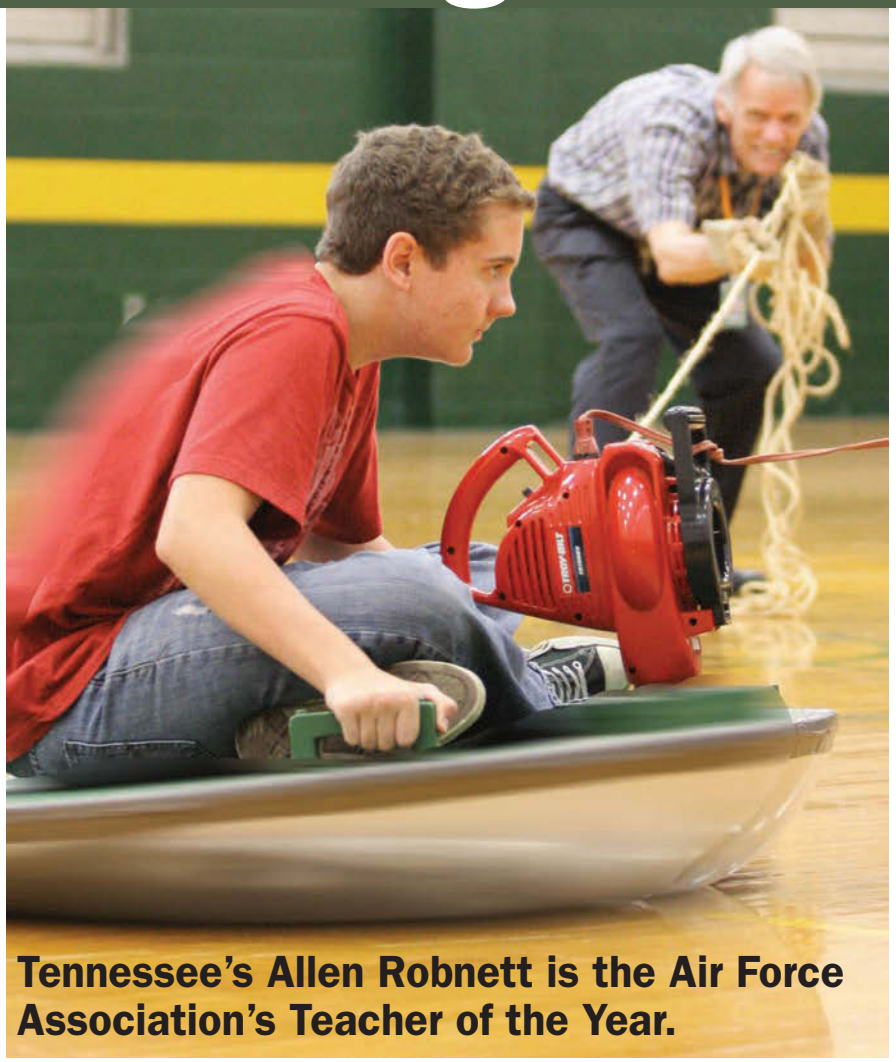
27. Iraq could experience ethnic strife among Sunni, Shia, and Kurds.

28. Iraq could use chemical weapons against the Shia and blame the US.

29. Iraq could successfully best us in public relations and persuade the world that the war is against Muslims.

Note: It is possible of course to prepare a similar illustrative list of all the potential problems that need to be considered if there is no regime change in Iraq. ■

Making Science Fun



Tennessee's Allen Robnett is the Air Force Association's Teacher of the Year.

By Peter Grier

Hovercrafts are not usually used as teaching aids, but one is at Gallatin High School in Gallatin, Tenn.

Teacher Allen Robnett built a personal hovercraft from plywood, a shower curtain, and a leaf blower. His students get to ride it in the gym, gliding about as if involved in a giant game of air hockey. Sometimes Robnett shows it off in a hallway near the cafeteria. "It makes a lot of noise," he says.

Robnett wants to show students fun is part of science. This is why he erected an observatory on the school roof. Inside is a Schmidt-Cassegrain telescope. Then there is Robnett's classroom. It is partially black, so it can serve as a planetarium.

Robnett is doing his best to hook kids into math and science classes at a time when the performance of US children in these subjects lags behind many other nations. For his innovative efforts, he earned the Air Force Association National Aerospace Teacher of the Year award for 2010.

"His enthusiasm for aerospace fields generates interest in science. His students will be better prepared no matter what career and college paths they choose," said S. Sanford Schlitt, AFA's Chairman of the Board.

Because of Robnett, Gallatin students can take two courses not offered at any other high school in the state. In Astronomy and Space Exploration, subjects include constellations and the history of rocketry. In Aviation Theory and Practice, students fly simulated Cessna 172 missions while learning enough flight theory to be able to pass the written portion of the FAA's private pilot exam. A local flight school donates a free lesson for students who win Robnett's Aviator of the Month award.

Robnett is a pilot, having learned by first flying sailplanes in his native New Mexico. For a while, he maintained several small aircraft and taught flying himself. He has around 30 years of experience in education. Earning a degree in electrical engineering at Princeton, he took a job at Sandia National Laboratories in the late 1950s, doing research and development on neutron generators. He found the subject fascinating, but the job boring, with too much contract administration.

He started teaching noontime courses in electronics and logic at Sandia and enjoyed the work. He took classes at the University of New Mexico to qualify for a career change, and sent out a letter inquiring about jobs at Gallatin High, in his mother's hometown in Tennessee's Sumner County.

Setting the Standards

Forty years later, Robnett still teaches at Gallatin High.

Robnett took a break when he left teaching in the early 1980s, spending the decade as an independent computer consultant. By the 1990s, big software firms were blotting out opportunities for little guys, so Robnett moved back to his real love: the classroom.

When he returned, enrollment in his advanced physics and algebra classes was fairly strong, getting 24 or 25 kids in each, per semester. But by the mid-2000s his class size shrank to 12 or so. At this point, less than one percent of the school was taking senior physics or calculus.

Robnett set out to do something about the decline. He decided to create a special science class with wide appeal to get kids interested in further studies. After winning permission from his principal, the local school board, and the state of Tennessee, in 2006 he created his Astronomy and Space Exploration class.

Standards for the course did not exist, so he had to write them. He also painted two of his classroom walls black and used glow-in-the-dark paint to depict constellations. He concocted a plywood planisphere that can be adjusted to show visible stars for any time and date, and arranged for a NASA-owned

inflatable planetarium to visit Gallatin each semester. Over winter break, in the school's shop, he built a 12-foot-tall observatory. Painted white, with a large gray "G," it stands next to a large air handler, and is controlled remotely from the classroom.

Each astronomy class is split into thirds, with one-third of the time spent with a textbook, a third spent with an astronomy or space-related video, and a third devoted to current events. "Every day, something is happening in the astronomy world. We have to keep up with that," he says.

In fall of 2008, Robnett developed and began teaching another special course, Aviation Theory and Practice. To help illustrate this subject, he added an aviation time line to his semiplanetarium of a classroom, starting with Icarus, continuing through DaVinci's designs, to the Wright brothers, and ending with the Hubble telescope.

For aviation class, the most important items in the room are the simulators. There are 12 fixed-wing simulators—yokes hooked up to computers—and one for helicopters. When he first started teaching the class, Robnett wrote the 100-page manual for the course and borrowed laptops from the library. Students fly 35 missions of increasing difficulty on the simulators, progressing through instrument flight rules and navigation instruction.

No student has ever managed to make it through all the missions in the manual, however. The last few involve the helicopter simulator, which is much harder to use. The majority of students complete the fixed-wing portion of the curriculum. The highest average point-earner gets the Aviator of the Month award. Robnett also hands out an Aviator of the Year award at the end of the course to the student who best completes a special mission challenge.

Allen Robnett, AFA's National Aerospace Teacher of the Year, spins James Jackson in a swivel chair to demonstrate gyroscopic effects.

Robnett admits that his own experience as a flight instructor makes it much easier for him to teach an aviation class. "I can't imagine a teacher undertaking to teach this course without having some experience in private flying," he says.

The Question Is: Why?

After three years, none of Robnett's aviation students have progressed far enough to earn a pilot's license on their own—although one has expressed interest in attending the Air Force Academy, and another now works at the flight line at a local airport, gassing up airplanes and coordinating their movement.

But the special science classes have drawn more students into science and math in general, and into the higher level courses in particular. Enrollment in Robnett's most recent physics course was 28 students, up from 14 a year or two ago.

In a nominating letter for the AFA Teacher of the Year award, Gallatin's principal, Ronald W. Becker, described Robnett as a "wonderful teacher" with "a passion for sharing science and math with others."

Robnett says he has three main principles of teaching. The first is classes should be shaped for the students expected to take them. Forcing every child to take all college-required courses results in less rigorous instruction, he believes, because content gets watered down so more can pass.

The second is "memorizing is not understanding," he says. Education is more than repetition; rather, it is making links between a new concept and old knowledge. "I think I probably ask 'why' more than most teachers. Somebody gives me an answer and I go back to them and say, 'Why?'" he says.

The third is to accept student challenges. "I give students extra credit when they challenge what I say, because that gets them involved," he says. "I will make mistakes occasionally. Any student who catches one gets a one hundred for the day."

Remembering his own time in high school, Robnett says he asked his classmates during senior year what their hurry was when they said they were eager to graduate. He was having the time of his life. He still is. At age 77, he has no thoughts of retiring, he says. ■

Facing page: Robnett helps Matthew Wright steer a hovercraft. Here: Robnett with student Tony Tuttle, an aviator of the month.

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, *is a longtime defense correspondent and a contributing editor to Air Force* Magazine. *His most recent article, "Call From the Desert," appeared in the February issue.*

AFA National Report

natrep@afa.org

By Frances McKenney, Assistant Managing Editor

Desert Storm Anniversary

The **Central Florida Chapter's** 27th annual black-tie Air Force Gala noted the 20th anniversary of Operation Desert Storm, spotlighting some of the milestone events and major players from that war. The gala always serves as the culmination activity for the Air Warfare Symposium and Technology Exposition in Orlando, Fla., this year held Feb. 17-18.

Gala Chairman John Timothy Brock opened the evening by introducing several VIPs in the audience, including Air Force Undersecretary Erin C. Conaton and the new vice chief of staff, Gen. Philip M. Breedlove.

Chapter President William A. Yucuis, as master of ceremonies, then led the after-dinner tributes to Desert Storm veterans and equipment teams.

During Desert Shield, USAF Red Horse and Prime Beef civil engineers created airfields and other base infrastructure from barren desert, Yucuis told the audience. Also, two types of equipment—Lockheed Martin's LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) and Northrop Grumman's JSTARS—though still in development, were pressed into service. In addition, two groups of key personnel, the "Black Hole" air campaign planners and the B-52 Operation Senior Surprise team from Barksdale AFB, La., were instrumental to success.

The chapter designated all of these groups as Ira Eaker Historical Fellows.

Its highest honor went to retired Gen. Charles A. Horner, the Desert Storm air campaign planner. Yucuis told the audience that Horner was "a true legend of airpower." The chapter named Horner an H. H. Arnold Fellow.

The gala this year raised $10,000 for the Air Force Memorial Foundation and $65,000 for AFA's aerospace education efforts. The chapter's total contribution to aerospace education programs nationwide, over nearly three decades, comes to more than $2.5 million.

May We Introduce You to AFA?

When newly elected US Rep. Mo Brooks (R-Ala.) began meeting with constituents in his Huntsville, Ala., district office in January, **Tennessee Valley Chapter** officers stepped forward to introduce him to AFA.

Chapter President Frederick J. Driesbach; Guy L. Broadhurst, the chapter VP; and Russell V. Lewey, chapter secretary, met with the congressman, who sits on the House Armed Services Committee and the House Science and Technology Committee.

Driesbach described the chapter's vision and mission and the scope of its members' defense and Air Force knowledge. He suggested that Brooks join the Air Force Caucus. He presented the congressman with an AFA membership and invited Brooks and his district director, Tiffany Noel, to attend a chapter meeting.

Lewey reported that Brooks "expressed an understanding and support for a strong defense" but said difficult budget decisions lay ahead.

Partners Supporting USAF

It was Page 1 news when the head of 20th Air Force served as guest speaker for a **Cheyenne Cowboy Chapter** luncheon in Wyoming this February.

Maj. Gen. C. Donald Alston, from F. E. Warren Air Force Base, attended the chapter's Community Partners Recognition Luncheon with his wife, Ana.

"Twentieth Air Force depends a great deal on three communities: Cheyenne, Great Falls, and Minot," said Alston, listing the cities in Wyoming, Montana, and North Dakota, where the 20th's ICBM wings are located.

He told the local business leaders, "There are very few communities that understand the intricacies of our military missions, especially our nuclear deterrence mission."

According to the F. E. Warren base newspaper, Alston got specific: "Warren depends on a range of counties across three states for miles of roads, sometimes in austere conditions."

Chapter President Irene G. Johnigan, too, had praise for the Community Partners. They act as "the catalyst behind" the chapter's programs in support of Warren airmen, she told the audience.

In Local News

A local ABC television news program in North Carolina recently delivered

Photo by Dan Higgins

At the Air Force Gala, Central Florida Chapter's John Timothy Brock (left) and William Yucuis (right) present the chapter's donation to AFA Board Chairman Sandy Schlitt (second from right) and George Muellner, AFA's vice chairman for aerospace education.

More photos at http://www.airforce-magazine.com, in "AFA National Report"

an "Armed Forces Salute" to **Tarheel Chapter** members Joyce W. Feuerstein and Lewis E. Feuerstein.

The three-minute segment, aired by Channel 11 in the Raleigh-Durham area focused on their ties to North Carolina State's AFROTC Det. 595 in Raleigh. It showed a chapter meeting in progress, attended by several cadets, and featured comments about the Feuersteins' support for the unit.

Cadet C. J. Elliott said on camera, "They attend, really, all of our functions: the drill meet that we put on, the military ball that we have at the end of the year. So they're at everything. They make themselves very visible."

The AFA banner was part of the feature story's images, and Joyce was identified as an AFA member. The association even figured into the couple's love story: They met at an AFA meeting in 1999, the reporter said, and married 16 months later.

Joyce is the chapter's secretary, and Lew is the veterans affairs VP.

Under 35 Runs the Show

The goal? Attract younger people to an AFA event. The method? Here's what worked for the **Paul Revere Chapter** of Massachusetts: Give the job of organizing a road race to some "youngsters."

That's how state aerospace education VP Joseph P. Bisognano characterized 1st Lt. Erin Kendall and Ryan Lafferty, who pulled together the chapter's inaugural Veterans Day 5K walk and 5K and 10K runs, last November.

Chapter members Mary K. Zeger and Steve Fuss—whom Bisognano called "seasoned" AFAers—lent a hand.

But it was Kendall and Lafferty who headed a team of 25 volunteers. They worked for six months with the Bedford Veterans Affairs Medical Center and Electronic Systems Center at Hanscom AFB, Mass., ironing out the typical road race details: measuring the course, arranging road closures, designing the race t-shirt, securing insurance, staffing water stations, and handling registration.

Bisognano said, "The results speak for themselves: 430 participants, including 60 military and civilians from Hanscom and a profit of more than $7,000," earmarked for deployed personnel and their families.

The event was videotaped for a local Internet production by Steve Katsos and posted on YouTube.

It's not on the 10-minute video clip, but Bisognano pointed out that the chapter also held a postrace barbeque for some 200 VA patients. Only "youngsters" would have the energy to do that after running six miles.

Star Donation

The **Central Oklahoma (Gerrity) Chapter,** in Oklahoma City, donated $1,000 to the Starbase program held at Will Rogers World Airport.

Rick Buschelman presented the funds to Pamela Kirk, Oklahoma ANG Starbase program director.

Starbase began in 1993, when the National Guard Bureau and state governors combined forces to conduct programs, often at military sites, to help at-risk students. The program aims to provide education and develop values, self-esteem, skills, and self-discipline.

This was the Oklahoma-Gerrity Chapter's third donation to Starbase, and Buschelman reported that it would be used to buy motors for model rockets that the students will build and launch during their week-long course held at a 137th Air Refueling Wing classroom at the airport.

More Chapter News

■ In January, the **Thomas W. Anthony Chapter** hosted its annual awards luncheon at JB Andrews, Md., with Central Region President Jeffrey Platte as guest speaker. Maryland State President Joseph L. Hardy received the Chapter Member of the Year award. Cheryl A. Nagel, chapter secretary, was presented with a 2010 AFA National Medal of Merit. Col. Kenneth R. Rizer, commander of 11th Wing and Andrews, and CMSgt. Anthony Brinkley, the wing's command chief master sergeant, were named as the chapter's Presidential Awards recipients.

■ At JB Pearl Harbor-Hickam, Hawaii, several **Hawaii Chapter** members attended a commemoration of the birthday of civil rights leader Martin Luther King Jr. President Nora Ruebrook and Treasurer Lance Bleakley were among the attendees at the Jan. 14 event, held in the main base chapel and sponsored by the Hickam African-American Heritage Association. Re-enactors portrayed President Ronald Reagan's Nov. 2, 1983, signing of the law establishing the federal holiday in King's honor. ■

At a Thomas W. Anthony Chapter awards luncheon are (l-r) Chapter President Charles Suraci, Col. David Koontz (who accepted an award for Col. Kenneth Rizer), John Thomas, Command CMSgt. Anthony Brinkley, and Sam Bass.

Reunions

reunions@afa.org

20th Fighter Wg Assn, 20th FG, FBW, TFW, FW (1930s-present). Oct. 26-30 in San Antonio. **Contact:** David Skilling (770-429-9955) (abbyndavid@aol.com).

60th Troop Carrier Gp, 10th, 11th, 12th Sq, at Rhein Main and Dreux AB (1951-61). Sept. 18-21 in Myrtle Beach, SC. **Contact:** Charles Dawes, 7544 Statecoach Ln., Vacaville, CA 95688 (707-448-6085) (cldawes1@aol.com).

87th Aerial Port Sq Assn. July 7-10 at the Hope Hotel and Conference Center at Wright-Patterson AFB, OH. **Contact:** Charles Hampton (859-946-8873) (chamrham@aol.com).

303rd Air Refueling Sq. Sept. 21-25 in Branson, MO. **Contact:** Bill Young (318-746-3637) (bandvyoung@bellsouth.net).

351st BG (WWII). June 16-19 at the Holiday Inn Virginia Beach-Norfolk Hotel and Conference Center in Virginia Beach, VA. **Contact:** Deborah Eason, 3722 Sussex Dr., Milledgeville, GA 31061 (478-453-7388) (dbme@windstream.net).

B-57 Canberra Assn. Sept. 15-19 in Cocoa Beach, FL. **Contact:** Bob Winklepleck, 3091 Southern Oaks Dr., Merritt Island, FL 32952 (321-449-7322) (rwinklepleck@cfl.rr.com).

Berlin Airlift Veterans Assn (1948-49). Sept. 28-Oct. 1 in Fort Worth, TX. **Contact:** J.W. Studak, 3204 Benbrook Dr., Austin, TX 78757 (512-452-0903).

SAC Elite Guard. June 9-11 in Omaha, NE. **Contact:** Bill Gdovic (402-953-3863) (billgdovic@cox.net).

Sewart AFB. June 2-5 at the Nashville Airport Marriott in Nashville, TN. **Contact:** Don Dallenbach (615-826-2212) (dondbach@comcast.net).

Seeking personnel from the **376th Air Refueling Sq.** for a reunion. **Contact:** Bill Bryan (360-692-3609) (376bill897@gmail.com).

Seeking **F-100 crew chiefs/maintainers,** 431X1C. **Contact:** Joe Gordy (970-301-6336) (jgordy@wildblue.net).

Seeking members of **UPT Class 69-05,** Reese AFB for a reunion. **Contact:** Jim Finley, 6257 E. Skyline View Dr., Claremore, OK 74019 (918-607-1547) (jfinley@atlasok.com). ▪

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.

AFA Conventions

April 29-30	**South Carolina State Convention,** Columbia, S.C.
June 2-5	**California State Convention,** Vandenberg AFB, Calif.
June 25	**North Carolina State Convention,** Raleigh, N.C.
Sept. 17-18	**AFA National Convention,** Washington, D.C.
Sept. 19-21	**AFA Air & Space Conference,** Washington, D.C.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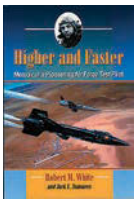
Books

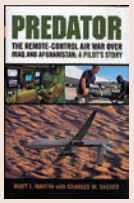
Compiled by Chequita Wood, Media Research Editor

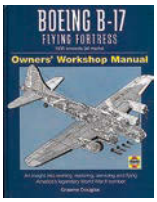
Beneficial Bombing: The Progressive Foundations of American Air Power, 1917-1945. Mark Clodfelter. University of Nebraska Press, Lincoln, NE (800-848-6224). 347 pages. $40.00.

Higher and Faster: Memoir of a Pioneering Air Force Test Pilot. Robert M. White and Jack L. Summers. McFarland & Company, Jefferson, NC (800-253-2187). 287 pages. $29.95.

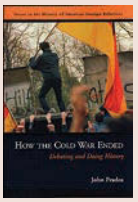


Predator: The Remote-Control Air War Over Iraq and Afghanistan: A Pilot's Story. Matt J. Martin with Charles W. Sasser. Zenith Press, Minneapolis (800-458-0454). 310 pages. $28.00.





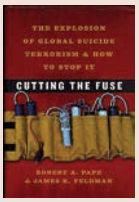
Boeing B-17 Flying Fortress: 1935 Onwards. Graeme Douglas. Zenith Press, Minneapolis (800-458-0454). 160 pages. $28.00.



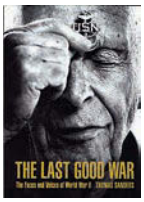
How the Cold War Ended: Debating and Doing History. John Prados. Potomac Books, Dulles, VA (800-775-2518). 301 pages. $24.95.

Revolutionary Atmosphere: The Story of the Altitude Wind Tunnel and the Space Power Chambers. Robert S. Arrighi. GPO, Supt. of Documents, Washington, DC (866-512-1800). 392 pages. $44.00.

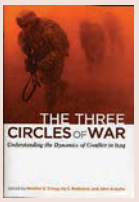
Cutting the Fuse: The Explosion of Global Suicide Terrorism and How To Stop It. Robert A. Pape and James K. Feldman. The University of Chicago Press, Chicago (800-621-2736). 349 pages. $30.00.

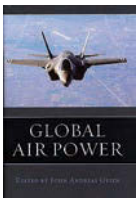


The Last Good War: The Faces and Voices of World War II. Thomas Sanders. Welcome Books, New York (212-989-3200). 223 pages. $45.00.

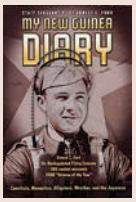


The Three Circles of War: Understanding the Dynamics of Conflict in Iraq. Heather S. Gregg, Hy S. Rothstein, and John Arquilla, eds. Potomac Books, Dulles, VA (800-775-2518). 259 pages. $60.00.

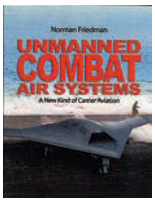




Global Air Power. John Andreas Olsen, ed. Potomac Books, Dulles, VA (800-775-2518). 539 pages. $55.00.

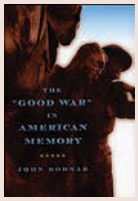


My New Guinea Diary. Staff Sergeant Pilot Ernest C. Ford. White Stag Press, Roseville, CA (800-587-6666). 364 pages. $17.95.

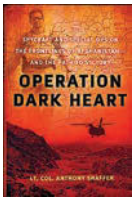


Unmanned Combat Air Systems: A New Kind of Carrier Aviation. Norman Friedman. Naval Institute Press, Annapolis, MD (800-233-8764). 266 pages. $52.95.

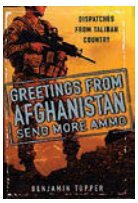
The "Good War" in American Memory. John Bodnar. Johns Hopkins University Press, Baltimore (800-537-5487). 299 pages. $40.00.



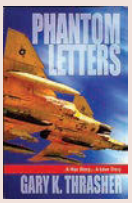
Operation Dark Heart: Spycraft and Special Ops on the Frontlines of Afghanistan—and the Path to Victory. Lt. Col. Anthony Shaffer. Thomas Dunne Books, New York (888-330-8477). 299 pages. $25.99.



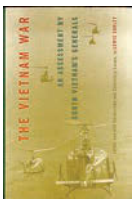
US 9th Air Force Bases in Essex 1943-44. Martin W. Bowman. Casemate Publishers, Havertown, PA (610-853-9131). 208 pages. $24.95.



Greetings From Afghanistan, Send More Ammo: Dispatches From Taliban Country. Benjamin Tupper. New American Library Caliber, New York (800-631-8571). 253 pages. $24.95.



Phantom Letters: A War Story ... A Love Story. Gary K. Thrasher. Langdon Street Press, Minneapolis (800-901-3480). 298 pages. $16.00.



The Vietnam War: An Assessment by South Vietnam's Generals. Lewis Sorley, ed. Texas Tech University Press, Lubbock, TX (800-832-4042). 919 pages. $60.00.

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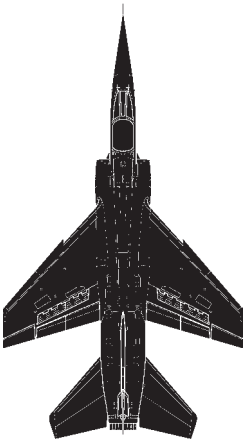
Mirage F1



The Mirage F1 is a French-built air superiority fighter and attack aircraft that has been widely used as a light, low-cost, multipurpose weapon. The Dassault fighter became operational in France in 1973, followed by a dozen other nations. It has flown in a variety of roles: air superiority, interceptor, close air support, reconnaissance, and training.

The F1 followed a long line of successful Dassault delta-wing aircraft. It combined the basic Mirage 5 fuselage with a new wing and empennage, resulting in greater maneuverability, shorter takeoff and landing distances, and longer endurance. It featured sophisticated shoulder-mounted wings with split double-slotted trailing edge flaps, among other advanced items. Tail surfaces were swept with the stabilators set low on the fuselage and assisted by twin fixed ventral fins. When fitted with in-flight refueling gear, the F1 could deploy over long distances.

The Mirage F1 has seen extensive combat. The first was in 1983, when France used it in Chad against Libyan-backed forces. Its most extensive use has been in the Persian Gulf. During the Iran-Iraq War, Iraqi F1s flew many intercept, attack, and anti-ship missions. An Iraqi F1 in May 1987 fired an Exocet missile that nearly sank the US Navy frigate USS *Stark.*

The tables turned in the 1991 Gulf War; USAF F-15s shot down eight F1s. Iraq eventually flushed 24 F1s to Iran to avoid destruction.

—By Walter J. Boyne

This aircraft: Mirage F1CT, 13QA—#278—as it looked in 1995 when assigned to Regiment de Chasse 01/030 Normandie-Niemen, at Colmar, France.

France found many buyers for the Mirage.

In Brief

Designed, built by Dassault ★ first flight Dec. 23, 1966 ★ crew of one or two ★ number built 714 ★ one Snecma Atar 9K turbojet engine ★ **Specific to F1C:** armament, two 30 mm cannon and up to 8,800 lbs of ordnance (bombs, rockets, missiles) ★ max speed 1,460 mph ★ cruise speed 560 mph ★ max range 870 mi ★ weight (loaded) 35,715 lb ★ span 27 ft 7 in ★ length 49 ft 2 in ★ height 14 ft 9 in.

Famous Fliers

Combat: Johan Rankin of South Africa (vs. Angola); R. Banderas, C. Uzcategui, both of Ecuador (vs. Peru); Nikos Sialmas of Greece (vs. Turkey). **Test Pilots:** Rene Bigand, Jean-Marie Saget, Guy Mitaux-Maurouard.

Interesting Facts

Launched as a self-financed Dassault venture ★ built as a stopgap while France considered F-16 ★ suffered high early accident rate (13 of first 162 lost) ★ flown by 13 air forces, eight currently (Ecuador, France, Gabon, Iran, Jordan, Libya, Morocco, Spain) and five formerly (Greece, Iraq, Kuwait, Qatar, South Africa) ★ flown in combat by almost all users ★ designated originally "Mirage F3" ★ downed 35 Iranian aircraft in Iran-Iraq War ★ flown by two senior Libyan Air Force pilots who defected to Malta Feb. 21, 2011.

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