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AIR FORCE MAGAZINE

JOURNAL OF THE AIR FORCE ASSOCIATION

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September 2009, Vol. 92, No. 9

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About the cover: F-22s from the 94th Fighter Squadron on a training mission from Kadena AB, Japan. Photo by Jim Haseltine. See "The New Playbook," p. 40.

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Editorial

By Robert S. Dudney, Editor in Chief

Requiem for a Heavyweight

For a few weeks this summer, it appeared that Congress might extend the F-22 fighter program, despite Pentagon calls to kill it. Then came President Obama's anti-Raptor offensive, featuring veto threats, arm-twisting, and more.

Fire and brimstone rained down on lawmakers supporting the use of $1.75 billion to sustain F-22 production. The Senate, duly cowed, voted July 21 to stop production. The House backed down on July 30. Congress quickly moved on to the task of finding $2 billion in "cash for clunkers" funding.

For F-22 backers, this is truly a time for gallows humor. The F-22 program is dead, stopped at only 187 fighters. With this editorial, we come to bury the Raptor, not praise it.

Interment of the departed, however, requires a *postmortem*, specifying cause of death. What was that cause? In Senate debate, the anti-F-22 speakers expended scores of thousands of words laying out their reasons, all preserved in the Congressional Record. It makes for confusing reading.

Take, for example, the most-cited reason for opposition: the Raptor's alleged unaffordability, given "the economic crisis we are in" (Sen. John McCain, R-Ariz., July 13). The F-22 was said to cost an exorbitant $350 million per copy (actually, each new one would cost $140 million). To hear Raptor foes tell it, a vote against the F-22 amounted to a vote for government rectitude.

It was a notion heavily retailed by Secretary of Defense Robert M. Gates, the F-22's principal bureaucratic foe.

Yet if we know anything for certain, it is that the F-22 kill didn't reflect any new shift to fiscal discipline. Heavy stimulus spending, auto bailouts, and health care expansion are and will continue to be massive budget busters. In the words of a recent *Wall Street Journal* editorial: "Credit $1.75 billion in savings. ... Only a couple of trillion more, and Mr. Obama will have a balanced budget."

The $1.75 billion amounted to two-tenths of a percent of DOD's budget. The most optimistic F-22 backers thought USAF might need, over several years, a max of $13 billion.

Also prominent were charges of "irrelevance" in current wars, an alleged defect that really got Sen. Harry Reid (D-Nev.) lathered up. "The F-22," fumed Reid, "has not flown a single mission over Iraq or Afghanistan—not one." This, of course, was a patented Gates applause line.

Our response is: So what? The F-22 was built for air-to-air combat at supersonic speeds, unseen by radar, not for patrolling uncontested airspace in Southwest Asia. The F-22 is not needed there; it will be needed elsewhere. Or, do Senator Reid, Gates, and others really believe that all future wars will be fought against primitive, irregular foes?

The Air Force's F-22 fighter finally goes down for the count.

A different argument, also frequently heard, was that the Raptor is indeed vital, but that 187 are enough. The F-22 skeptics hailed a July 9 claim by Marine Corps Gen. James E. Cartwright, Joint Chiefs of Staff vice chairman, that the number 187 had been validated as sufficient by a new "study."

Were they surprised, then, when Sen. Saxby Chambliss (R-Ga.), an F-22 supporter, later revealed Cartwright was "amending" his remarks? The Pentagon conceded that there really was no real study of this matter, only some partial "work products" slapped together.

No statement received wider media coverage than this type: The Air Force "says it doesn't want" any more Raptors (Sen. Ron Wyden, D-Ore., July 21). The intended message was that corrupt, pork-barreling, jobs-protecting members of Congress were trying to cram an excessive number of these fighters down USAF's throat.

Is that a fair claim? It is true that Michael B. Donley, the Secretary of the Air Force, and Gen. Norton A. Schwartz, USAF Chief of Staff, agreed with Gates' decision to stop production at 187 fighters, but there is more to the story. The Chief has stated publicly that the "military requirement" is 243 F-22s—for a "moderate-risk" force. Something similar was said by another USAF leader, Gen. John D. W. Corley, commander of Air Combat Command. Corley stated in a letter to Chambliss that USAF needs from 250 to 381 F-22s, and that 187 provides only a "high-risk" force.

Neither general ever claimed USAF couldn't use more of these kinds of fighters.

The Senate chamber rang out with a surprising number of claims that the F-22, to put it bluntly, was just not that great a fighter. The Pentagon leadership told the Senate that the triservice F-35 is "a half generation newer aircraft" and "more capable" in some areas. Obama himself, in the wake of the Senate vote, dismissed the F-22 as just one of many "outdated and unnecessary defense projects" sucking down tax dollars.

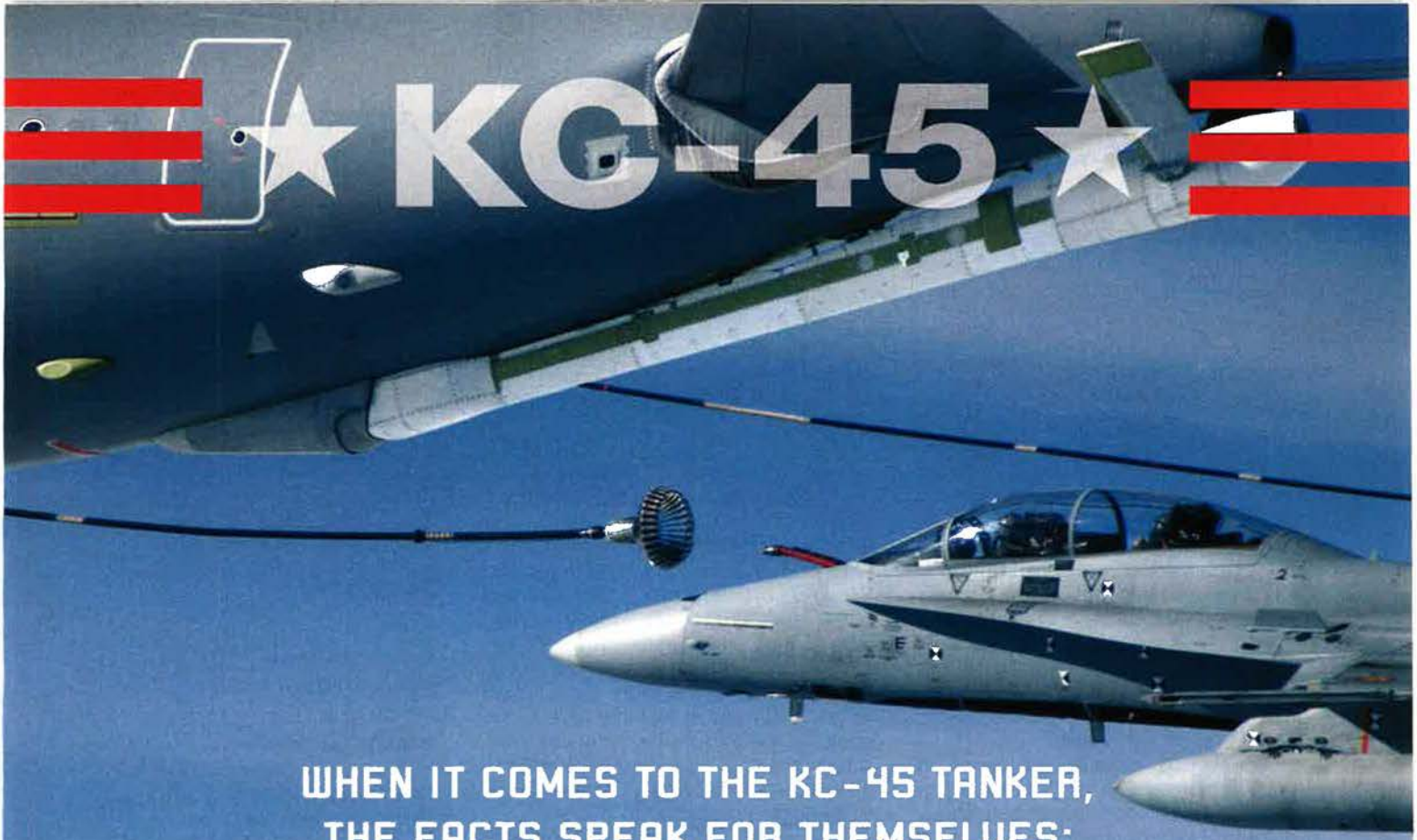
Is that logical? If the F-22 is so "outdated and unnecessary," why has Congress barred its sale to our top allies—Japan, Israel, and Australia—but allows sale of the F-35, its alleged peer, to whoever wants to buy it? We intend no disparagement of the F-35, which will be a great fighter. We only mean to point out a commonsense explanation: The F-22, the most advanced fighter ever built, offers an enormous edge, and Washington is loath to risk the technological secrets of its true airpower heavyweight.

"If the President of the United States calls the F-22 'outdated and unnecessary,'" said a pro-Raptor official, "there is something very wrong with the information he is being provided."

Indeed, the critics' case—at least as it was presented in the Senate debate—does seem to us to have been based on exaggerations and false assumptions. Not a single one of the major assertions really stands up to scrutiny.

Clearly, though, the US will have to make do with 187 Raptors. In a piece starting on p. 40 of this issue, Executive Editor John A. Tirpak reports that the Air Force is planning to do just that, producing revised plans to embrace using each F-22 as a force multiplier for older F-15s and F-16s.

That's a good move, but 187 F-22s is not the best possible return on a development investment of $32 billion spanning 20 years. The United States deserved a better outcome. ■



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Letters

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Evaluating the Threat

In July's editorial *["The Strategy's Last Stand?" p. 2],* you presented a long-needed, cogent statement on strategy. In today's political climate, it appears that it is not only the politicians who demonstrate that their only concern is "defense costs" but the civilian leaders of the Defense Department and the Joint Chiefs of Staff officers as well. The Air Force is under attack in the misguided belief that it is the Army and the Marines, with a modest reference to the Navy's patrol of the Gulf and Indian Oceans, that are protecting the United States and its "strategic" allies.

None of us, retirees, businessmen and women, active duty members of the military, or politicians, can safely disregard the threats that our beloved nation faces.

The evaluation of the threat cannot, safely, be predicated upon evaluating its cost. This nation's survival is dependent upon the dedication of its leaders to live up to their oaths of office—to protect and defend the Constitution of the United States. In this Quadrennial Defense Review, it is even more important to honestly evaluate the risks we face and recommend the force that is required to counter it.

History shows the effectiveness of our "triad" of land-based intercontinental ballistic missiles, bombers, and submarines firing strategic missiles. To that mix, the United States successfully promoted the need to counter the missile threat from others with a defensive system that is just beginning to be effective. Now is not the time to relinquish superiority, especially with respect to our strategic forces and weapons.

Lt. Col. Richard J. Christofferson,
USAF (Ret.)
Guilford, Conn.

Fighter of the Future

As a Project Management Institute-certified project management professional, I read with amazement that the Pentagon's director of portfolio systems acquisition, David G. Ahern, used "percent complete" as a measure of project deliverable or phase completion *["Fighter of the Future," July, p. 22].* PMPs who hear that metric from project team members are trained to retort with, "Percent of what?" since execution of complex projects is rarely linear. This fully explains the F-35's cost increases and schedule delays.

MSgt. Rick Brumble,
ANG (Ret.)
Hillsboro, Ore.

Into the History Books

I read with great interest your recent Predator article ("How the Predator Grew Teeth," July, p. 42). It really helped fill in some of the gaps between my experiences and the rest of the story. A career airfield ops officer, I was lucky to get a fair share of early "Predator stink" on me as operations officer with the provisional operations squadron at Taszar AB, Hungary, where early Predators were based in 2006.

During my rather austere deployed experience at Taszar, I was involved firsthand with what you described as the Predator's "inauspicious start." I believe it was at Taszar that the Army officially transferred the program to the Air Force, with USAF Maj. Gen. Ken Israel, the then director of the Defense Airborne Reconnaissance Office, on hand to make the appropriate historical remarks and cut the cake.

It was a fledgling UAV cadre of military and contractors, led by then-Maj. Phil Pearson, the deployed operations officer from the new 15th Reconnaissance Squadron at Indian Springs, who were faced with the daunting task of standing up the operation literally from scratch, after the handoff. As the host Air Force unit, we joined with the cadre to scrape together tents, computers, furniture, cell phones, radios, vehicles, etc.—everything needed to set up and maintain day-to-day operations.

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

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AFA's Mission

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

To advocate aerospace power and a strong national defense.

To support the United States Air Force and the Air Force family and aerospace education.

Letters

We had a large cloth "hangar" on the field, where the transfer ceremony occured, which served to house both the aircraft and maintainers. A taxiway was constructed out of wood, to enable the UAVs to be towed from the hangar to the paved surface for engine start, followed by taxi and takeoff.

Initial missions amounted to launches out of Taszar, then a flight south for an extended loiter in the "the box" over Bosnia, followed by a hoped-for recovery back at Taszar. Unlike in the US, our air traffic controllers treated Predators pretty much like any other aircraft, although with special consideration for their comparatively low airspeeds.

Had I only known at the time where the Predator was headed in the history books, I'd have taken pictures and secured some souvenirs.

Col. Bill Malec
Scott AFB, Ill.

Walter Boyne's article in July's edition of *Air Force* Magazine, "How the Predator Grew Teeth," was an especially revealing documentary of the innovative abilities of American ingenuity. As has happened so many times in our history, success became the mother of invention as commanders, leaders, engineers, technicians, pilots, former pilots, and almost everyone else contributed to the success of proving a new weapons system for the Air Force and for our nation.

And the leaders of our Air Force Association did not err when they presented the prestigious Member of the Year award to then-Lt. Col. James G. "Snake" Clark at the 1993 AFA National Convention. I remember, as then-AFA President Jim McCoy introduced Colonel Clark to the audience, he remarked, "I'm just not used to calling a senior Air Force Officer 'Snake,'" but here he is, ladies and gentlemen, your Member of the Year, Lt. Col. James G. 'Snake' Clark!" Everyone laughed and applauded.

I'm sure that all of AFA joins me in toasting Snake for his brilliant success in weaponizing the Predator!

Ivan L. McKinney
Bossier City, La.

The *Mayaguez* Rescue

Your recent article on the Mayaguez missed some key details on the involvement of F-111 aircraft from the 347th Fighter Wing, at Korat Royal Thai Air Base *["The* Mayaguez *Rescue," July, p. 68]*. In fact, it was F-111s that were initially tasked to conduct a search for the *Mayaguez,* based on their long-range ability; the ship was located by an F-111 crew, and a handheld picture taken that was verified and began the mission planning. As you correctly note, Air Force security police were initially tasked until a tragic helicopter crash.

The mission focused on locating the ship's crew and preventing the enemy from leaving the island with the captured crew while the air assault forces were gathered and the attack plan finalized. I flew as part of a two-ship F-111 formation that launched around 3 a.m. from Korat Royal Thai Air Base, armed with 2,000-pound bombs. We arrived at Koh Tang, and were able to spend time in the target area while other aircraft were forced to retire for lack of fuel. We were ordered to drop our bombs in front of several small boats trying to leave the island, and that was successful (a 2,000-pound bomb makes a big splash)—the boats turned back.

It was an ideal mission for the F-111, flying from Korat to the target area and returning with ordnance and without refueling. The F-111s from the 347th played a key role in finding the ship and stopping enemy boats from escaping the island, while the mission unfolded.

Lt. Col. Steve Altick,
USAF (Ret.)
Auburn, Wash.

I read the article on "The *Mayaguez* Rescue" by George M. Watson Jr. In addition to the USAF aircraft listed in the article, the 432nd Tactical Reconnaissance Wing was based at Udorn RTAB, Thailand, with four fighter squadrons (4th, 13th, 25th, and 421st TFS) and one reconnaissance squadron (14th TRS).

The 432nd TRW was an active player in the *Mayaguez* incident. I was privileged to be No. 2 in a four-ship of F-4s, call sign Dallas. The flight leader was our 13th TFS commander, Lt. Col. Benoni Nowland. We each carried two Mk 84s (2,000-pound bombs).

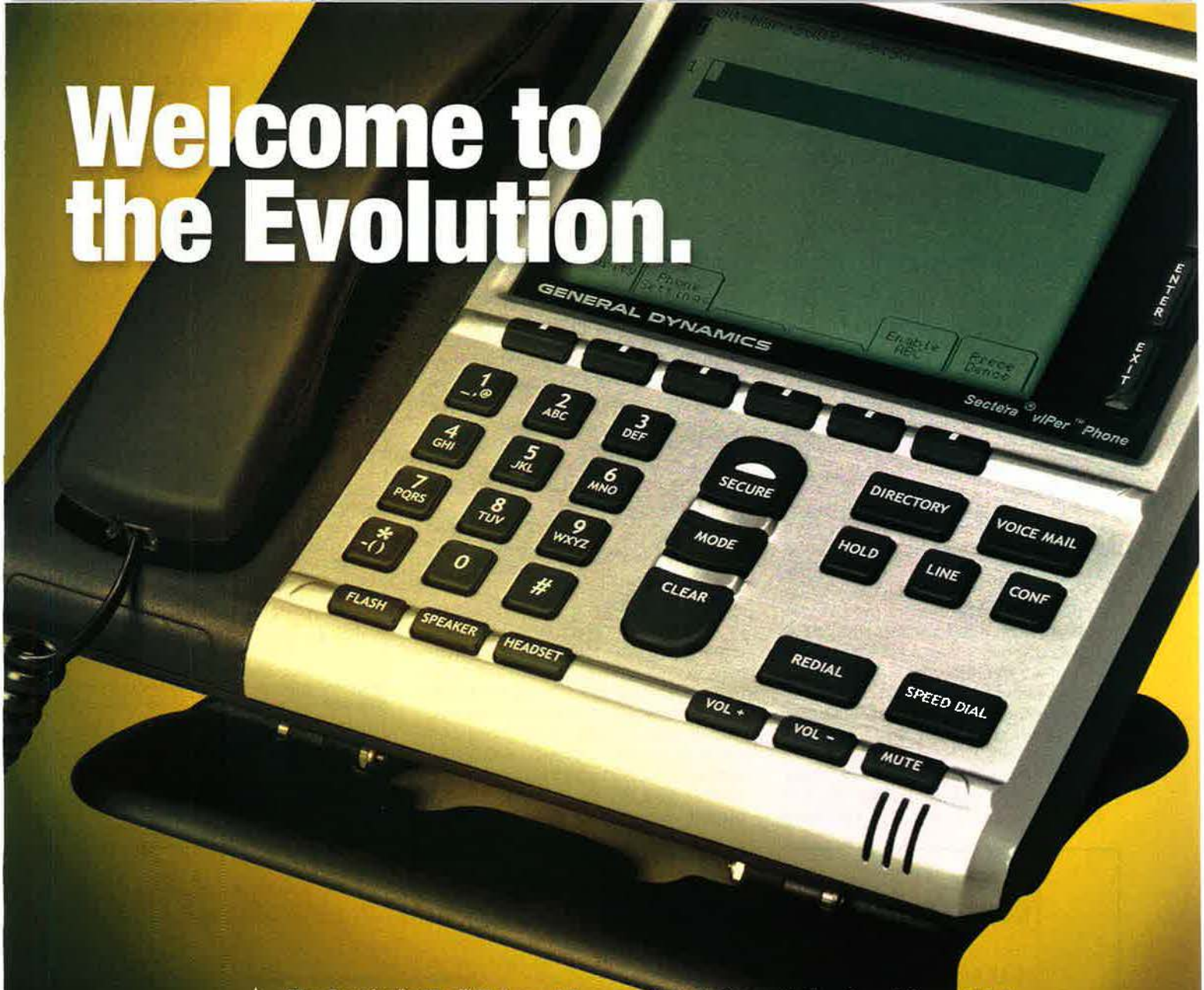
Air cover for our four-ship was provided by the US Navy. We took off from Udorn, aerial refueled, and set up orbit near Koh Tang. Our flight leader directed No. 3 and 4 to return to base due to fuel.

We were cleared to expend ordnance on Koh Tang and released both Mk 84s. We recovered at U Tapao Royal Thai Air Base and returned to Udorn. Needless to say, the ground support crews were elated that we returned minus the ordnance.

I have read several articles on the *Mayaguez* incident, and each one has omitted the role of the 432nd TRW. Perhaps historians can research this and correct the record.

Col. John W. Zink,
USAF (Ret.)
Flagstaff, Ariz.

Welcome to the Evolution.



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Usually when *Air Force* Magazine publishes a historical account, someone will write in with a minor correction. I don't have a minor correction, I have a major addition. The author of "The *Mayaguez* Rescue" completely ignored and failed to mention the efforts of the F-111As in the recovery of the container ship. I know: I was there, at Korat Royal Thai Air Base, as commander of F-111A squadron, 428th TFS.

In the early afternoon of May 12, 1975, Col. Russ Thoburn, commander of the 347th TFW, called me to his office and tasked my squadron with sending an F-111 down to the Gulf of Siam "to look for a US ship that is missing." I, in turn, tasked my acting ops officer, Lt. Col. Roger Bogard, and his navigator, Maj. Ken Law, for the mission. They launched and after searching, found the ship anchored just off Koh Tang, with no steam up. Lieutenant Colonel Bogard and Major Law reported the discovery to 7th Air Force headquarters (the F-111 crew's discovery was covered in an issue of *Airman* Magazine). It was only some years after the fact that the Navy stepped forward to claim discovery. If the Navy had actually discovered the ship, they should have told someone.

One of our squadron pilots, Capt. Paul Reichel, provided a camera and film for the crew, and Ken Law took many photos of the ship, dead in the water. The following day, those photographs were published in every major newspaper in the world.

Also forgotten was that Capt. Gil Bertleson, 428th TFS, provided "pathfinder" duties for the C-130 and called the drop of the 15,000-pound BLU-82 expended by the Spectre gunship. I understand the hole that the BLU-82 made on Koh Tang can still be seen today.

So, an F-111 found the *Mayaguez*, and we had F-111s over the container ship 24 hours a day, some expending ordnance, some not, for the entire period of the incident. The last airplane over the ship as it steamed away was an F-111—and we didn't even get a footnote.

Col. Lester G. Frazier,
USAF (Ret.)
Georgetown, Tex.

Playing With Fire

Just to set the story straight regarding "Playing With Fire," July, p. 32): [On] Nov. 12, 2001, two F-15E Strike Eagles, call sign Crockette 51, departed Kuwait and were retasked multiple times over Afghanistan. All told, these two aircraft and four airmen dropped 16 GBU-12, 500-pound LGBs and took out multiple Taliban and top al Qaeda leadership targets, while logging an incredible

15.6-hour duration (the longest fighter combat sortie in history).

From mid-October 2001 to early January 2002, the 391st Fighter Squadron "Bold Tigers" flew more than 200 sorties from Kuwait to Afghanistan, totaling over 2,200 combat hours (mostly at night with night vision goggles) for an average sortie duration of 10.6 hours; they dropped over 450,000 pounds of precision guided munitions in less than 90 days. (The typical loadout was nine GBU-12s per aircraft.) This was accomplished with 122 aircraft, 36 crew members, and fewer than 200 maintainers. To put this many hours on this few aircraft, the Bold Tiger maintainers performed an impossible 17 full-phase inspections in 69 days, in a place not equipped to do so.

As improbable as this story is (Tom Clancy could have crafted a tale in the '90s about USAF fighters taking off from Kuwait and bombing Afghanistan night after night, and no one would have believed it!), it would not have been possible without massive and well-coordinated tanker support. A typical two-ship F-15E mission required over 300,000 pounds of aerial refueling. A single KC-135 could offload only about 80K over Afghanistan. This mission required multiple 135s and the Strike Eagle pilot's best friend, the KC-10 (which could offload 220 to 280K). The typical refueling profile for two Strike Eagles was this: Meet a single 135 over the Gulf about 90 minutes after takeoff, follow him to PAKSOUTH for about an hour, and take all the fuel he had and send him home. Then meet up with a KC-10 over Afghanistan, direct the 10 to "follow us" (you could always tell when a new tanker crew rotated in; they would say, "But there's no tanker track over there!") for about the next four hours; then when his fuel was gone, meet with one more 135 over the Gulf, top off, push it up, and go home.

Sometimes it took another KC-135 or part of a second KC-10's offload to get the mission done. The tanker guys were great during this campaign—there is nothing better than joining on a USAF tanker when you are low on gas, there are "troops in contact," and the nearest friendly base is 500 miles to the south. There is no doubt that USAF is way behind in revitalizing the "force enabler" of the aerial tanker. We need to buy the KC-10/30/767/777 or whatever now.

Lt. Col. James C. Gunn,
USAF (Ret.)
Horseshoe Bend, Idaho

Rather than focusing KC-135 tanker replacement on widebody types such as the 767 and A330, which would logically be considered more as replacements for the widebody KC-10 than the narrow body KC-135, has it occurred to anyone to consider a variant of another airframe already in the military inventory in the form of the 737-700-based C-40 or 737-800-based P-8A? An AEW & C variant also already exists with foreign air arms as well (Australia and Turkey). The latest 737 variant (737-900ER) has a gross weight of 60 percent of the KC-135R (about 190,000 pounds vs. 320,000 pounds), and all current generation 737s utilize the same basic CFM56 engines as existing KC-135Rs, which would ease transition and maintenance. If nothing else, replacement of all ANG and AFRC KC-135 variants with 737 variants would make even more sense, given that many ANG/AFRC crews made up of airline pilots may already be 737 qualified. Cancellation of 737 delivery positions due to airline cutbacks in the prevailing economy could make early availability of such "KC-737s" a good possibility. If even quicker replacement of KC-135Es and/or Rs was desired, conversion of the many earlier generation 737-300/400 aircraft being phased out or already phased out by operators such as United and Continental might even make sense, as these aircraft are also all equipped with CFM56 engine variants.

Just as it made sense, starting back in the 1980s, to acquire surplus airline 707/720 aircraft to enable upgrading

nearly 200 primarily ANG/AFRC KC-135As to more capable E versions, it would seem to make just as much sense today to make use of surplus airline assets such as 737-300/400 aircraft, and perhaps even 757 (C-32) and 767 variants.

The book *The Boeing C-135 Series,* by Don Logan, on p. 30-31 contains a table titled, "JT3D/TF-33-P-102 Re-Engined 135 and Their Commercial Donors," listing the 187 EC-KC-135E conversions and their corresponding 707/720 "donors" from which engines and tail surfaces were obtained. Perhaps this would make a good subject for a future article on an acquisition program that actually saved or made money!

Some might argue that a 737 tanker variant might not be capable of a worthwhile fuel offload, but I'd be willing to bet it would equal, if not exceed, any existing KC-130 variant (USAF, USMC, or foreign) as well as far exceeding the capabilities of any carrier-based tanker, such as the Vietnam-era KA-3 "Whale" or the KA-6. Incidentally, somewhere in my archives I still have a Boeing brochure proposing a variant of an early 737 to the Navy as a "COD" transport (carrier onboard delivery) to replace the C-2, believe it or not. Just about as incredible were actual Navy evaluations of the C-130 from carrier decks, around the mid-1960s, as I recall.

T. J. Gibson
Taylor, Ariz.

Rebecca Grant's article supports an argument that all services require the new tanker. What is lacking is the commitment of the armed services, the President, and Congress to move decisively to make the requirement a reality.

Although I normally would not consider splitting the contract between two contractors cost effective, there is a necessity to procure new tankers before the KC-135s begin to fall from the air and cripple our defensive and offensive capabilities. The major advantage of the dual contract is the ability to use the production facilities of both contractors to put wheels on the runway faster. Each contractor should step up to the line to build 12 aircraft a year over a 15-year period (24 per year). Following this concept, instead of 179 new tankers in 15 years, they could build 360 tankers in 15 years. Follow-on contracts for the remaining 177 tankers, at a slower rate, would be awarded to the contractor demonstrating the best reliability, maintainability, and cost savings over the 15-year period. As a result, the competition is maintained over the build period, ensuring a continuous dedication to cost-effective production and improvements. Additionally, the higher rate of production should decrease the cost per aircraft.

Of course, this tact requires the Air Force, Navy, and Army, who need tankers to support war plans, to put aside differences and unite in presenting the tanker requirements to the President and Congress as their highest priority. In addition, it will take a bold and farsighted President to support the tanker requirement and press Congress to provide the funds for the compressed build without drastic cuts to other needed programs. Yes, that means a bigger defense budget, but the price of failure will be absorbed by our service personnel and our status in the world and potentially endanger our country.

The tanker need is so important to all DOD plans that the 15-year build should be fully funded with no ability for Congress or the President to change it other than nonperformance of a contractor. Without a viable tanker capability in the future, all DOD plans for action and reaction are nothing but paper. Our nation needs to step up to the plate on the tanker requirement and get it right—now.

Lt. Col. Alan L. Strzemieczny,
USAF (Ret.)
Riverside, Calif.

"Playing With Fire": Another great article by Rebecca Grant. This article should be made mandatory reading for all the powers to be that have any connection with the developing and letting of the new contract for the new Air Force air refueling tanker.

She points out some very important points about the requirements, the need, and the past history and performance of the KC-135s in world combat support situations. The picture on p. 30 of the July magazine helped reiterate just one of the past performances of the KC-135s. Even though it is in SEA, the same scenario applies today in the combat areas of Iraq and Afghanistan.

I had the privilege of being the maintenance supervisor on several tanker task forces to SEA, and what a great feeling it was, when all the tankers completed their offload to their receivers, on time as scheduled.

As Grant pointed out, the pace of the current operations requires more loiter time, thereby putting a greater demand on an already very tired tanker. Just another reason why the Air Force needs a Boeing-built tanker—now.

Gen. Carrol H. Chandler's comment about taking about seven hours of ground maintenance for every one hour of flight time is probably a little conservative. All the tanker crews are doing an outstanding job under bad circumstances. So also are the great maintenance crews, the backbone of the Air Force operations, doing an outstanding job, with old equipment, parts shortages, and a heavy flying schedule.

Keep up the great job, all you tanker personnel. Remember, nobody goes anywhere without tanker gas.

CMSgt. Donald W. Grannan,
USAF (Ret.)
Benbrook, Tex.

Heroes or Bums

This is another General Doolittle story ["Letters: Meeting Jimmy," July, p. 5]:

I served in the 97th Bomb Group in England, which was the bomb group that did the first daylight raid on occupied Europe with B-17s. In the [Imperial] War Museum in London, that raid is listed as one of the most important events of World War II. As duty officer of the headquarters base of the 97th Bomb Group, I was in charge of the base at the time of the bombing attack on Europe. I will never forget that on the blackboard in the operations room, there was written, "Ruin Rouen" [the French city whose railroad marshaling yards were bombed by the unit]. In any event, sometime after that raid, we had an important visit from General Doolittle.

General Doolittle called a staff meeting in the conference room of the 97th Bomb Group. There were about 10 of us in the room. He briefed us on the coming invasion of North Africa, and he gave us that information in some detail. When he finally finished, he went to the door, turned, and said to us, "Gentlemen, we're going to be heroes or bums" and out he walked. I will never forget that day. I will always remember General Doolittle, and we didn't turn out to be bums.

Leon Davis
Houston

Eliminate Which Force?

The [quote] in July's "Verbatim" about eliminating the Air Force appears to be laced with fuzzy logic *["Eliminate the Air Force," p. 58]*. If Paul Kane's argument is predicated upon redundancy, then the most reasonable service to be abolished would—and probably should—be the Marine Corps. Their ground combat and amphibious duties and missions could be effectively absorbed into the Army, with their tactical air shared by both the Navy and Air Force.

A contrary argument could be made, however, that individual service culture, tradition, and methodology precludes any such corrective measures. Precisely so, and this is also true of the Air Force, whose experience, doctrines, culture, and technical expertise are proven and indispensable assets in both tactical and strategic major warfare. When we are again faced with military hostility from an armed, formidable nation, those very assets will once more become our salvation.

Mr. Kane's assertion that the Air Force is not at war begs clarification. He needs to ask those boots on the ground about USAF close air support, ISR, airlift, and cyber operations among many Air Force contributions.

MSgt. C. E. Shaver,
USAF (Ret.)
Highland, Ill.

Classics

Mr. Boyne makes it sound like the T-28 Trojan was about done by the middle 1960s *["Airpower Classics: T-28 Trojan," July p. 80]*. They were still flying out of Keesler AFB, Miss., when I was there in 1974, and I think they were still flying at Luke AFB, Ariz., at that time too. They were used to train a variety of foreign military students through most of the 1970s.

Bruce Krohn,
Los Lunas, N.M.

I enjoyed the "Airpower Classics" in the July issue regarding the T-28 Trojan—a neat old bird to fly. However, I found one flaw regarding USAF using it as a trainer through 1956 and it being replaced with the T-34 (and the T-37).

Members of Class 59-F, Bainbridge AFB, Ga. (civilian contract), graduated in August 1958 after flying 30 hours in the T-34 and 100 hours in the T-28. At least at Bainbridge, this was supposed to be the last class before Tweets replaced the T-28.

It's also interesting to note that the class patch "Charlie Brown coming down" may have been the first patch designed and approved by Charles M. Schulz. The class military training instructor was 1st Lt. Carlyle S. Harris, later a long-term guest at the Hanoi Hilton.

Always enjoy your excellent magazine.

Col. George H. Howard,
USAF (Ret.)
Auburn, Wash.

I wish to contribute a small add-on to the informative article by Walter Boyne. I was based at Laredo Air Force Base from June 1957 to December 1958, assigned to the 3641st flight line maintenance squadron. I was informed that the T-28s left Laredo over a year or so before my arrival. The replacement aircraft was the T-33. Our squadron had approximately 90 T-33s, and our sister squadron, the 3640th, also had 90 T-33s. What a sight, when many of the aircraft took off for their training missions morning, noon, and night. Thanks for a fine article covering the evolution of fine aircraft that served the Air Force for so many years.

Richard Bochkay
Ochlocknee, Ga.

Black Shoe

In a side line titled "The Last Manned Aircraft" of the article "Fighter of the Future" in July's issue, it states that Adm. Michael G. Mullen is a naval aviator. Not true. He's what we aviators call a "black shoe." He is not an aviator.

Cmdr. H. C. Nickerson,
USNR (Ret.)
Palm City, Fla.

Fully Developed

The first sentence of the caption to the photograph on p. 73 of your July 2009 issue ("Flashback: The Image Catchers") is misleading. Aerial photography in World War I began as early as September 1914, and was in wide-scale use by all combatants well before the US entered the conflict (April 6, 1917). Appropriately, your photograph shows what appears to be a British ground crewman handing a camera to an observer in a Royal Aircraft Factory FE2. The critical role of aerial reconnaissance during any major conflict since World War I has been underplayed by the emphasis on fighter aces and strategic bombing.

Lt. Col. Stephen H. Miller,
USAF (Ret.)
Fredericksburg, Va.

Washington Watch

By John A. Tirpak, Executive Editor

The QDR tackles two wars; Taiwan in the crosshairs; Industrial base extinction? ....

"Something Like" a Two-War Strategy

The US military policy of being able to fight two major theater wars in close succession isn't necessarily dead, but it's likely to be redefined as part of the Quadrennial Defense Review now under way, according to a senior Pentagon official.

No matter what its final shape, though, the emerging US concept of national defense will be constrained by flat defense budgets during the next five-year cycle.

This was the view of David A. Ochmanek, deputy assistant secretary of defense for force planning. Ochmanek, meeting with defense reporters in late July, said that the traditional "two-war" planning construct—which, with some variation, has served as the basic force-sizing tool since the early 1990s—is "not dead," but is the subject of great debate in the QDR.

Ochmanek said Defense Secretary Robert M. Gates very much wants to "retain the capacity and capability to project power into multiple regions of the world simultaneously," but Ochmanek hedged his remark by prefacing it with the phrase "if at all possible."

While Ochmanek insisted that in the QDR analysis, security comes first and resources second, he admitted that the QDR teams have been told to expect no real growth in defense budgets for at least the next five years, and to make choices among capabilities accordingly.

"There isn't any 'low hanging fruit' in the defense program anymore," he acknowledged. Any program cut is "going to reduce some important capability." He added that "we, down at my level, hope that the Administration will be able to provide some positive growth to the DOD budget, so we don't have a lot of these painful trade-offs," but it's part of their charter to identify possible spending cuts. The various services will get first crack at nominating their own cuts, he added.

He specified a dollar amount to the pain: across the future years defense plan, "on the order of $50-to-$60 billion." That's over and above the 50 or so programs Gates identified for termination or sharp reduction in April.

The QDR team seeks to account for the changing nature of warfare, Ochmanek said; in the 21st century, wars will likely take on a "hybrid" nature, characterized both by low- and high-end threats. What Ochmanek thinks will emerge is "something like a two-war or multiengagement capacity."

The last QDR specified that a new bomber needed to be fielded by 2018, but Gates terminated the program because he didn't feel the Air Force had adequately explained what the system should be able to do. A QDR "Tiger Team" will specifically examine "the requirements and concepts for long-range penetrating strike" and intelligence, surveillance, and reconnaissance, "recognizing that a manned bomber may or may not be the right answer," Ochmanek reported.

Facing Defeat in Taiwan?

An air war to defend Taiwan from a Chinese invasion may be lost before it starts, due to dramatic improvements in China's air force and land-based missiles, and a shortage of land-based US aircraft, according to a new RAND study.

In "A Question of Balance," released in early August, RAND authors said that China's large and growing tactical ballistic missile force could effectively suppress Taiwan's own air force, cutting most runways and destroying most aircraft on the ground. A large and better-equipped People's Liberation Army Air Forces would then greatly outnumber US land-based fighters from Okinawa and Guam and would likely prevail in a conflict across the Taiwan Strait.

Photo via sinodefence.com

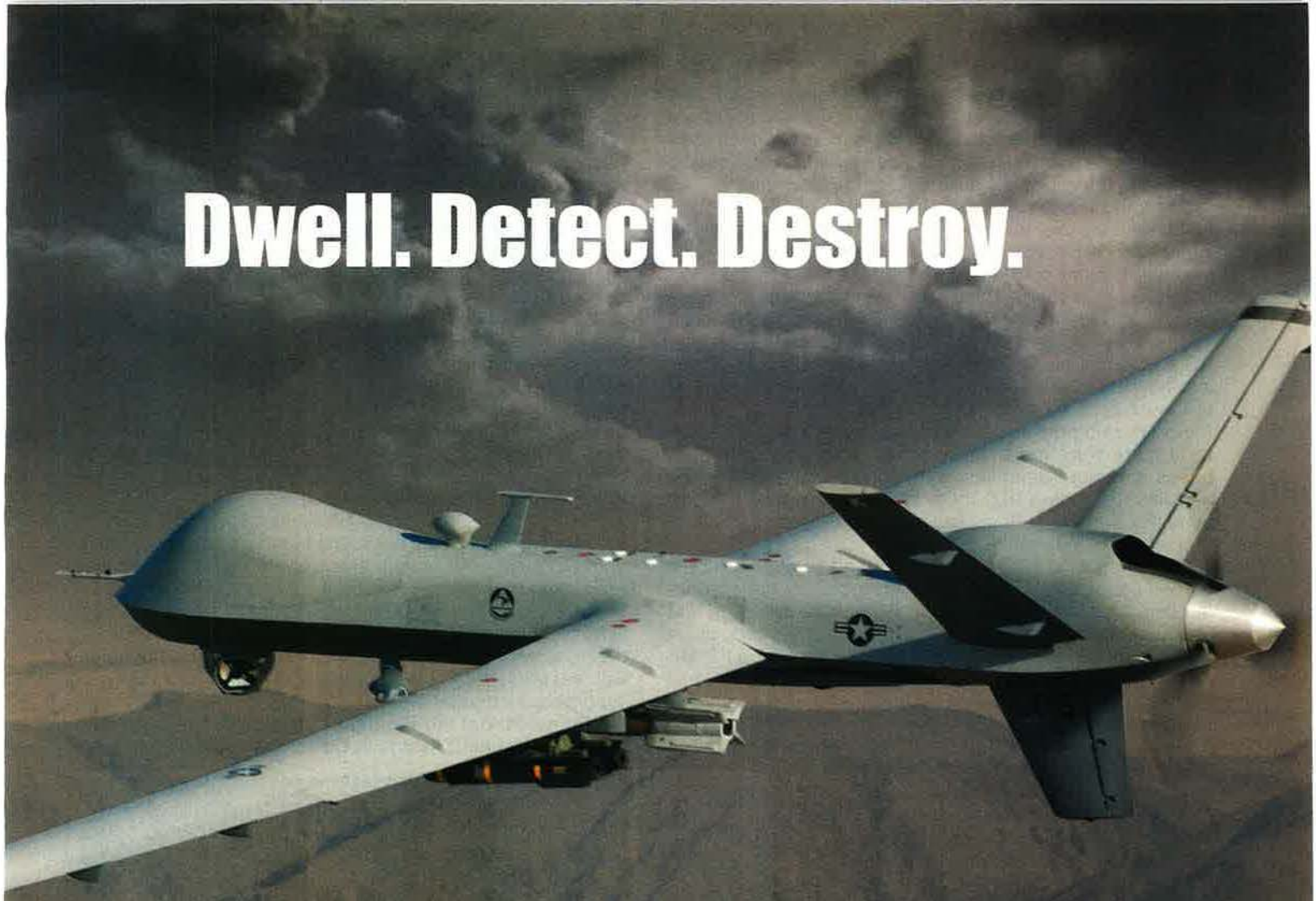
Dong Feng missiles: Are they tipping the balance?

"A credible case can be made that the air war for Taiwan could essentially be over before much of the Blue Air forces have even fired a shot," according to RAND. In all scenarios, the air battle was "very intense," and in most was settled in a matter of only four days.

The results represent a dramatic shift from a similar study RAND did in 2000, postulating a conflict in 2005, which the US and Taiwanese forces won handily in most scenarios. In the new study, modeled on forces expected to be fielded in 2013, US and Taiwanese forces won the day only 20 percent of the time.

One of the biggest factors in the losses was the overwhelming number and precision of PLAAF tactical ballistic missiles, which in a pre-emptive strike destroyed not only most Taiwan air defenders but many US aircraft based in Japan. In the computer models, Japanese forces defended their own territory but did not engage the Chinese. Air Force F-15s based at Kadena Air Base and Marine F/A-18E/Fs at Iwakuni Air Base were in the fight, and many were destroyed on the ground.

It was the shortage of land-based aircraft that led to defeat for the US and Taiwan. Sortie generation was a key factor, and carrier-based aviation simply couldn't keep up.



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"In the absence of land-based airpower, [Blue Forces] fared poorly even with two [carrier strike groups] in the fight from its outset; although the addition of two carrier air wings does improve performance on both measures, Blue is still playing a losing hand, especially according to the loss ratio."

Since the first study, China has been steadily fielding a better and "sizable" air force, with Su-27 and Su-30 Flanker variants on a par with the F-15 and new, indigenous J-10 multirole fighters considered to be in the class of the F-16. In the RAND models, China supplemented these front-line aircraft with older aircraft fitted with modern, precision "launch and leave" munitions that wouldn't require them to engage US aircraft directly. Chinese land-based air defense missiles also now have the range to engage aircraft over the land area of Taiwan itself.

RAND said both Taiwan and US forces would fare better if there were more hardened aircraft shelters at their bases and more defenses to thin out the rain of Chinese missiles, but noted that there is no plan in the works to build the shelters or devise an effective means of stopping precision guided munitions.

Operating F-22s from Guam seemed to offer the best outcomes for the US. "We were intrigued by the surprising level of success enjoyed by Guam-based F-22s," the RAND authors said. However, that success depends on the fielding of a new aerial tanker fleet, something the US has long delayed building.

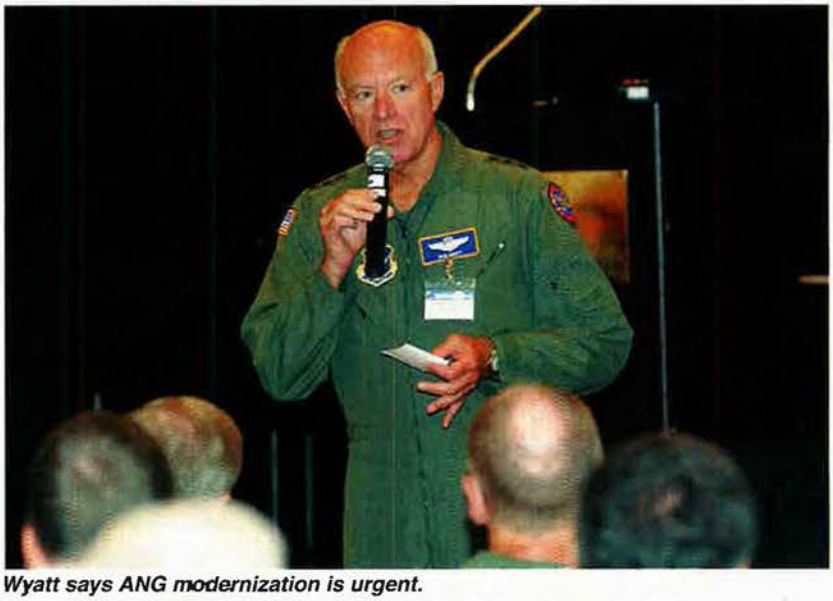
Years Too Late

Air National Guard Director Lt. Gen. Harry M. Wyatt III has been very vocal about the urgent need to modernize his force.

Much has been made of Wyatt's response to a letter from Sen. Saxby Chambliss (R-Ga.), widely interpreted as being a call for more F-22s to equip the Air Guard. However, Wyatt insisted that he didn't ask for more F-22s, but simply said the F-22 had the necessary capability for the air sovereignty mission, and that new airplanes of some kind are needed.

"I am basically platform agnostic," he said. However, the systems supplied to the Guard must be relevant, state-of-the-art machines that can both defend the homeland and participate equally in the Air Force's expeditionary rotations.

Moreover, "it's not just fighters," Wyatt noted. "It is tankers, ... airlifters, ... AWACS," and communications. Virtually all of the Guard's systems are aged and in need of replacement, mirroring the situation in the active duty force.



USAF photo by MSgt. Christopher Gillis

Wyatt says ANG modernization is urgent.

Wyatt said he is keeping "all options open" and wouldn't rule out buying new-build F-15s and F-16s for the Air Guard mission, but that possibility has been stridently opposed by USAF Chief of Staff Gen. Norton A. Schwartz, who insists that such spending would divert funds needed to ramp up F-35 production as quickly as possible.

There are creative basing options that would make it possible to put more of the limited number of F-22s into the Guard than are now planned, Wyatt said, allowing them to perform both the expeditionary role and the air sovereignty mission.

Twilight Zone Industrial Base

Submitted for the Pentagon's approval: Consider the effects of Quadrennial Defense Review decisions on the defense industrial base, or you'll be talking to yourself when you get around to asking for new systems.

That's the upshot of a new study, "The Unseen Cost: Industrial Base Consequences of Defense Strategy Choices," prepared by the Aerospace Industries Association and released in July. It notes that there will be little for combat aircraft design teams to do if there are no new starts in the next few years. With no new projects, it would be hard for major airframers to justify to their stockholders the expense of keeping such design teams on the payroll, and no experienced engineers on hand when new systems are called for.

"We have been concerned for a number of years" that the industrial base has never been "counted" in previous QDRs, AIA President Marion C. Blakey told reporters in Washington, D.C. She said she fears that the new Administration—populated largely with policy-makers who haven't been in the business for a decade or more—may not know the true situation in the industrial base, which is down to one or two suppliers in many fields, and no domestic vendors in a growing number of key areas.

Since the last Democratic Administration, many companies have consolidated or left the business altogether, and some of those that remain are wrapping up the work they have, with no new projects on the horizon. The Pentagon shouldn't rely on "the market," Blakey said, because there is no other customer for many defense systems, particularly the most advanced weapons. AIA believes more companies will feel pressured to leave what for some is becoming an "unprofitable market."

She noted that the Pentagon's acquisition, technology, and logistics chief, Ashton B. Carter, has indicated that he may push to include the industrial base in QDR deliberations, but had made no promises by late July.

According to the report, some of the capabilities already atrophied from program starvation include helicopter design, long-range strike, and space power. A lack of science and technology investment in those sectors has "degraded" them to the point where they could not provide new systems in a timely manner if asked to do so on a short timetable. Other sectors are on borrowed time, as well.

The AIA made six recommendations in its report, mostly focused on reinvigorating the relationship between the Pentagon and its suppliers. Blakey said AIA wants to make sure that the government's "expectations" about what the industry can do in the future are based on reality, and not false assumptions. A robust defense industrial base "is not a given," and "should not be neglected," she said. ■

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Photo courtesy of the Department of Defense

Air Force World

By **Michael Sirak,** Senior Editor, with **Marc Schanz,** Associate Editor

Two Airmen Die in F-15E Crash

Capt. Thomas J. Gramith, 27, of Eagan, Minn., and Capt. Mark R. McDowell, 26, of Colorado Springs, Colo., died July 18 when their F-15E Strike Eagle fighter crashed while conducting coalition operations in eastern Afghanistan near Ghazni province.

Both were assigned to the 336th Fighter Squadron from Seymour Johnson AFB, N.C. The Air Force said the crash was not due to hostile fire.

As of mid-August, the mishap's cause was under investigation.

KC-X Tanker Restart Delayed

DOD efforts to release a draft request for proposal to restart the KC-X tanker recapitalization program by the spring or early summer have faltered. As a result, the Office of the Secretary of Defense hinted that the solicitation might not hit the streets until around September.

"No final decision has been made on this yet," Pentagon Press Secretary Geoff Morrell told reporters in the Pentagon July 15.

McKinley Steps Down, Roy Steps Up

CMSAF Rodney J. McKinley stepped down from his post as USAF's top enlisted leader on June 30 during a ceremony at Bolling AFB, D.C. Taking over the post from McKinley that same day was CMSgt. James A. Roy, who became 16th Chief Master Sergeant of the Air Force.

"It isn't the awards, the decorations, or the rank that means the most to me; it's the people, ... the relationships I've experienced along the way," said McKinley during his farewell address. He is retiring from the Air Force after 35 years of service, effective Nov. 1. He became 15th Chief Master Sergeant of the Air Force in June 2006.

Roy, who was US Pacific Command's command chief master sergeant prior to his new post, said he was "truly humbled and honored" to follow McKinley and would "take great personal responsibility" in advising the USAF leadership on the enlisted force.

QDR Vetting COIN Wing

The current Quadrennial Defense Review is strongly considering the establishment of a dedicated counterinsurgency/irregular warfare wing within the Air Force, Michael G. Vickers, assistant secretary of defense for special operations and low intensity conflict and interdependent capabilities, told reporters in the Pentagon July 23.

"I think there is a need for that kind of capability, ... but the question is how much and exactly the mix," he said. Air Force Chief of Staff Gen. Norton A. Schwartz divulged back in April that the Air Force was mulling such a wing.

Holloman To Host UAV Training

Air Combat Command on July 13 announced that Holloman AFB, N.M., would be the site of the Air Force's new Predator and Reaper unmanned aerial vehicle formal training unit.

Air Force officials have said establishing a second UAV training site—in addition to the one at Creech AFB, Nev.—would allow the service to churn out greater numbers of UAV combat operators. The longer-term plan is to consolidate all UAV operator training at Holloman, which has extensive training capacity. This would free the space-constrained Creech to focus on operational UAV employment.

"The stand up of the second FTU and the subsequent FTU consolidation at Holloman will put the Air Force on a sustainable [unmanned aircraft system] flight path," said Gen. John D. W. Corley, outgoing ACC commander.

Missile Wing Passes Inspection

The 91st Missile Wing at Minot AFB, N.D., passed a nuclear surety inspection that took place from June 14-28, receiving a grade of "satisfactory," the highest possible mark, in the demanding assessment by an Air Force Space Command-led inspection team.

As a result, the wing remained certified to perform its strategic deterrent mission. In addition to passing the NRI, the wing also performed well during its operational readiness inspection that was conducted during the same time frame. It earned a satisfactory grade there, too.

Kehler Eyes Close Cyber-Intel Ties

Air Force Space Command is making progress in defining the direction it will take with its nascent cyber efforts, and

USAF photo by SrA. Jason Huddleston

that tack may well include closer ties with the Intelligence Community, Gen. C. Robert Kehler, AFSPC boss, told a Capitol Hill seminar July 14.

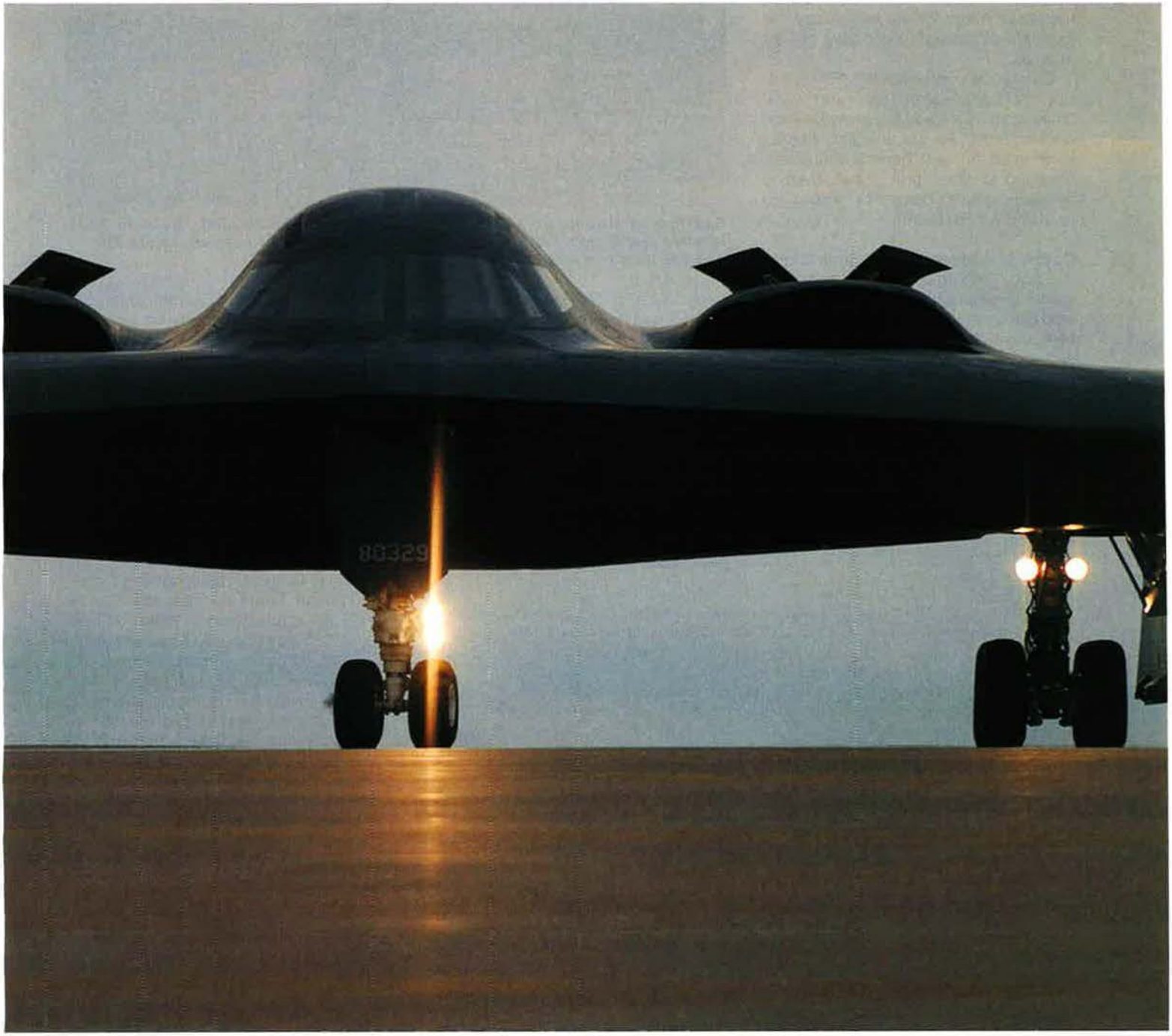
Kehler said the very nature of cyberspace with its national security, economic, and private elements makes it "difficult to separate traditional intelligence from traditional operations." He expects to have IC personnel attached to 24th Air Force, the new numbered air force for cyber operations, set for Lackland AFB, Tex.

"We're going to put them in the unit, and they're going to be sitting in there with the appropriate authorities to conduct intelligence-related activities at the same time that we conduct operational activities," Kehler said.

Speicher's Remains Identified

The Pentagon announced Aug. 2 that the remains of Navy Capt. Michael Scott Speicher, the first US pilot lost over Iraq during the opening phase of Operation Desert Storm in January 1991, have been positively identified. His identification culminated an 18-year saga: Speicher was shot down while flying a combat mission in an F/A-18 Hornet over west-central Iraq on Jan. 17, 1991, but his remains were not found at the crash site and there was evidence that seemed to indicate he might have survived and been taken prisoner.

According to the Pentagon, US marines, acting on information provided by an Iraqi citizen, last month found Speicher's remains in the western Iraqi



08.10.2009

The B-2 stealth bomber **Spirit of Missouri** *taxis along the north ramp of Whiteman AFB, Mo., before a multiaircraft "fly-off" as part of a nuclear operational readiness exercise. The 509th Bomb Wing's NORE was preparation for a combined nuclear surety inspection and nuclear operational readiness inspection coming in October. The Air Force has stepped up the frequency and intensity of these sorts of nuclear inspections and sometimes performs them with no notice.*

desert. Among the bones and skeletal fragments, the jawbone found matched his dental records, DOD said.

"Our thoughts and prayers are with Captain Speicher's family for the ultimate sacrifice he made for his country," said Navy Secretary Ray Mabus.

Adm. Gary Roughead, Chief of Naval Operations, added "We owe a tremendous debt of gratitude to Captain Speicher and his family for the sacrifice they have made for our nation and the example of strength they have set for all of us."

During the intervening 18 years, Speicher's official status changed several times as various leads and investigations were pursued. He was initially listed as killed in action, and then his status was changed to missing in action, then to missing/captured, before finally reverting to MIA this past March.

Photo by Greg L. Davis

Snarling at Moody: *An A-10C at Moody AFB, Ga., sports the markings of Air Force Reserve Command's 476th Fighter Group, established at the base on July 11. The unit operates as a detachment of the 442nd Fighter Wing.*

Cause of Airmen's Death Identified

SSgt. Kenneth J. Wilburn, a combat controller apprentice from Union, S.C., who died Jan. 12 after losing consciousness three days earlier during training, suffered cardiac arrest that led to irreversible brain injury, according to the findings of Air Combat Command's investigation into his death, released July 7.

Wilburn, who was assigned to Lackland's 342nd Training Squadron, lost consciousness Jan. 9 while treading water during skills training in a pool at Lackland AFB, Tex. He did not respond to emergency lifesaving efforts on the scene and never regained consciousness at Wilford Hall Medical Center. He was removed from life support three days later. He was 30.

Multinational C-17 Wing Activated

The first of three new Boeing-built C-17 Globemaster III transports destined for the 12-nation Strategic Airlift Capability consortium arrived at its main operating base, Papa AB, Hungary, on July 18.

On July 27, the SAC activated the multinational Heavy Airlift Wing that will operate the aircraft. Boeing expects to deliver the other two C-17s this month and in October.

The SAC members are NATO nations Bulgaria, Estonia, Hungary, Lithuania, the Netherlands, Norway, Poland, Romania, Slovenia, and the US, plus Partnership for Peace countries Finland and Sweden.

Keesler Gains Cyber Training Role

The Air Force has chosen Keesler AFB, Miss., over Goodfellow and Sheppard Air Force Bases in Texas as the site to host its cyber warfare training, the *Standard-Times*, of San Angelo, Tex., Goodfellow's location, reported June 26.

Meanwhile, supporters of Goodfellow and Sheppard said these bases may still have a future cyber training role. The *Times Record News* of Wichita Falls, home to Sheppard, reported June 27 that Sen. Kay Bailey Hutchison (R-Tex.) said she would be "making that case to the Pentagon as it plans for Fiscal Year 2011 and beyond."

T-6 Crashes, No Injuries

A T-6 Texan II trainer aircraft assigned to the 14th Flying Training Wing at Columbus AFB, Miss., crashed July 9 in a sparsely populated area of Webster County, Miss., about 40 miles west of the base.

The pilot, an international officer whose name was initially withheld, ejected safely. This officer was conducting flight training as part of the Aviation

US, Russia Agree on Nuclear Force Cuts

President Barack Obama and Russian President Dmitry Medvedev on July 6 signed a document in Moscow that sets the parameters for reductions in the two nations' nuclear force levels by up to one-third beyond the current ceilings laid down in the 1991 Strategic Arms Reduction Treaty and 2002 Strategic Offensive Reductions Treaty.

This joint understanding for the START follow-on treaty states that both sides are committed to reducing their strategic warheads to a range of 1,500 to 1,675, and their strategic delivery vehicles to between 500 and 1,100.

Under START and SORT, the maximum amount of deployed warheads is currently 2,200 and the maximum allowable level of launch vehicles is 1,600.

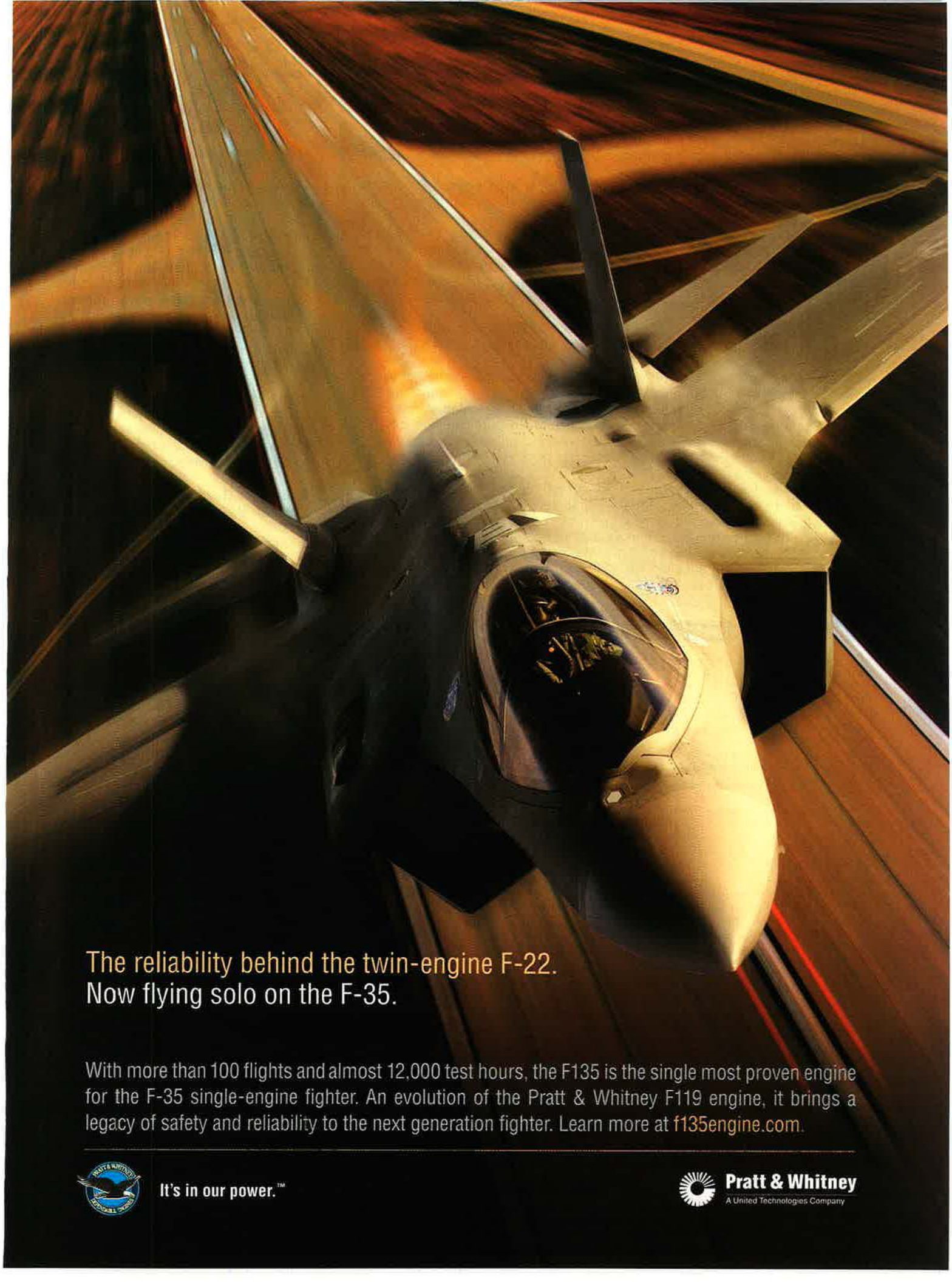
"As the world's two leading nuclear powers, the United States and Russia must lead by example, and that's what we're doing here today," said Obama at a joint press briefing with Medvedev.

The joint understanding is meant to guide the remainder of the negotiations that will culminate in a new legally binding agreement that will replace START, which expires in December.

The new treaty, which Obama said would be completed by year's end, will include effective verification measures, according to the joint statement.

The two nations also released documents on July 6 outlining their intent to resume bilateral military-to-military exchanges that were suspended in August 2008 after Russia's armed incursion into Georgia; strengthen cooperation to prevent the proliferation of nuclear weapons; and seek cooperation in monitoring ballistic missile developments around the globe and work toward a multilateral missile launch notification regime.

Russia also agreed to allow US military personnel and military equipment to pass through Russian territory en route to Afghanistan.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Air Force Issues UAV Roadmap

The Air Force's new Unmanned Aerial Systems Flight Plan 2009-47, issued July 23, forecasts a future where unmanned drones replace manned aircraft as the dominant airpower capability that USAF provides to the joint military force.

The flight plan, service officials said during its rollout in the Pentagon, is meant to institutionalize USAF's vision for developing and resourcing unmanned capabilities for the foreseeable future.

"We are today, with unmanned aerial systems, about where we were in the 1920s with manned aircraft," said Lt. Gen. David A. Deptula, deputy chief of staff for intelligence, surveillance, and reconnaissance on the Air Staff.

He added that there is "lots of potential out there. And we have to change the way that we think about using these systems across the entire spectrum of military operations."

The flight plan centers on development of a "family" of unmanned aircraft ranging from small, man-portable vehicles to "medium 'fighter-size' vehicles" and "large 'tanker-size' vehicles."

Ultimately, they would have "autonomous-capable operations," enabling them "to perceive the situation and act independently with limited or little human input," the Air Force said. This will greatly shorten decision time, in effect, compressing airpower's OODA loop—observe, orient, decide, and act.

The document does not lay out specific solutions but rather "concepts and possibilities" that will be filled in as the service talks with industry, academia, the other services, and allies.

Deptula said a key advantage of unmanned aircraft today is the persistence—dubbed "first among equals"—that they provide. UAVs have "the ability to stay in position or maneuver over large areas for a long period of time, and that's where a person in an aircraft becomes a limitation."

Although there is no pilot sitting in the cockpit of unmanned vehicles, "highly skilled airmen" are still today at the heart of these systems, said Gen. William M. Fraser III, then vice chief of staff of the Air Force.

Index to Advertisers

Leadership Program, which provides undergraduate flying training.

The Air Force convened a board to investigate the accident.

Training Complex for Lackland

The Air Force in early July launched a construction project to bring a 74,000-square-foot training complex by the fall of 2010 to the Inter-American Air Forces Academy at Lackland AFB, Tex.

The *San Antonio Business Journal* reported July 6 that AMEC Earth & Environmental of Plymouth Meeting, Pa., received an $18.5 million contract to start work on the complex, which will house classrooms, aircraft operations, and hangar maintenance training areas as well as administrative space.

This type of training for the IAAFA, which educates airmen from partner nations in Latin America, currently goes on at Port San Antonio, the former Kelly Air Force Base, but it is being relocated to Lackland courtesy of BRAC 2005.

Expanded Guard Role Sought

National Guard Caucus leaders Sen. Patrick J. Leahy (D-Vt.) and Sen. Christopher S. Bond (R-Mo.) reintroduced legislation June 25 dubbed the National Guard Empowerment Act III that continues their push to further the role of the Guard in defense policy-making.

Among the latest initiatives, the caucus wants to ensure governors retain "tactical control" of the Guard when operating domestically; wants to give the National Guard Bureau budgetary authority; and wants to create an NGB vice chief.

Under last year's empowerment effort, the lawmakers successfully elevated the NGB chief to a four-star position. Now, they want to try again to get the chief a seat on the Joint Chiefs of Staff.

Latest Global Hawk Variant Unveiled

Air Force and Northrop Grumman officials rolled out the first RQ-4 Global Hawk Block 40 unmanned aerial vehicle at the company's Palmdale, Calif., facility June 25. This aircraft is designated AF-18.

The Air Force program of record is to procure 15 Global Hawk Block 40 aircraft. This configuration of the high-flying reconnaissance UAV carries the Northrop Grumman-Raytheon Multiplatform Radar Technology Improvement Program sensor, a sophisticated active electronically scanned array radar for synthetic aperture radar imaging and tracking moving ground targets.

USAF expects to field Block 40 aircraft at Grand Forks AFB, N.D., next decade.

Space Fence Upgrade Launched

The Air Force in June awarded $30 million contracts each to Lockheed Martin,

NCADE

Raytheon's Affordable Solution for the Growing Ballistic Missile Threat

As the Missile Defense Agency continues to reshape the focus of Ballistic Missile Defense toward early mission intercept, the significance of the Network Centric Airborne Defense Element as an affordable, near-term, boost and ascent phase interceptor becomes more and more compelling. The growing ballistic missile threat from emerging nuclear powers puts the spotlight on NCADE as a solution to the challenges faced by the MDA, the U.S. warfighter, and allied forces.

The U.S. Air Force and the Missile Defense Agency are engaged in a joint study examining operational feasibility and technical readiness of using fighter jets, bombers and unmanned systems for ballistic missile defense. Raytheon's NCADE is clearly emerging as the preferred option, as it is affordable, compatible with all platforms, and maintains a multi-mission aircraft role.

NCADE is an air-launched weapon system designed to engage short and medium-range ballistic missiles in the early phase of flight. The interceptor leverages proven components and existing technologies, including the aerodynamic design, aircraft interface and flight control system of Raytheon's Advanced Medium Range Air-to-Air Missile (AMRAAM). The commonality with AMRAAM enables the warfighter to launch NCADE from a wide variety of aircraft, including unmanned aerial systems. NCADE is also the only early intercept solution to go exoatmospheric and is compatible with the internal carriage of many of today's front line fighters.

NCADE also leverages combat-proven imaging infrared seeker components from existing Raytheon production programs, enabling rapid development and fielding. Raytheon has already flight-tested the infrared seeker with the intercept of a test ballistic missile at White Sands Missile Range. The test demonstrated the NCADE infrared seeker's ability to acquire and track a ballistic missile target in the boost phase of flight.

According to Loren B. Thompson, chief operating officer of the Lexington Institute, NCADE offers many advantages over other platforms: "NCADE can be deployed on any fighter in the joint inventory, and requires only minor modifications to be installed. By networking together various sensors and linking them to the aircraft carrying the intercept missile, the military can obtain a highly capable defensive system while avoiding many of the costs associated with traditional missile defense programs."

NCADE provides a deterrent against missile launches by rogue states, and has the potential to neutralize potent threats that U.S. forward-deployed forces may face in the years ahead. It fills a critical niche in the Ballistic Missile Defense system and provides an affordable, near term approach to interceptor development and acquisition.

NCADE: Delivering affordable, early intercept capability

- Focused on short- and medium-range regional threats
  - Boost and ascent, exo and endo intercepts for high utility and creates substantial mission coverage
- Fully compatible with any manned or unmanned platform that can carry AMRAAM
- Leverages existing Fighter, Sensor and AMRAAM worldwide infrastructure
- Provides critical near term capability
  - IOC with 20 NCADES by 2014
- Could provide cost effective missile defense solution to U.S. allies

JASSM Again Comes Under the Microscope

Production of the Air Force's AGM-158 Joint Air-to-Surface Standoff Missile may be terminated if its test record does not improve, Bloomberg news reported June 30, citing an Air Force spokeswoman.

Lockheed Martin builds the missile and more than 600 of them have already been delivered to air bases for potential use, and more than 1,000 have been ordered, Bloomberg reported.

However, the missile program has still not fully overcome reliability issues that have marred the performance of the baseline JASSM in some flight tests despite internal Lockheed Martin efforts and Air Force-sponsored improvements.

As a result, an upcoming series of 16 test shots later this year could seal the missile's fate. The Air Force wants end-to-end success (i.e., hitting the targets and detonating properly) in at least 80 percent of the upcoming flights.

Alan Jackson, Lockheed's JASSM and JASSM-Extended Range program director, told Reuters in early July that the missile program had achieved "significantly over 80 percent reliability" and was nearing the 90 percent mark, which the Air Force is establishing as the future standard for the missile.

Pending the test results, the Air Force did not ask procurement funds for JASSM in its Fiscal 2010 budget request to Congress.

This isn't the first time JASSM has been in the hot seat. Performance reliability was an also issue back in 2007-08 when the missile program underwent an extensive review and had to be recertified by the Office of the Secretary of Defense for continuation.

Meanwhile the Air Force did award Lockheed Martin a $23 million contract in July for 12 extended-range JASSMs for use in upcoming flight tests to determine whether this variant of the missile is ready for low-rate production.

As of late July, JASSM-ER had a 100 percent success rate in its four developmental flight tests.

Northrop Grumman, and Raytheon for Phase A concept development work on the proposed "Space Fence," the replacement for the Air Force Space Surveillance System, the string of ground-based space-surveillance radars across the US.

The Air Force wants to transition from the VHF band of the AFSSS to the S-band for the Space Fence in order to achieve greater tracking accuracy and have the ability to detect and monitor smaller space objects and debris in low and medium Earth orbit. Phase A will culminate with a system design review and prototyping demonstration.

Delivery of the first new radar is anticipated in 2015. According to Raytheon, up to three globally positioned S-band radars are envisioned. Northrop Grumman said Australia is a candidate for the first Space Fence location.

F-15 Training To Be Consolidated

The Oregon Air National Guard's 173rd Fighter Wing at Klamath Falls Airport/Kingsley Field is slated to become the Air Force's sole F-15 training base, Army Maj. Gen. Raymond F. Rees, adjutant general of the Oregon National Guard, said in a July 10 interview.

Under a proposal in the Air Force's Fiscal 2010 budget plan, F-15 training operations would be phased out at Tyndall AFB, Fla., and consolidated at Klamath Falls. If Congress approves this proposal, F-15 training activities would cease at Tyndall by the end of Fiscal 2010.

Earlier this year, news reports suggested that the Oregon legislature was considering closing Kingsley Field as a cost-saving measure. But upon closer examination, Rees said, it became clear that "it was kind of like cutting off your nose to spite your face to talk about reducing state fiscal responsibilities to Kingsley Field."

AFRL Groundbreaking in Ohio

Air Force officials broke ground July 1 at Wright-Patterson AFB, Ohio, on a new $36 million project to expand the facilities of the Air Force Research Laboratory's Sensors Directorate.

The *Dayton Daily News* reported that same day that the project, which is due for completion in April 2011, will add offices, labs, and a testing range to the existing Sensors Directorate building. The project is part of the Air Force's effort to consolidate Sensors Directorate work at Wright-Patterson by moving about 100 research positions to the Ohio base from Rome, N.Y., and Hanscom AFB, Mass. Butt Construction is the lead contractor.

Overall, Wright-Patterson is undergoing about $332 million in construction projects as about 1,200 research positions transfer to the base per BRAC 2005, according to the newspaper.

Human Error Caused E-8C Damage

A plug mistakenly left by a civilian subcontractor employee in a fuel vent of an E-8C Joint Surveillance Target Attack Radar System aircraft after scheduled depot maintenance late last year led to a ruptured fuel tank while the aircraft was operating in Southwest Asia March 13, Air Combat Command announced July 9.

The aircrew was able to overcome the in-flight emergency, which occurred during aerial refueling, and safely return the aircraft to its base. There were no injuries, but the rupture caused an estimated $25 million in damage.

Investigators also faulted the depot subcontractor for ineffective tool-control measures and not following mandated procedures. Northrop Grumman, lead Joint STARS contractor, said July 9 it implemented corrective actions immediately after learning of the incident and assembled an independent team to review its procedures.

USAF Matures UAV Concept

The Air Force is poised to begin the analysis of alternatives for its MQ-X unmanned aerial vehicle, the notional successor to today's MQ-1 Predators and MQ-9 Reapers.

The service intends to have the study of alternatives complete by late summer or fall of 2010, Col. Eric Mathewson, director of USAF's Unmanned Aerial Systems Task Force, told reporters in the Pentagon July 23. He said it's too early to know when the new platform would be fielded.

Mathewson said the Air Force will examine a range of capabilities for the aircraft, including low-observable technology. Further, the MQ-X program will serve as a "test bed" for the concepts of modular unmanned fighters and intelligence-surveillance-reconnaissance, electronic attack, mobility, and other mission aircraft, he said.

IG Report Faults Moseley

The Pentagon inspector general on July 10 released the results of its investigation into actions by now-retired Gen. T. Michael Moseley, former Chief of Staff, surrounding the December 2005 Thunderbird Air Show Production Services (TAPS) contract award to Strategic Message Solutions.

The IG concluded that Moseley violated ethics regulations by: providing preferential treatment to SMS; creating an appearance of improper disclosure of nonpublic information; misusing subordinates' time and government

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Operation Iraqi Freedom—Iraq

Casualties

By Aug. 17, a total of 4,335 Americans had died in Operation Iraqi Freedom. The total includes 4,322 troops and 13 Department of Defense civilians. Of these deaths, 3,465 were killed in action with the enemy while 870 died in noncombat incidents.

There have been 31,463 troops wounded in action during Operation Iraqi Freedom. This number includes 17,612 who were wounded and returned to duty within 72 hours and 13,851 who were unable to return to duty quickly.

Air Strikes Decline Precipitously in Iraq

US Air Forces Central in late June released a comprehensive tally of air operations statistics that revealed just how much offensive air operations in Iraq have wound down since the beginning of the year.

According to US air planners, no munitions were expended in Iraq in June. And so far, only 4,461 close air support sorties have been flown over Iraq in 2009, compared to 18,422 recorded for all of 2008.

In May, there were only three munitions delivered from the air countrywide. The drop in kinetic operations is in sharp contrast to two years ago, when 360 munitions were expended in Iraq during July 2007, around the height of the US troop surge.

Operation Enduring Freedom—Afghanistan

Casualties

By Aug. 17, a total of 778 Americans had died in Operation Enduring Freedom. The total includes 777 troops and one Department of Defense civilian. Of these deaths, 538 were killed in action with the enemy while 240 died in noncombat incidents.

There have been 3,522 troops wounded in action during OEF. This number includes 1,328 who were wounded and returned to duty within 72 hours and 2,194 who were unable to return to duty quickly.

Taliban Attack US Base Prior To Helmand Offensive

Two US troops were killed in an attack on a remote outpost in Paktika province in early July, just as a large US offensive against the Taliban kicked off in the country's interior.

According to US and coalition reports, Taliban fighters fired mortars and rockets at the base, which is located near Zerok in Paktika province—not far from where a US soldier was captured in late June.

A suicide bomber attempted to drive a truck filled with explosives up to the facility's gate, but was shot before he could get to the gate. His truck detonated prematurely.

US officials said the attack started with small arms and indirect fire on the outpost, followed by the detonation of an improvised explosive device and successive waves of small-arms fire.

Air support in the form of an Air Force MQ-1 Predator unmanned aerial vehicle responded by dropping a GBU-12 laser guided bomb against a group of militants involved in the attack.

A Predator also fired a Hellfire air-to-surface missile against a group of militants who had engaged ground forces with a long-barreled weapon and rocket-propelled grenades.

Following the strikes, coalition aircraft and a Marine Corps AV-8B Harrier performed shows of force to deter further attacks.

In addition to the two killed in action, seven soldiers and two Afghan security force members were wounded in the assault.

The attack came days after US Marines spearheaded a massive offensive against the Taliban in Helmand province, with 4,000 troops moving in to attack and dismantle the core of the Taliban's opium trade, a major source of financing for their weapons and activities.

property; and soliciting and accepting gifts from a prohibited source.

The IG recommended that the Secretary of the Air Force "consider appropriate corrective action."

Moseley, through his counsel, responded to the IG that he believed the IG conclusions to be wrong and based on erroneous application of contract law. Air Force Secretary Michael B. Donley has stated that he will spend some months reviewing the entire case.

In 2008, a two-star Air Force general and several other officers received administrative discipline for their roles in allegedly steering the TAPS contract to SMS.

WASPs Get Overdue Recognition

President Obama on July 1 signed into law S. 614, the bill that awards a Congressional Gold Medal to the Women Airforce Service Pilots of World War II who flew noncombat military missions to free their male counterparts for combat missions.

Obama said at the signing ceremony these female pilots "courageously answered their country's call in a time of need, while blazing a trail for the brave women who have given and continue to give so much in service to this nation since." He added, "Every American should be grateful for their service."

Despite their service—they were the first women ever to fly American military aircraft—WASPs did not receive veteran status until 1977. The bill enjoyed broad bipartisan support as it moved its way though Congress.

Professor Sentenced in UAV Case

University of Tennessee emeritus professor J. Reece Roth was sentenced by a US federal judge to four years in prison on July 1 for violating US law regarding the protection of sensitive technology in his work on an Air Force research project related to unmanned aerial vehicles.

Roth, 71, was mulling an appeal. He was convicted in September 2008 on 18 counts of conspiracy, fraud, and violating the Arms Export Control Act for the unlawful transfer of sensitive data to foreign nationals from 2004 to 2006 while he was researching plasma guidance for UAVs under two Air Force-sponsored projects.

He has always maintained his innocence.

Ogden Does Get UAV Work

The Utah Congressional delegation announced July 15 that the Ogden Air Logistics Center at Hill AFB, Utah, will handle depot maintenance for key components of the MQ-1 Predator and MQ-9 Reaper unmanned aerial vehicles.

According to a release by Sen. Orrin G. Hatch (R), the Ogden ALC will work on the MQ-1 airframe, ground data terminal, primary satellite link, and ground control station as well as the MQ-9 airframe. Ogden will also service components for the RQ-4 Global Hawk UAV.

Airmen Receive Bronze Star Medals

Maj. Todd Andre received a Bronze

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Senior Staff Changes

RETIREMENTS: Maj. Gen. Thomas F. **Deppe,** Maj. Gen. Irving L. **Halter Jr.,** Maj. Gen. John W. **Maluda,** Maj. Gen. Eric J. **Rosborg,** Maj. Gen. R. Mike **Worden,** Brig. Gen. Arthur B. **Cameron III,** Brig. Gen. Gary S. **Connor,** Brig. Gen. Silvanus T. **Gilbert III,** Brig. Gen. Richard J. **Tubb.**

CHANGES: Brig. Gen. Gregory L. **Brundidge,** from DCS, Com. & Info. Sys., Multinational Force-Iraq, CENTCOM, Baghdad, Iraq, to Dir., C^3 & Warfighting Integration, EUCOM, Stuttgart-Vaihingen, Germany ... Brig. Gen. Cary C. **Chun,** from Cmdr., 50th Space Wg., AFSPC, Schriever AFB, Colo., to Dep. Cmdr., Space Spt. & Integration, Jt. Functional Component Command, Space, STRATCOM, Chantilly, Va. ... Maj. Gen. (sel.) David L. **Goldfein,** from Dep. Dir., Prgms., DCS, Strat. P&P, USAF, Pentagon, to Dir., Air & Space Ops., ACC, Langley AFB, Va. ... Maj. Gen. William L. **Holland,** from Vice Cmdr., 9th AF, ACC, Shaw AFB, S.C., to Cmdr., 9th AF, ACC, Shaw AFB, S.C. ... Brig. Gen. Jim H. **Keffer,** from Sr. Mil. nal Force-Iraq, CENTCOM, Baghdad, Iraq ... Brig. Gen. (sel.) John W. **Raymond,** from Cmdr., 21st Space Wg., AFSPC, Peterson AFB, Colo., to Dir., Plans, Prgms., & Analyses, AFSPC, Peterson AFB, Colo. ... Brig. Gen. Jack **Weinstein,** from Dir., Plans, Prgms., & Analyses, AFSPC, Peterson AFB, Colo., to Dep. Dir., Prgms., DCS, Strat. P&P, USAF, Pentagon.

SENIOR EXECUTIVE SERVICE RETIREMENT: Ronald A. **Winter.**

SES CHANGES: Randy E. **Brown,** to Dir., 308th Armament Systems Wg., AFMC, Eglin AFB, Fla. ... Harry C. **Disbrow Jr.,** to Assoc. DCS, Ops., P&R, USAF, Pentagon ... Daniel B. **Ginsberg,** to Asst. SECAF for Manpower & Reserve Affairs, OSAF, Pentagon ... Ann L. **Mitchell,** to Dir., Instl., Log., & Mission Spt., AF Global Strike Command, Barksdale AFB, La. ... Keith D. **Thomas,** to Exec. Dir., AF ISR Agency, Ft. George G. Meade, Md. ■

Star Medal in early July for his meritorious service as commander of the 379th Expeditionary Maintenance Squadron at an air base in Southwest Asia. He oversaw more than 400 airmen in this role.

Also receiving Bronze Star Medals in July were Capt. Karen Rupp, now assigned to Elmendorf AFB, Alaska, for her actions in Iraq as commander of the 424th Medium Truck Detachment, and CMSgt. William J. Brown, a native of Bristol, Conn., for his work last year leading more than 500 airmen at Kandahar Airfield, Afghanistan.

Also recognized were TSgt. Cohen Young of Hickam AFB, Hawaii, for his service in Iraq as a combat cameraman, and TSgt. Jeremy J. Pifer of Joint Base McGuire-Dix-Lakehurst, N.J., for his activities in Iraq last year as an explosive ordnance disposal team leader.

McClellan Cleanup Plan Approved

The Environmental Protection Agency and the state of California agreed in July to a cleanup plan for a 62-acre portion of land on the former McClellan Air Force Base. The decision represents the first time that the Department of Defense ceded authority to EPA to select a cleanup plan for a Superfund site, according to a July 20 EPA release.

EPA chose a private redevelopment company, McClellan Business Park LLC, to conduct the cleanup under EPA and state oversight, using Air Force funds. The rest of the base, about 3,000 acres, may also undergo a private cleanup approach, said EPA.

AFRC Activates Flying Tigers

Air Force Reserve Command on July 11 formally activated the 476th Fighter Group at Moody AFB, Ga. Its 76th Fighter Squadron, 476th Maintenance Squadron, and 476th Aerospace Medicine Flight will participate in A-10C Warthog operations at Moody with the active duty 23rd Wing.

The 476th FG embraces the Flying Tigers heritage of World War II fame through the newly reformed 76th Fighter Squadron, which is the first-ever Reserve A-10 associate unit.

AFRC began working in June 2007 toward standup of the group by establishing a detachment at Moody to pave the way for transfer of some Reservists from the 442nd Fighter Wing at Whiteman AFB, Mo. The 442nd FW still serves as the parent wing for the 476th FG. ■

News Notes

■ Air Force Secretary Michael B. Donley on July 9 dismissed from the service the three officers who fell asleep on July 12, 2008, when they were supposed to be watching classified launch code devices at a missile alert facility at Minot AFB, N.D.

■ US and coalition forces supporting operations in Southwest Asia set a new airdrop record in June by delivering 3.25 million pounds of supplies in Afghanistan, the most in one month in the region since operations began in fall 2001.

■ The National Aviation Hall of Fame on July 18 enshrined the late Brig. Gen. Jimmy Stewart, World War II bomber pilot, famed Hollywood actor, and one of the early officers in the Air Force Association, as one of its inductees in the class of 2009.

■ The New York Air National Guard's Northeast Air Defense Sector on July 15 was renamed the Eastern Air Defense Sector to better reflect its expanded mission of providing air sovereignty over the eastern US.

■ The 451st Air Expeditionary Group at Kandahar Airfield, Afghanistan, officially became the 451st Air Expeditionary Wing on July 2. Kandahar is the site of increased Air Force activity for the US troop buildup in Afghanistan.

■ The 41st Expeditionary Electronic Combat Squadron, an EC-130H Compass Call unit at Bagram AB, Afghanistan, on July 9 flew its 2,000th combat mission in support of operations in Afghanistan since October 2001.

■ Lt. Col. Booth M. Johnston on June 16 received the Koren Kolligian Jr. Safety Trophy for outstanding airmanship during an October 2007 sortie when he safely landed his F-16 despite back and neck injuries suffered during a high-G maneuver.

■ 2008 Lance P. Sijan Air Force Leadership Award winners, announced June 30, are: Maj. James Hughes Jr. (senior officer), Capt. Thomas Eckel (junior officer), SMSgt. Michael Bobbitt (senior enlisted), and TSgt. Scott Woodring (junior enlisted).

■ The Air Force Communications Agency at Scott AFB, Ill., on July 15 became the Air Force Network Integration Center to better reflect its role in cyberspace operations. USAF is realigning its cyber forces under Air Force Space Command.

■ North Dakota's Ronald Reagan Minuteman Missile State Historic Site near Cooperstown opened to the public July 13. It features a former missile alert facility and a launch facility that were part of the now-defunct 321st Missile Wing.

■ The first home to be completed under a $170 million housing upgrade project at Fairchild AFB, Wash., west of Spokane, was turned over to an Air Force family July 8 during a ceremony. ■

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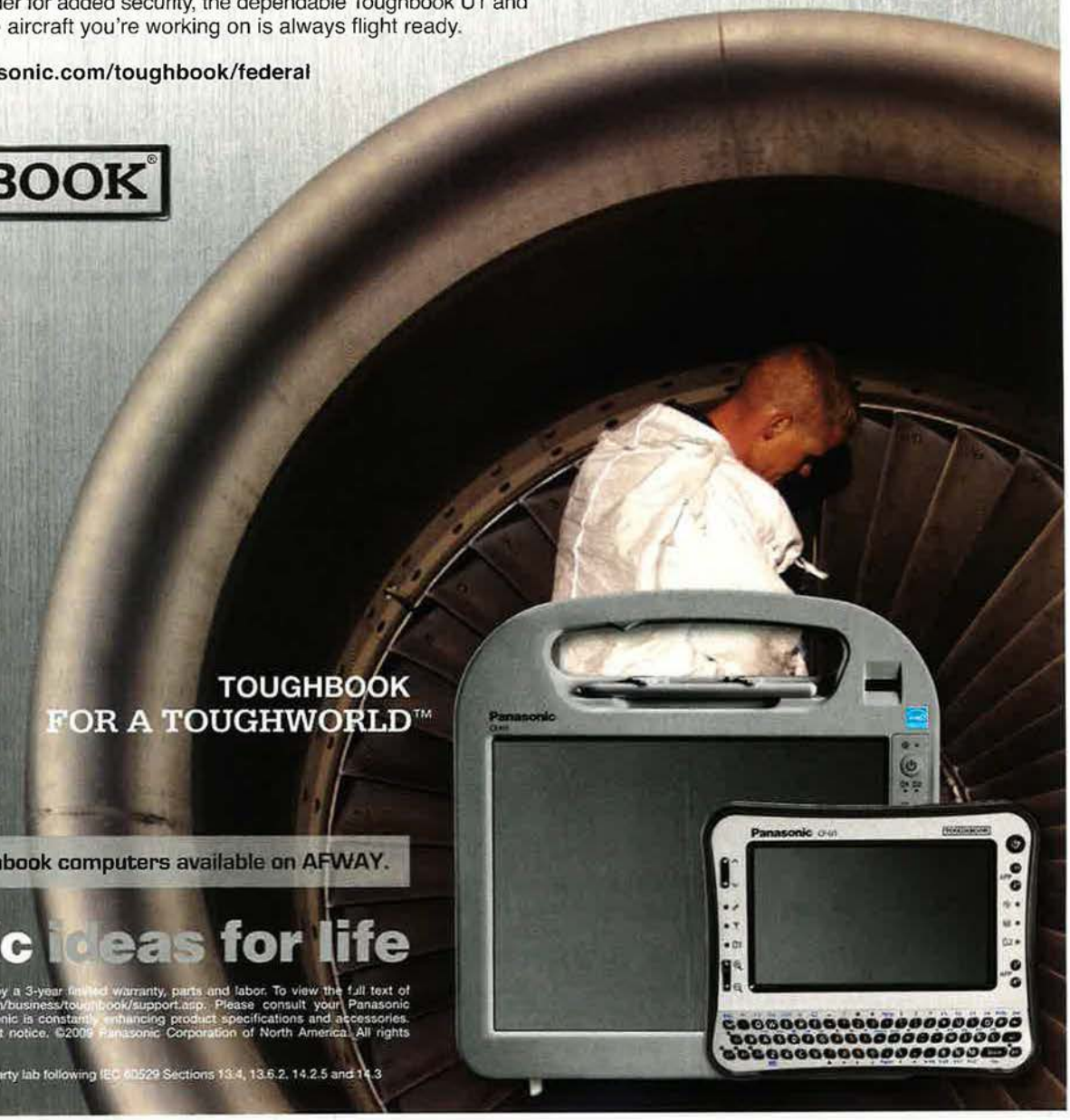

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Issue Brief

By Adam J. Hebert, Executive Editor

Wanted: An Air Defense Solution

The Air National Guard, principal defender of US air space, flies a geriatric collection of F-15s and F-16s. The fighters are so aged that most of them will be scrapped within a relatively few years.

Single-engine F-16s on the verge of retirement are located at 17 ANG bases. Massive retirements will start in 2015. By 2020, 13 of the bases will lose their fourth generation fighters, the other four bases by 2022. Guard F-15s, sprinkled around another six bases, will last a few years longer, but there are no firm plans for replacing them, either.

Under current plans, the biggest part of the air defense mission would fall to newly introduced F-35 fighters. However the phase-out and phase-in timelines don't quite match up. The first F-35 won't reach many Guard units until the mid-2020s. Unless the Guard carries out F-16 service life extension programs (SLEP), a lengthy gap will open up between departure of the F-16s and the arriva of the F-35s.

This poses a special problem in defending United States air sovereignty. At present, the US military maintains 18 sites dedicated to what the Pentagon calls "air sovereignty alert." Of these sites, 16 are manned by Guard airmen.

"A lot more attention needs to be paid [to] defense of the homeland," said Lt. Gen. Harry M. Wyatt III, the ANG director. While the clock is ticking, he told reporters on July 29, "there is no recapitalization plan."

"The key for me is this interim between now and the full fielding" of the F-35, Gen. Victor E. Renuart Jr., NORAD commander, told the trade newsletter, *Inside the Air Force.*

Renuart and Wyatt agree on several things. The Guard has an urgent need for new or significantly upgraded fighters; ANG needs to acquire specific capabilities, not particular air platforms; and the country has no plan to deal with the fighter gap.

The US has been in such situations before. In the early 1950s, the advent of long-range Soviet bombers armed with nuclear weapons forced US defense officials to rapidly assemble a way to barricade US air space. When the Pentagon reactivated Air Defense Command in 1951, the command lacked the purpose-built fighter-interceptors, communications systems, and radars vital to defending the homeland. Within the decade, a list of aircraft, radar networks, defensive weapons, and new organizations was under development or operational.

Then, almost as quickly as it had emerged, the threat changed. The rise of Soviet ICBMs and ballistic missile-equipped submarines changed the equation. Bombers were no longer seen as the primary threat to the US.

That realization sparked four straight decades of slow but constant dissipation of US air sovereignty capability. The F-106 was USAF's last purpose-built interceptor. Aerospace Defense Command was disestablished in 1980. The US-Canadian NORAD command oversaw an ever-contracting network of alert sites and fighters.

By 2001, the US was down to 14 fighters on alert at seven locations. Some in the Pentagon argued for eliminating the air defense sites altogether, saying the threat did not justify the cost. The result was that, on the morning of Sept. 11, 2001, when al Qaeda hijackers struck US targets, there were large gaps in coverage, and NORAD's radars were focused outward.

Staff photo by Guy Aceto

Like death and taxes, the Boneyard is inevitable.

The nation again scrambled to reconstitute its air defense system. In the days after 9/11, 26 alert sites were put on line, with combat air patrols a regular sight over major US cities. Airspace defense evolved into a steady-state mission, typically with 18 alert sites, enhanced radar coverage, and combat air patrols flown as needed.

The equipment that has backstopped this vital mission is now in question, but DOD has many options available.

It could SLEP old F-15s and F-16s to keep them in service until the F-35 is ready. Wyatt said the Guard would need to extend the lives of 100 to 150 legacy fighters to bridge to the F-35.

Another option is to upgrade old fighters with advanced radars, other types of advanced sensors, and equipment that give them the ability to track and destroy cruise missiles. Renuart and Wyatt both expressed interest in adding these sorts of near-term capabilities.

However, there is a debate over whether legacy fighters should be refurbished and upgraded. Many question whether it is more cost-effective to simply buy new aircraft.

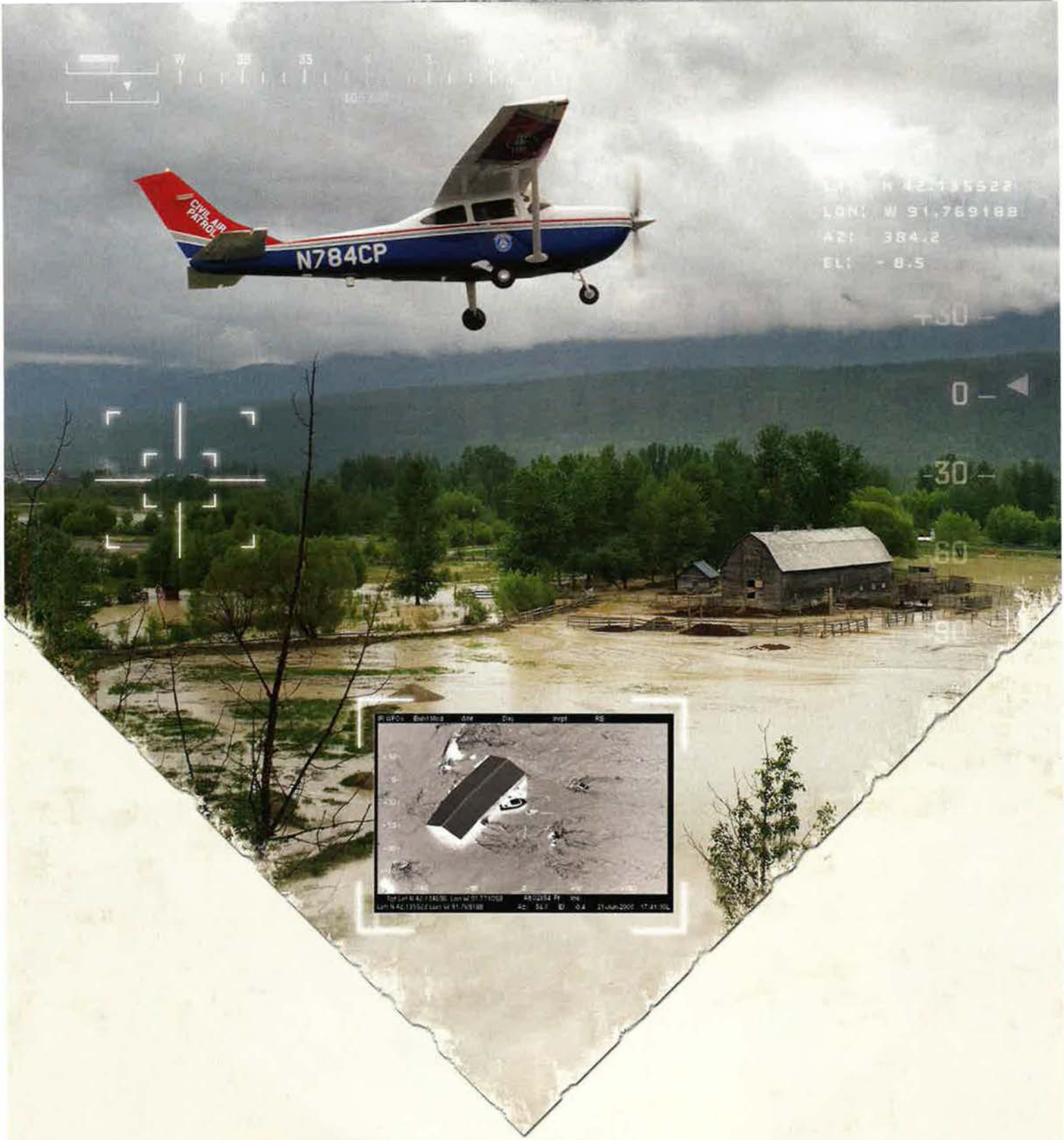
Some in Congress have advocated a plan in which the Air Force would buy new "Generation 4.5" fighters for the ASA mission, but Gen. Norton A. Schwartz, Chief of Staff, has attempted to quash these suggestions. "On 4.5, the answer is no" Schwartz said in June. "N-O. I can't make it any clearer."

For the air defense mission, the F-22 would be ideal. "The nature of the current and future asymmetric threats" requires a fighter with speed and situational awareness like the F-22's, Wyatt noted in a recent letter to Sen. Saxby Chambliss, the Georgia Republican who this year led the fight to save the F-22 program.

'The F-22's unique capability ... enables it to handle a full spectrum of threats that the ANG's current legacy systems are not capable of addressing. I am fond of saying that 'America's most important job [homeland defense] should be handled by America's best fighter.'"

On the ASA front, there is no shortage of options. What the US lacks is a real plan. ■

More information: http://www.airforce-magazine.com/DWG/Documents/2009/July%202009/072909Wyatt.pdf



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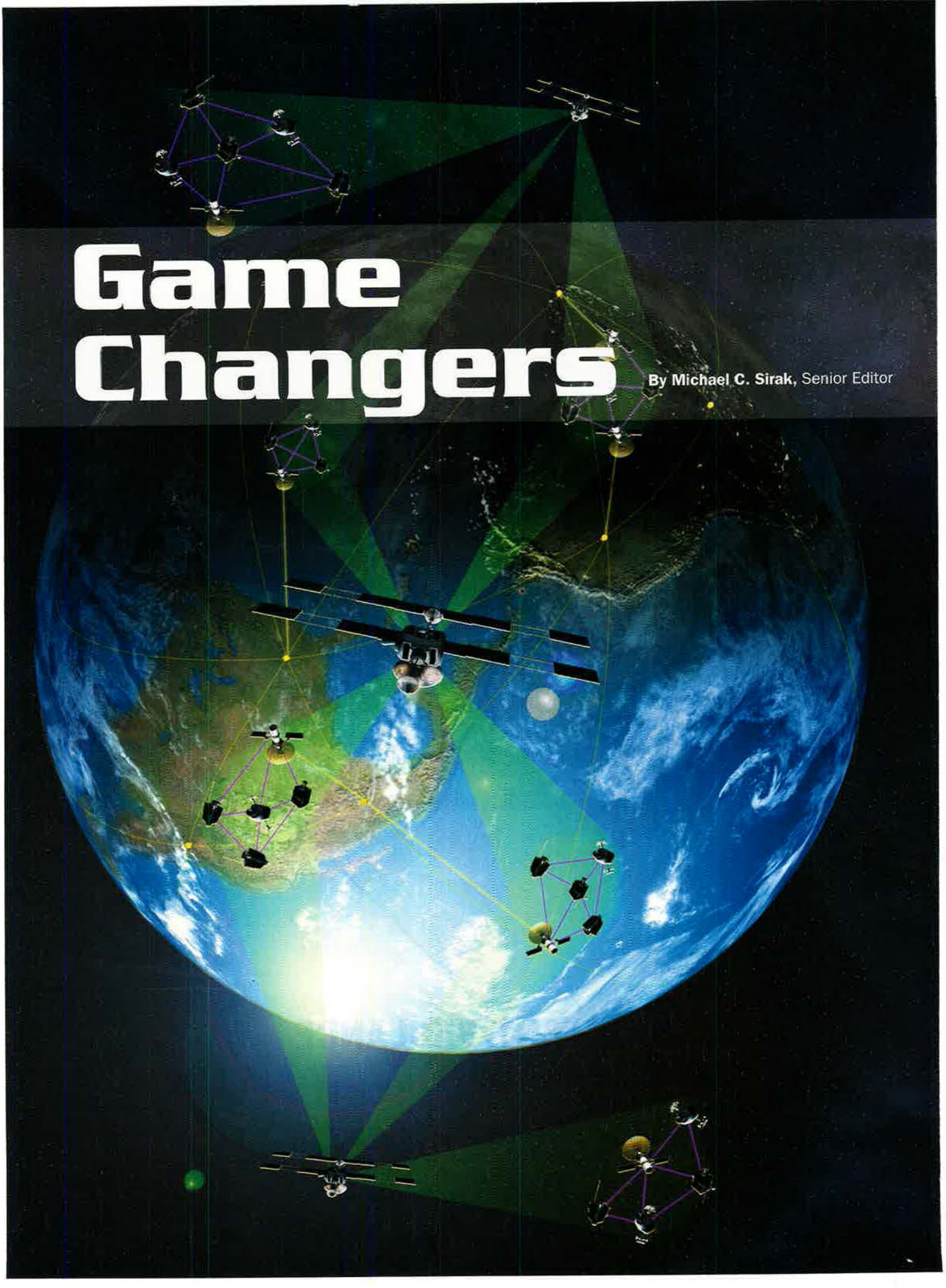
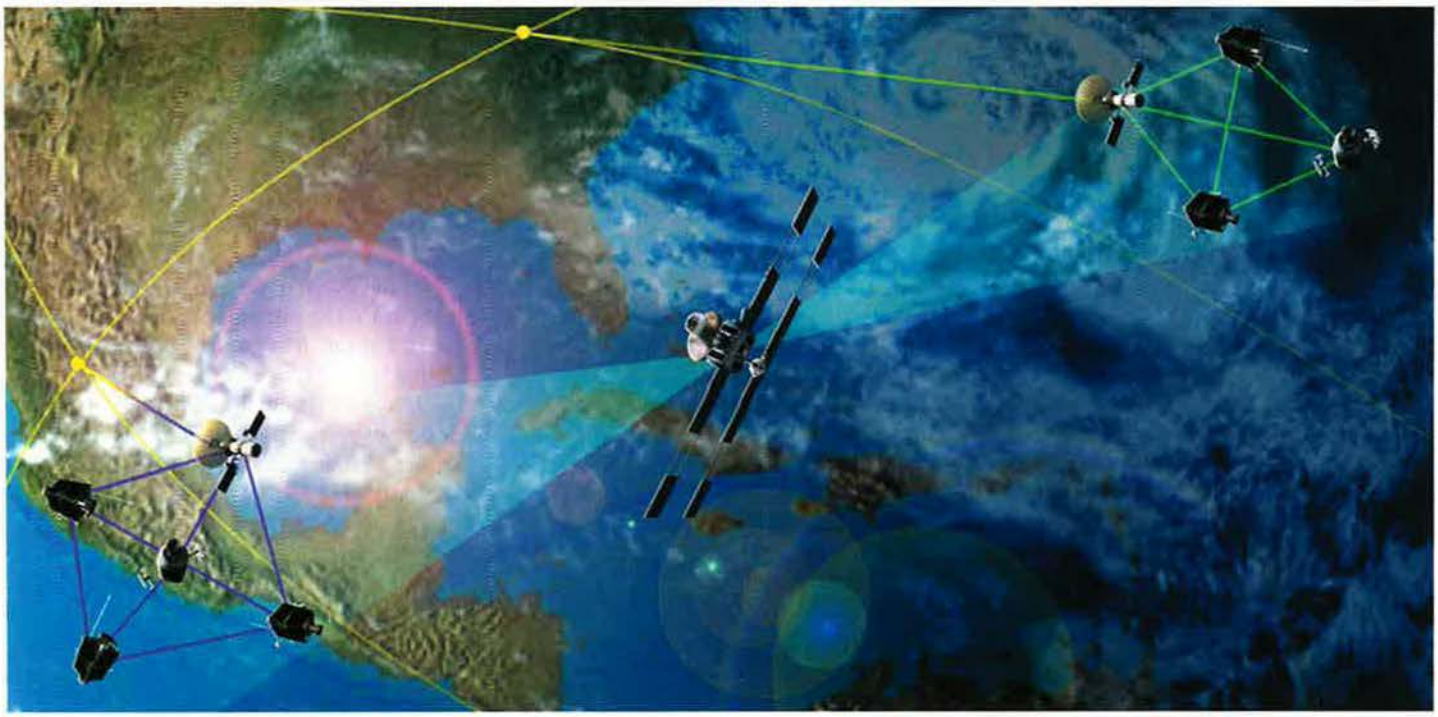
Game Changers

By Michael C. Sirak, Senior Editor



These are exciting times for those engaged in cutting-edge aerospace work. The Air Force and cooperative government agencies are engaged in an unusually large number of high-profile research efforts aimed at pushing the limits of the aerospace art.

Out on the frontiers of aerospace, next generation technologies are coming into view.



DARPA illustrations

Above and left: A DARPA artist's conception of System F-6.

For example, revolutionary technological advances likely are coming soon in the critical field of hypersonics.

Under current plans, the Air Force and its government and industry partners by year's end will conduct a maiden flight test of the X-51A Scramjet Engine Demonstrator-WaveRider over the Pacific. This hypersonic system features a supersonic combustion ramjet engine that burns jet fuel and is designed to operate at more than six times the speed of sound.

The X-51A could pave the way for new types of ultrafast-striking missiles that could reach targets much more quickly than can today's cruise missiles. It would also advance the technology base for aircraft and reusable space-access vehicles. These are potentially powered by a combination of high-Mach-capable scramjets and either rockets or turbine engines.

"I view hypersonics as one of the last great untapped frontiers in aeronautics," said Robert A. Mercier, deputy for technology in the Air Force Research Laboratory's Aerospace Propulsion Division at Wright-Patterson AFB, Ohio. Indeed, mastering the scramjet would go far toward eliminating distance as a barrier to operations.

The Fastest Ever

Also this year, the AFRL and Lockheed Martin have flown the Advanced Composite Cargo Aircraft, an experimental platform meant to prove out new manufacturing technologies that could be critical in the design of a next generation tactical airlifter.

The prototyping and manufacturing processes used in ACCA hold the promise of slashing the cost and time needed to field a new transport, said Barth Shenk, ACCA flight demonstrator program manager and air mobility technologies lead at AFRL's Air Vehicles Directorate at Wright-Patterson.

Moreover, the Defense Advanced Research Projects Agency expects by the end of the year to fly the first Hypersonic Technology Vehicle developed under its Falcon hypersonic technology research program. This vehicle, designated HTV-2, is a composite aeroshell meant to validate the materials and navigation, guidance, and control technologies for a future unmanned hypersonic cruise vehicle that could blaze through the atmosphere to deliver weapons at a point on the other side of the globe.

It is thought that HTV-2, if successful in flight, would be the fastest vehicle ever flown from the ground, said Steven H. Walker, deputy director of DARPA's Tactical Technology Office and program manager for Falcon.

"We have never built or flown a vehicle like this, so it will be interesting to see history being made," he said.

Early next decade will be important milestones for two additional projects that have the potential of a huge impact. In the case of the DARPA-Air Force Integrated Sensor Is Structure (ISIS) program, huge is no exaggeration. Both organizations aim to demonstrate the technologies in a scaled model starting in late 2012 that could lead to a helium-filled airship so large it could fit USS *Ronald Reagan* (CVN-76), the largest US aircraft carrier, inside its massive belly.

Perched on station for up to 10 years in the stratosphere at altitudes around 70,000 feet, this airship's massive radar would be able to discern individual soldiers from 186 miles out and otherwise hard-to-detect slow-moving cruise missiles from 373 miles distance, said Timothy Clark, a DARPA program manager who leads the airship project. Its radar could see under foliage. Such capabilities do not exist today.

The DARPA-led System F6 satellite technology program, known formally as the Future, Fast, Flexible, Fractionated, Free-Flying Spacecraft United by Information Exchange initiative, also seeks to conduct a demonstration beginning in 2012, this time on-orbit.

Under System F6, DARPA aims to break the current mold of designing large, monolithic satellites and replace them with so-called fractionated architectures in which nodes of the satellite are placed on modules that are physically separated but connected via wireless links to provide the same capability as the monolithic counterpart.

Such an approach offers advantages in flexibility and robustness, said Paul Eremenko, a DARPA program manager who is leading F6. However, it also offers far-reaching implications in enabling smaller aerospace companies to be viable players in the satellite arena, whereas today that is much more difficult.

What's What

"I think that this is probably by far the most exciting program in DOD today ... in terms of the potential impact on the way we acquire, the way we develop spacecraft, and the structure of the aerospace industry," Eremenko said. "This program has the potential to have ramifications beyond any single technology because it is an architectural paradigm change."

■ **X-51A.** The X-51A is scheduled to fly for the first time in late October off the coast of southern California. Three additional flight tests are planned in 2010. A B-52 test aircraft flying from Edwards AFB, Calif., will carry the X-51A and its host Army Tactical Missile System rocket booster aloft and release them over the Point Mugu test range heading west.

The ATACMS booster will propel the X-51A to speeds more than Mach 4.5. The X-51A will separate from the booster and, if all goes according to plan, its HyTech scramjet will ignite when the vehicle reaches speeds around Mach 4.8. The scramjet will then accelerate the vehicle to speeds greater than Mach 6 and propel it for about five minutes until its fuel runs out. The expendable vehicle will splash down in the ocean; the test articles will not be recovered.

"This will be a very significant advance," said AFRL's Mercier of the time that the scramjet will run and valuable flight data are collected. By comparison, he said each of NASA's two successful flights of scramjet-powered X-43A Hyper-X air vehicles in March and November 2004 collected just 10 seconds' worth of engine data.

For each successive X-51A flight, the goal will be to achieve the maximum speed, said Mercier. The vehicle's design limits its top speed to Mach 6.5.

Success in the flights would show that scramjets have strike "missile application, definitely," explained Mercier. It would also establish a cornerstone for building the technology base to enable larger, sustained-use scramjets in reusable aircraft and space-access systems, he said.

AFRL believes that a scramjet 10 times the size of the X-51A's engine is necessary to power a long-range strike missile carrying a significant weapon payload or as part of a combined-cycle propulsion system, such as coupled with a high-speed turbine engine, in unmanned strike or reconnaissance aircraft.

For larger strike and reconnaissance platforms and for space-access vehicles, a scramjet on the order of 100 times larger than the X-51A's engine is envisioned, Mercier said.

While the X-51A design could be spun off into a weapon, Mercier said he doesn't think it would be the best configuration for a weapon.

AFRL is teamed with DARPA, NASA, and industry partners Boeing and Pratt & Whitney Rocketdyne on the X-51A.

■ **Falcon's HTV-2.** DARPA is building two identical HTV-2 air vehicles for flight testing. The first test is slated for December and the second about a half year later, said DARPA's Walker.

Each expendable vehicle will be launched atop a Minotaur IV Lite booster stack from Vandenberg AFB, Calif., toward the Kwajalein Atoll, said Walker.

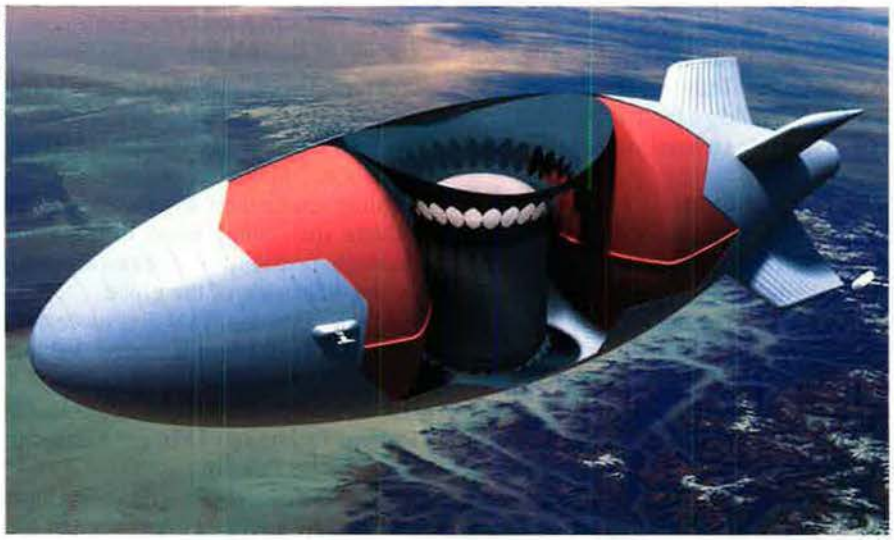
These unpowered glide vehicles will reach speeds of Mach 15 and Mach 20 and soar in the atmosphere at altitudes between 150,000 feet and 200,000 feet.

"The goal has been from Day 1 to simulate long-duration hypersonic flight," explained Walker.

The flights are meant to validate the thermal management and navigation, guidance, and control systems, and assess how well the vehicles handle. HTV-2A will fly essentially straight downrange, while HTV-2B will travel along more of a curved trajectory to test the vehicle's ability to maneuver significantly cross range, said Walker.

These flights will also make history, he noted.

DARPA illustration



A conception of the DARPA-USAF Integrated Sensor Is Structure (ISIS) airship.

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DARPA illustrations

Conceptions of the Hypersonic Cruise Vehicle envisioned as part of DARPA's Falcon program (above) and the Hypersonic Technology Vehicle-2 (right).

"This HTV-2 will be, we believe, the farthest and fastest vehicle ever flown" for a vehicle taking off from the ground, said Walker. "It is going to go 4,000 nautical miles in the atmosphere at Mach 15 to Mach 20."

The fruits of Falcon will transition to the Air Force in 2010. Already, in June, the service announced its intent to task Lockheed Martin to modify the HTV-2 design into one that can accommodate a weapon. The Air Force wants to test this modified air vehicle in flight in 2012.

This work will fall under USAF's Payload Delivery Vehicle project, which fixes to demonstrate the warhead shroud component of the service's Conventional Strike Missile concept. CSM calls for launching a non-nuclear weapons payload on top of a Minotaur booster stack from coastal US bases such as Vandenberg, in order to strike extremely time-sensitive targets within an hour of launch when other military options are not available. An example of this target set would be an enemy's long-range missile being fueled on the launchpad with a launch imminent.

Under Falcon, DARPA has also been maturing scramjet engine technologies. The agency, together with the Air Force, wanted to commence in Fiscal 2009 the development of a reusable test bed demonstration aircraft called the Blackswift. About the size of the Have Blue experimental aircraft, this would be used to validate a combined-cycle propulsion system comprising a high-speed turbine engine and the scramjet DARPA has been developing.

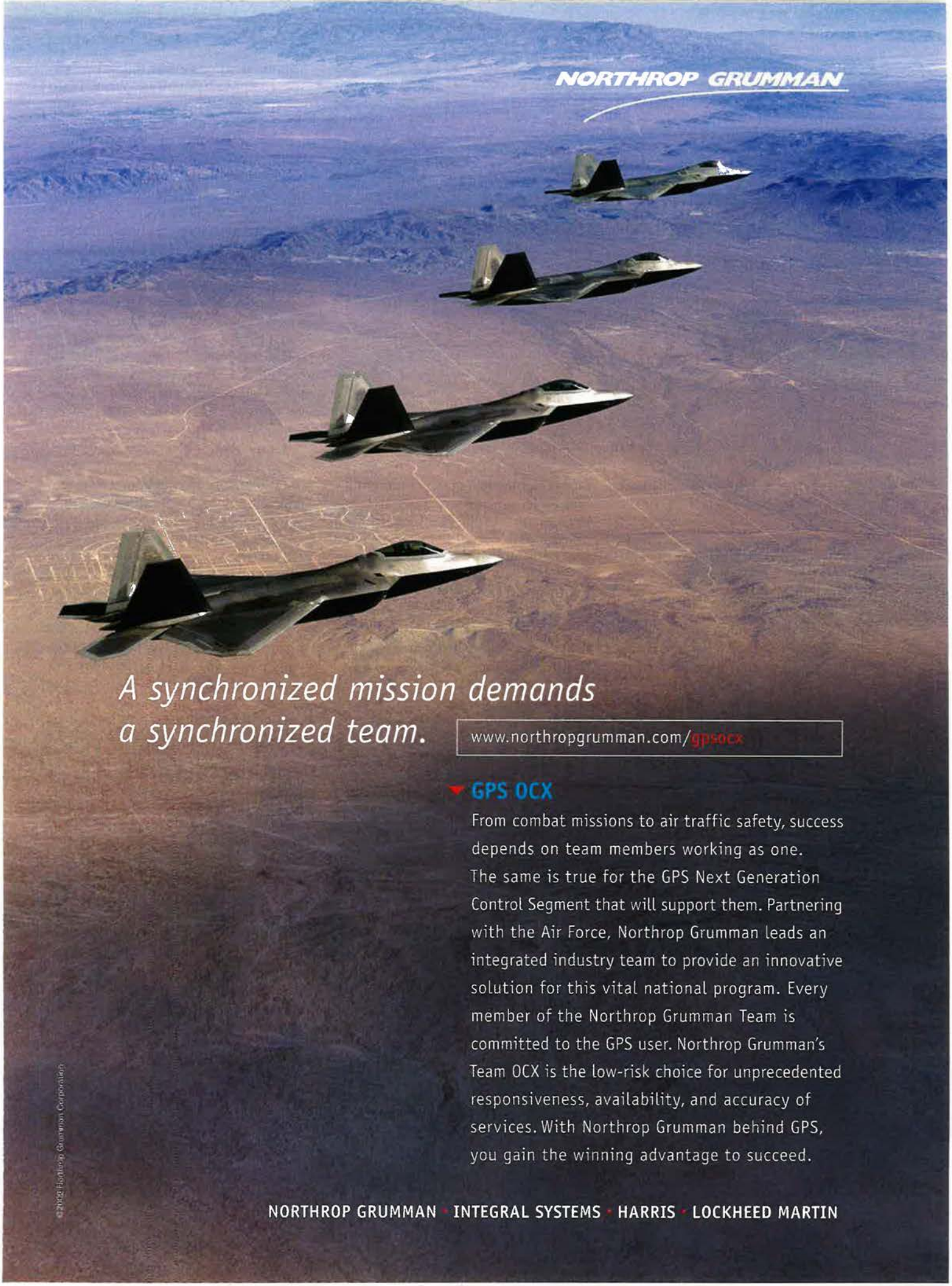
Enter ISIS

However, Congress essentially killed this idea by severely cutting the $120 million funding request for it to just $10 million. With that limited funding in hand, DARPA started this year a project called Mode Transition, or MOTR, with which it intends to demonstrate the combined-cycle propulsion envisioned for Blackswift in ground tests around 2011 to 2012.

■ **ISIS.** The ISIS airship, perched in the stratosphere, would enable unprecedented overhead search, tracking, and fire-control functions with an exceedingly large radar system in both the X-band and UHF-band that is fitted to a cylinder inside the airship.

The UHF radar will enable both volume searches for air targets, including otherwise hard-to-detect, slow-moving cruise missiles, and will penetrate foliage to be able to track dismounted soldiers. The X-band provides higher resolution tracking for fire control.

The airship fits in with the Air Force's layered sensing approach under which "you want to put the right sensor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Lockheed Martin photo

The Advanced Composite Cargo Aircraft on its first flight June 2.

at the right place at the right time to get the right data," said Mark Longbrake of the AFRL's Sensor Directorate at Wright-Patterson.

"We recognize that one sensor can't do everything and one platform can't do everything," he continued. So, "we look at ISIS as a node in that layered sensing construct that can provide a great capability" in terms of air moving target indication and ground moving target indication, he said.

DARPA plans to conduct the one-year ISIS flight demonstration starting in late 2012, said the agency's Clark. The vehicle will be launched from its hangar at Lockheed Martin's facility in Akron, Ohio, and then will fly down into the Florida Keys area where radar performance will be assessed against ground, water, and air targets, he said. Lockheed Martin is the lead contractor; Raytheon supplies the radar.

The demonstration aircraft will be roughly one-third the size of the notional operational variant—the one that could fit the carrier *Reagan*. This means the demonstrator will be about 460 feet long and 197 feet high.

Its X-band array will be about 1,067 square feet, roughly half the size of a highway billboard, and its UHF antenna will be about 5,813 square feet, for full 360-degree coverage. On an operational ISIS airship, the radar arrays would cover approximately 65,000 square feet, the size of a 15-story building, according to DARPA.

Clark said ISIS will feature an advanced hull material that is one-quarter of the weight of contemporary hull materials and has about 10 times the life of current material, as well as very lightweight radar arrays, and fuel cells and solar arrays for power.

Fractionated Space

The airship is designed to stay aloft the entire time of its service life and not come down to the surface and then return to the stratosphere. At the end of the demonstration, the airship will still have "significant lifetime" left and will be transitioned to the Air Force, Clark explained. He said the service was still determining exactly how it would exercise the system.

Clark asserted that the ISIS would be a very affordable system. Estimates are that it would cost just $30 million a year in operations and maintenance, including all of the data analysis, the data links, and software improvements. That equals out to about $3,000 per flight hour, he said.

Alone, one ISIS positioned near Iraq could have watched over one of the former no-fly zones there, he noted.

ISIS leverages some technology from the Missile Defense Agency's High Altitude Airship, also designed to operate in the stratosphere.

■ **System F6.** System F6 is designed to help break the paradigm of monolithic satellite design—that is, planning to put all of a satellite's components on the same spacecraft bus, connected via wires. In its place, DARPA is advancing the concept of fractionated space architectures in which a satellite's nodes (e.g., sensors, power source, communications downlinks, processors) can be physically separated into modules that are connected in function via wireless links so that they create the same capability as their monolithic counterpart, if not more.

"What we have here is essentially the capability of creating a virtual satellite," said DARPA's Eremenko.

Fractionated architectures offer satellite designers and operators flexibility not possible with monolithic systems, Eremenko said. Nodes can be deployed incrementally to offer partial functionality until the complete capability is on orbit or to upgrade the virtual system once on orbit as technology advances. Eventually this approach could even enable wireless resupply of a satellite network's power, Eremenko said.

Launching nodes separately prevents one launch failure from causing the loss of an entire new space system and overcomes the lift limits of launch vehicles that today's largest monolithic satellites are steadily approaching.

Fractionated nodes allow for more robust on-orbit systems since nodes could be repopulated more easily than large satellites if lost due to collisions with debris or an enemy act. Nodes are more survivable on orbit because they can be spread out to avoid debris or an adversary's anti-satellite activities, said Eremenko.

But it's System F6's influence on the space industry that could have the greatest impact of all, he said.

"This has the potential to do for the space industry what modular computing and the Internet did for the computer industry," he said. By breaking the large satellites down into smaller pieces that can be networked on orbit, "you reduce the barrier to entry" for smaller companies and universities in today's oligopolic industry, said Eremenko.

To foster this, DARPA is developing an F6 developer's package to allow for easy entry into fractionated design, as well as a layer of software known as middleware that acts as a "universal translator" to tie modules with different software seamlessly into the fractionated network.

Another innovation of System F6 is the focus on designing the space system's software before the module's hardware is fabricated, said Owen Brown, DARPA program manager, who led System F6 at its inception.

DARPA plans to conduct an on-orbit demonstration in low Earth orbit


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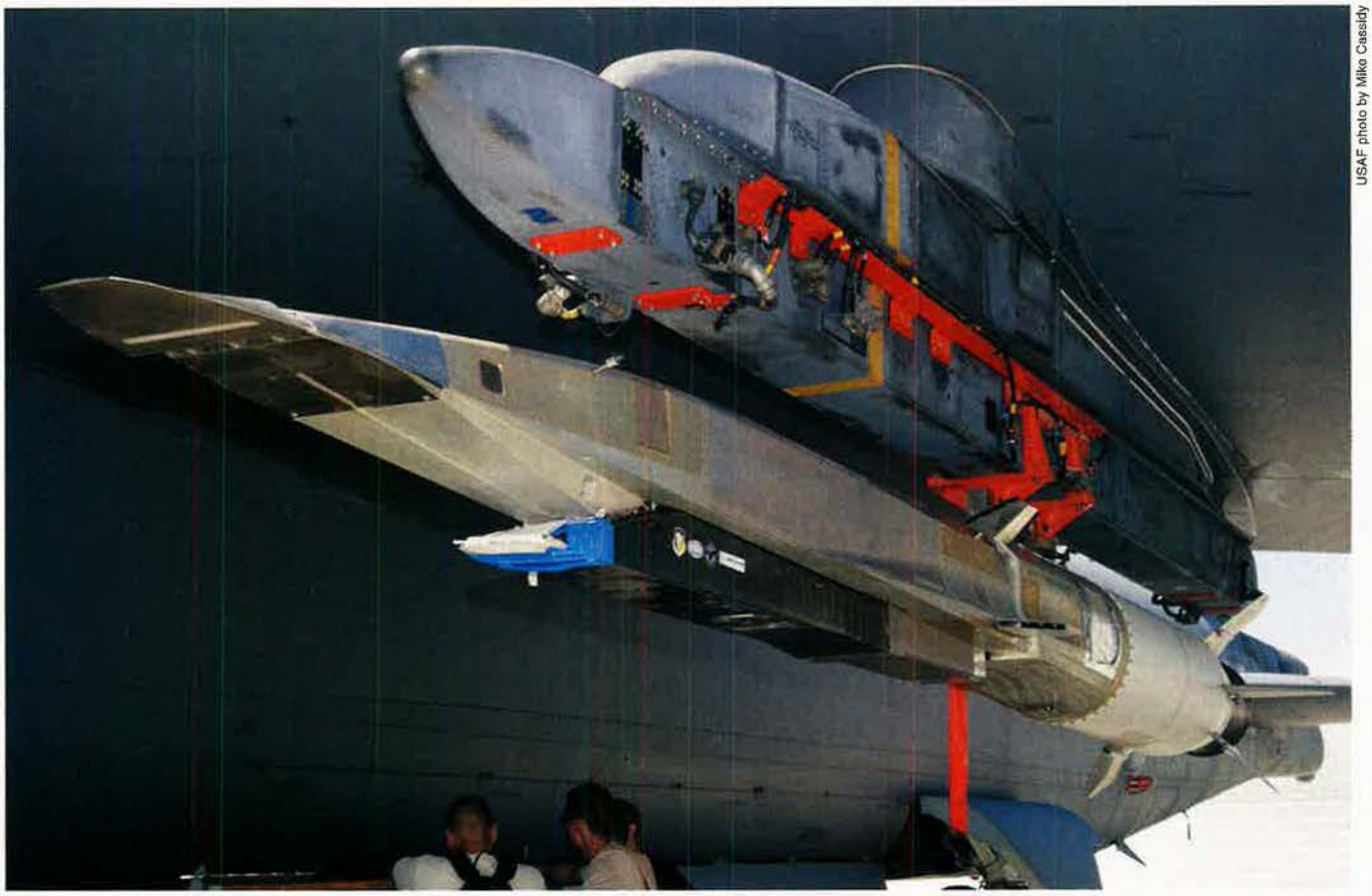


USAF photo by Mike Cassidy

An X-51A Scramjet Engine Demonstrator-WaveRider hangs from the wing of a B-52 at Edwards AFB, Calif.

with four modules starting in 2012, said Eremenko. Notionally, there will be two infrastructure modules that provide basic mission-independent functionality (e.g., terrestrial communication downlinks, computing, and data storage).

There will also be a payload module carrying some yet-to-be-determined military-useful package. The fourth module will be provided by another military agency to demonstrate the ability of an outside source using the developer's kit to participate in the fractionated architecture.

Dramatically Fast

The demo is slated for about eight months, after which there will be a residual capability.

Eremenko said fractionated architectures are just as applicable to satellites in geosynchronous orbits as they are to LEO. They also fit the Air Force's Operationally Responsive Space concept of operations, which the service is currently working to address via small satellites that can be placed in orbit on short notice compared to traditional satellites.

System F6 represents a midterm approach to ORS, he said. In fact, it overcomes the limits of the current approach which is constrained by what one can fit on the small satellites.

■ **ACCA.** The composite aircraft's maiden flight took place June 2 in Palmdale, Calif., an impressive feat, considering that the program started only about 25 months before that, said AFRL's Shenk.

"That is dramatically fast," he said. "If you had to build a lot of tooling for metal parts, there is no way you would make that kind of timetable." Further, this was accomplished for the comparatively affordable investment of $50 million, he said.

ACCA is a Dornier 328J aircraft with its mid/aft fuselage and empennage fitted with an advanced composite structure that reduced the number of parts for those sections from 3,000 to 300 and the number of mechanical fasteners from 30,000 to approximately 4,000. Lockheed Martin is the prime industry partner.

"We are compressing the time and the cost by probably over 50 percent of what you would expect in a metallic airplane," said Shenk of the results. Compared to a metallic airplane of its size class, ACCA is also "about 20 percent lighter," although it can carry heavier loads, he said.

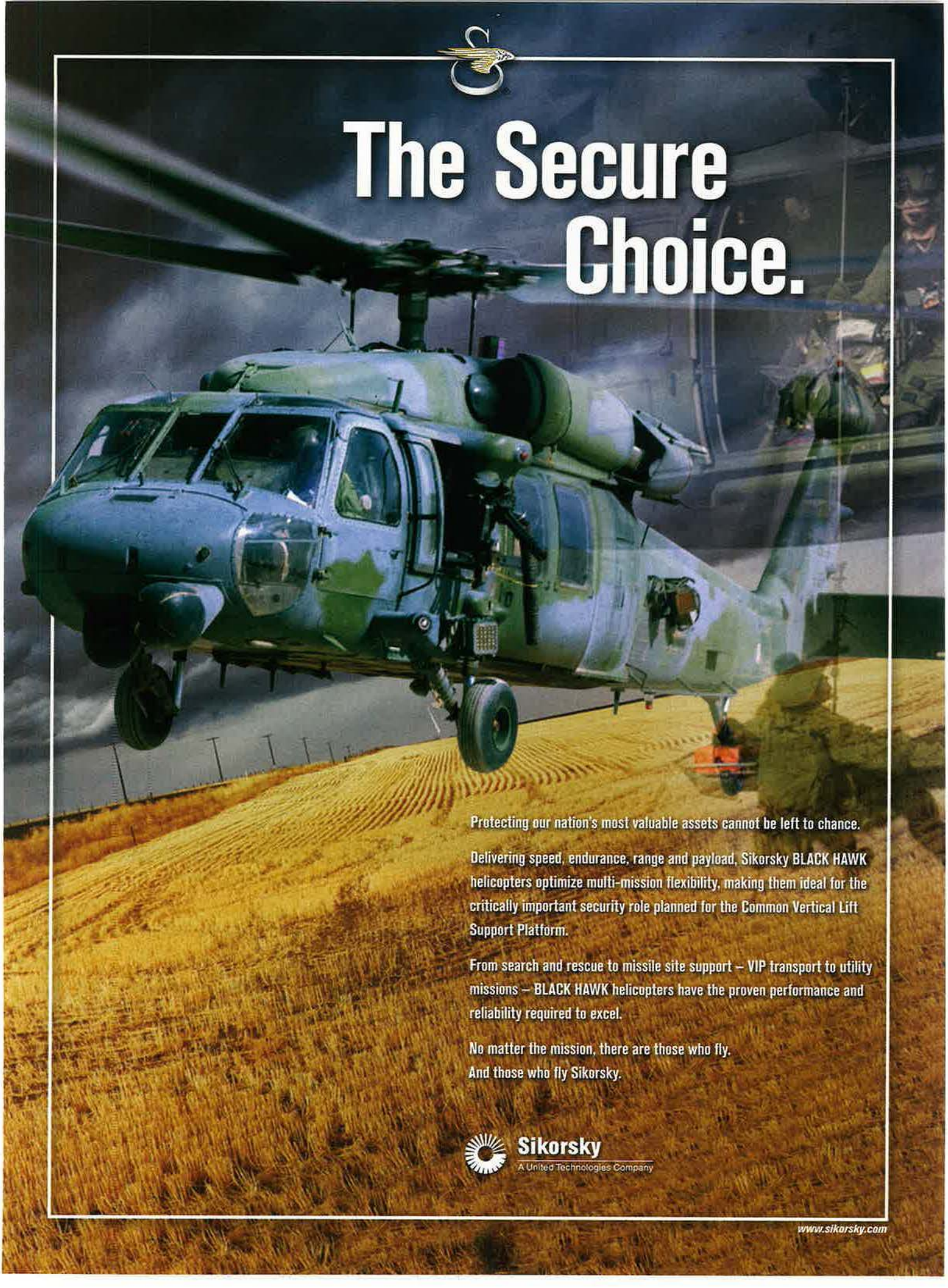
ACCA was modified to have the attributes of a tactical transport such as a cargo door and a fuselage wide enough to accommodate pallets. It was meant to be a realistic cargo aircraft design in order to validate the tools and manufacturing processes, including rapid prototyping and out-of-autoclave curing of large composite structures, that could be used to build a future transport to replace the C-130 Hercules family.

The Air Force has an emerging requirement for a future speedy, short takeoff and landing transport, which it calls provisionally the Joint Future Theater Lift platform, that can take off from air strips 2,000 feet long or less.

Shenk said the work on ACCA has raised the knowledge baseline in industry in preparation for developing and building a future airlifter program.

Shenk anticipates that the ACCA flight-test phase will last about one year. Thereafter, ACCA may be used as a testbed aircraft for other technologies such as cargo-handling systems, sensors, and subsystems, said Shenk.

"The aircraft has good endurance and volume and it's not too expensive to operate," he said. ■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The New P

A pair of F-22s (top) fly in formation with F-15Cs from Kadena AB, Japan, during a Raptor deployment to the Far East.

By John A. Tirpak, Executive Editor

The Air Force has begun radically revising its combat playbook for the F-22 fighter. Instead of employing the Raptor en masse, as previously planned, USAF will use it as a scarce but extremely powerful enabler, deployed selectively in those times and places when it can enhance the performance of the entire combat air force.

Plans call for F-22s, in small numbers, to work in cooperation with more numerous but aged F-15s, which are expected to serve for another 15 years. The two air superiority fighters, old and new, will share air combat duties and hew to employment tactics suitable for a mixed force.

The F-22, with a potent suite of sensors and electronics, will supplement E-3 Airborne Warning and Control System airplanes and other surveillance systems. It will identify and track some targets behind enemy lines, directing aircraft against targets in urgent need of destruction and away from those posing no danger.

The Raptor will spot pop-up surface-to-air threats—either missiles or guns—and, when ordered to do so, attack with on-board weapons, either suppressing or destroying enemy air defenses. It will be able to jam certain radars—performing an electronic warfare function—and protect high-value flying assets such as the AWACS and E-8 Joint STARS aircraft.

In addition, the Air National Guard plans to use the F-22 in defending US territory against a surprise cruise missile attack.

All signs are that the Raptor will only get better over the next decade. Fortified with a planned $7 billion in improvements, the F-22 will move more and more into the role of quarterback in any air conflict fought by the United States. It will have that job for about the next 25 years.

The revised employment plan was made necessary by the now near-certainty that the Air Force will never acquire 381 F-22s or anything close to that number. The Air Force has since 2002 held fast to the claim that it required 381 F-22s in

aybook

This F-22 superfighter, few in number, will quarterback the war for the combat air force.

Photo by Jim Haseltine

Photo by Jim Haseltine

An F-22 is prepped for a mission at Kadena in June. Like the queen on a chessboard, the F-22 will be carefully deployed to achieve maximum effect.

order to comfortably guarantee control of the air under the demanding scenario of having to fight two major conventional wars at more or less the same time.

Yet the requirement for 381 F-22s fell hard when the USAF Chief of Staff, Gen. Norton A. Schwartz, told Congress that he believed such a number was excess to actual Air Force need. Schwartz argued instead for building a fleet of 243 F-22s, which USAF could have attained through the production of an additional 20 Raptors per year for three more years.

Such a plan would have kept the US building so-called fifth generation stealth fighters until the F-35 program ramped up. It would also have allowed the Air Force to put a full squadron of F-22s in each of its 10 Air and Space Expeditionary Forces. Instead, it will have less than half a squadron for each AEF.

The argument for more was made succinctly by Air Combat Command chief Gen. John D. W. Corley. In a June letter to Sen. Saxby Chambliss (R-Ga.)—who had asked Corley for an unvarnished opinion on how many F-22 are needed—Corley wrote that a force of 381 would deliver "a tailored package of air superiority to our combatant commanders and provide a potent, globally arrayed asymmetric deterrent against potential adversaries."

Schwartz had described a fleet of 243 F-22s as a "moderate risk" force. Corley said that "in my opinion, a fleet of 187 F-22s puts execution of our current national military strategy at high risk in the near- to midterm."

That strategy called for maintaining a capability to fight and win two major regional wars simultaneously, or at least in close succession. This summer, though, Defense Secretary Robert M. Gates signaled heavily that he was preparing to lower this bar of readiness, and require capability to fight only one conflict. For that, he reasoned, 187 F-22s would be adequate.

A letter to Chambliss from Lt. Gen. Harry M. Wyatt III, head of the Air National Guard, noted that his organization believes the F-22 is essential to combating "current and future asymmetric threats to our nation, particularly from seaborne cruise missiles," and is the only platform "with the requisite speed and detection to address them."

After a spirited debate in Congress—with direct lobbying by Gates and a veto threat from President Obama—efforts to keep the F-22 in production past 187 aircraft faded in late July. Supporters in Congress vowed to press their case, but the Air Force likely will have to make the best use it can of just 186 F-22s (one has been lost in an accident).

The F-22 became operational in 2005, and is now nearing the performance expected of it at "maturity"—commonly described as when all aircraft have been delivered, or 100,000 flight hours. Its mission capable rate has gradually crept up, now at about 62 percent, versus about 70 percent for mature fighters such as the F-15 and F-16, which have been in service for more than three decades. Air Force managers believe the F-22 will achieve MC rates comparable to the F-15 and F-16 some time next year.

USAF photo by MSgt. Kevin J. Gruenwald

A quartet of F-22s from Alaska arrives at Andersen AFB, Guam. The Raptor has demonstrated it can deploy worldwide and function perfectly in any climate.

Deploying the Raptor

The F-22 will be permanently based at five locations, with the bulk assigned in the Western US or Pacific Theater, as follows:

Tyndall AFB, Fla.: 32 aircraft
Langley AFB, Va.: 40 aircraft
Elmendorf AFB, Alaska: 40 aircraft
Holloman AFB, N.M.: 40 aircraft
Hickam AFB, Hawaii: 20 aircraft

Squadrons consist of 18 primary aircraft authorized, or PAA, as well as two spares each. A further 16 aircraft will be involved in test, depot maintenance, or tactics development functions.

By all accounts, the F-22 does everything it was expected to do, and more. In Air Force-run wargames such as Red Flag in Nevada, or Northern Edge in Alaska, the F-22 has racked up almost absurdly lopsided air combat victories of more than 140-to-one. Its stealth capabilities have a profound influence on the air battle.

"The technology absolutely works," said Brig. Gen. Mark A. Barrett. Now ACC's inspector general, Barrett was the commander of the 1st Fighter Wing at Langley AFB, Va., from April 2007 to May of this year.

"It's hard to explain or describe it to somebody [who] hasn't flown it," he said in an interview, but "I've been flying fighters for 30 years; most of my background is in F-15Cs. And the F-15 is a great airplane, but ... all the magic you wish the F-15 could do, the F-22 can do."

Barrett said the F-22 is simply invisible to other fighters and ground radars. That allows it to sneak up on enemy fighters and line up for an optimal shot with radar guided missiles. In a flash too quick for enemy radars to see, the weapons bay opens, a missile comes out, and the enemy is dead before he even knows he's under attack. By then, the F-22 is either long gone or on to another target.

"I have literally flown over the top of another [fighter] at [a separation of] 1,000 feet, and he had no idea I was there," said Maj. Geoff Church, an F-22 pilot and chief of tactics development for ACC. So powerful is the F-22's all-aspect stealthiness, Church said, that "we've kind of worn out our welcome" with units who have flown against the Raptor.

He noted, "It's not fun to fight us. When you always die, you always lose, and if you never see a Raptor, it's not fun. It's not good training for anyone else. ... You can't see anything."

"Stealth platforms provide very poor 'Red Air,'" Barrett said, "so there's not a lot of payback for a unit that's going to host an F-22 unit for a couple of weeks, because if you're not fighting them within visual range, they don't get a whole lot out of it."

What the F-22 brings to a combatant commander has changed with the cut in planned production, Barrett said.

With some 750 aircraft—the earliest planned total of F-22s—the airplane could deliver "complete air dominance, anywhere, from Day 1, ... 24 hours a day," and without "a whole lot of help from the legacy fighters or support aircraft."

But at 186 aircraft, "then I have to start looking at different ways of employing it. ... I'm going to have to start employing it with other legacy airplanes."

Directing the Fight

The F-22s will likely be moved around frequently, responding to mounting tensions in a given part of the world. Units practice packing up their aircraft and equipment and making long deployments. There won't be enough of them to economically deploy them permanently in forward locations; they will be designated reinforcements for other US and coalition aircraft.

The good news, Barrett added, is that the F-22 "can make the whole fighting force ... better." But, he added, "they have to do it together. ... [You] embed it with whatever you have."

Barrett said that the 1st Fighter Wing has two squadrons of F-22s and one squadron of F-15s. That's on purpose. The F-15s and F-22s operate together, he said, to "maximize the number of missiles" that hit enemy aircraft. Typically, "we'll take out a four-ship [flight] of F-22s and an eight-ship of F-15s, and in a combined force, we will go out and fight together."

Enemy fighters tend to point at what they can see, he explained, and when they pick up the F-15s on radar, they zero in on them. However, the F-22s, with their stealth and speed, "skirt around, avoid jamming, avoid detection, and then get a little bit closer to provide kills." In other words, while the enemy is concentrating on the F-15, the F-22 sneaks around and kills him from another angle.

"You want to have the F-15s in a position where they can get their best probability of a kill, and you want to use the F-22s to help direct that fight and clean up what's left," Barrett explained.

The F-22 changes what had become a fairly equal situation, in which the F-15 and comparable fourth generation fighters could detect each other at about the same distance, employ comparable jamming methods, fire missiles, and "if both survive," Barrett said, do it all over again until one made a mistake and died or fled the engagement. With the F-22 in the mix, enemy aircraft are seen and targeted first, and the combined force can husband its overall fuel and weapons to get the most kills possible.

The F-22's sensors not only collect lots of information on their own, they collate it with a flood of data coming in from off-board sensors such as AWACS and other intelligence-surveillance-reconnaissance systems. In the F-15, a pilot must integrate in his head data and other cues from radio calls, radars, and radar warning receivers. The F-22 "does all that for you," Barrett said, allowing the pilot to spend his time managing the air battle, and not the sensors.

Squadrons of F-22s have flown both against and alongside all types of US fighters, as well as those of coalition air forces in exercises, he noted. Afterward, the other pilots are "amazed," Barrett said. They usually have no idea how comprehensive the F-22's view of the battlespace is. It improves the odds for any allied force.

The radar invisibility not only leads to one-sided air combat, it allows the F-22s to operate with impunity inside heavily defended enemy airspace—the only machine that can do so in all weather, and in day as well as night. From that vantage point, F-22 pilots can see ground and air targets that may not be visible to AWACS controllers.

Church said the F-22's cockpit displays allow him to "overlay" radar tracks of enemy aircraft that are being sent out by AWACS over the battle network. If his sensors pick up something the AWACS doesn't, he can call the AWACS or directly to a flight of fighters that don't know they're headed into danger.

Aggressor units at Nellis AFB, Nev., and Eielson AFB, Alaska, have tried to devise ways to thwart the F-22's advantages, Barrett said. They've tried throwing large numbers of fighters at F-22s to overwhelm them, or flying extremely tight formations to make it difficult for the F-22's radar to distinguish individual targets. It "doesn't work particularly well," he observed dryly.

"I haven't seen anything that's been particularly effective, to be quite frank."

Sometimes, the Red Air pilots, even though they can't see their quarry, will begin to violently maneuver at the call

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of "fight's on," to make it hard for the F-22s to target them.

"Well, that's OK, because if they're maneuvering and doing everything they can to avoid getting killed, they're not being particularly effective in their mission, and that allows us to go on and do what we need to do," Barrett said.

The F-22 has made several long-distance deployments, and doesn't need to bring any specialized climate controlled hangars with it to let crews maintain the stealth surfaces, as the B-2 requires, Barrett reported.

"We've proven we can take it on the road, and it doesn't need any special facilities," he said.

The squadron brings what it needs along with it to do all maintenance, including that on the surfaces. It was designed to operate out in the open, on exposed runways without shelters, he noted. There have been deployments to Kadena AB, Japan, Andersen AFB, Guam, and Eielson, and in no instance did extreme humidity, cold, or heat affect the systems adversely. In fact, Barrett said, after the first deployment to Kadena, "when they came back, they were in as good a shape with their [low observable surfaces] ... as they were when they left. ...They were fine. So, it works."

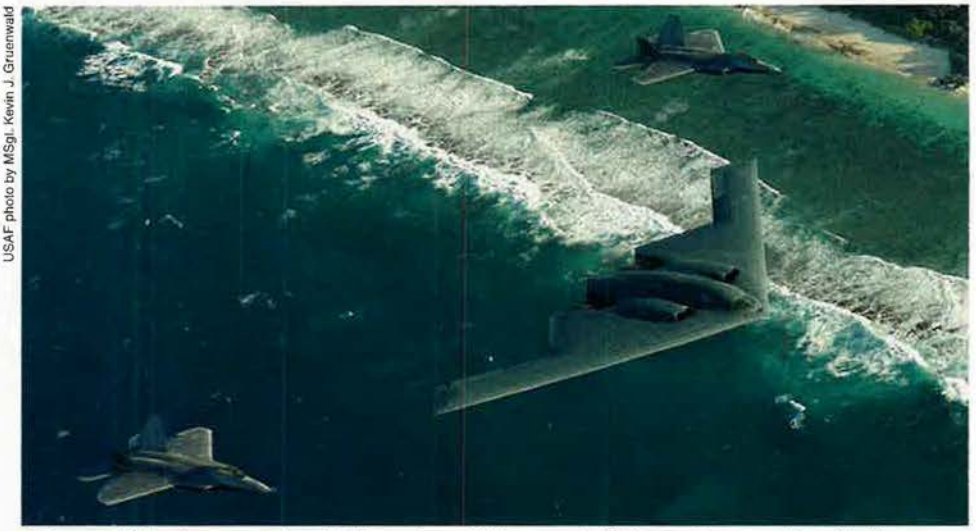
The F-22 can fly higher than the F-15—60,000 feet versus 50,000, according to Church—and at Mach 2 versus the F-15's age-limited speed of Mach 1.5. The Raptors tend to fly farther apart and can cover a wider area of airspace than the F-15s.

However, the key difference, Barrett said, is survivability.

"If you have to operate in a heavily defended area, a fifth gen fighter is survivable, and the nonstealth airplane is not. And I don't care if it's fourth generation or ... 4.5 or 4.7. You're either stealthy or you're not. If you're stealthy, you can survive." Putting "1,000 F-15s or F-18s" into an "anti-access environment" of modern air defenses means "they're going to die, and you're going to lose all those airplanes. And F-22s and F-35s are going to survive."

The F-22s can share what their sensors pick up immediately and digitally through a special communications system that only they can pick up. It's what's called a "low probability of intercept" system that is classified, but uses extremely thin beams of energy that constantly shift. The picture they acquire cannot be shared with other types of aircraft, though. In a planned upgrade, the Air Force plans to equip the F-22 with the Multifunction Advanced Data Link, or MADL, which will permit digital data sharing with F-35 and B-2 aircraft, USAF's only other stealth aircraft. That will enable the three types to collaborate early in an air campaign when stealth is of the highest importance.

USAF photo by MSgt. Kevin J. Gruenwald



A brace of Raptors escorts a B-2 bomber off the coast of Guam. Peppered in with the legacy fleet, the limited number of F-22s will enhance USAF's overall combat power.

New Mission Creep

Air Force Secretary Michael B. Donley told Congress in June that the Air Force will spend about $7 billion over the next five years on F-22 upgrades. Those upgrades focus on the connectivity of the F-22 with other aircraft, software, and new weapons. However, even the upgrades will be applied selectively.

The Air Force plans to have three versions of the F-22, divided into blocks. Block 20 aircraft will have the fewest improvements, and will be used at Tyndall AFB, Fla., to train pilots new to the F-22. Block 30 and 35 aircraft are intended to be the flying machines, although the Block 20 airplanes will be completely combat-capable.

The Block 20 upgrade sets a standard configuration such that Raptors within the block will be easier to update with new software. This will be accomplished by 2013.

The Block 30 and 35 machines will first receive the capability to drop the 250-pound-class Small Diameter Bomb. This will increase the number of ground targets an F-22 can hit from two today—with the 1,000-pound Joint Direct Attack Munition, or JDAM—to eight with the SDB. The first tranche of the upgrade will add a synthetic aperture radar view, or 3-D view of a target area, as well as an improvement in the F-22's ability to pinpoint and identify ground targets.

The second round of upgrades will add capability to carry the AIM-9X missile. The AIM-9X can be fired at high off-boresight angles, meaning the pilot doesn't have to point the F-22 directly at the target to shoot it with the short-range, heat-seeking missile. The second round will also add the MADL for connectivity to the B-2 and F-35, and likely the capability to carry the AIM-120D AMRAAM radar guided missile—the most advanced version yet. Further upgrades will have to wait until the first two are installed and prove out.

Church said the increased loadout offered by the SDB will allow the F-22 to strike more ground targets on a single sortie, and they are of sufficient size to be capable against things like air defense systems. Whether the F-22 would be tasked to do such a mission would be up to the combatant commander to decide, he said.

Barrett said the Air Force is still learning what the F-22 can do, and that new missions will inevitably creep into its repertoire. Although not yet tasked to do so, the F-22's phenomenal ability to collect ISR will doubtless become a mission unto itself in the future. But for now, the plan is to get the most capability possible out of the limited numbers of F-22s that USAF will field, and that will be substantial, if far less than originally envisioned.

"I can penetrate an anti-access area ... any place in the world," Barrett asserted. "I can take down key nodes with my air-to-ground capability. I can survive and I can start breaking down the door to allow the less-survivable airplanes, the legacy airplanes, to come in and do more work. ...I can provide defense of high-value assets or of any other force that's going in. ...The airplane can do all of that." ■

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USAF maintainers work daily miracles keeping those old airplanes flying. It can't last.

Uphill Struggle

By Marc V. Schanz, Associate Editor

USAF photo by SSgt. Joshua Garcia

SSgt. Richard Replinger inspects the engine on a C-130H Hercules.

Air Force maintainers are really up against it. They are struggling to support an aircraft fleet battered by some 18 years of war in two theaters and the nonstop demands of peacetime and homeland security missions. Moreover, the fleet each year sets a new record for average age, given that infusions of new airplanes are too small to offset fleetwide decline.

The maintenance force is working hard, with considerable success, but the stresses show no signs of a letup.

The wrench turners have to work a lot harder to keep the same numbers of aircraft, vehicles, and weapons available for the fight. The implications of an Air Force trend toward a smaller force—with a mix of ancient and brand-new platforms—are still being ferreted out.

Thus far, the mobility and combat fleets have largely avoided any large-scale availability pitfalls, thanks to the hard work of the maintainer force. In short, maintainers are keeping the Air Force's old and heavily used aircraft fleet viable. How long can it last, and at what cost?

"The duck continues to move across the pond fairly smoothly," said Maj. Gen. Robert H. McMahon, director of logistics on the Air Staff. "What I can't tell you is how much faster the duck's feet are going today than they were eight years ago."

The force has largely adapted from what was a rigid Cold War maintenance structure into one oriented toward expeditionary warfare.

Looking at the Air Force's own maintenance statistics is instructive. The fleet, across the board, averages 24 years old. The older the fleet gets, the more money it costs to keep it ready for combat.

Air Force fighters cost about $19,400 an hour to operate, according to Air Staff statistics for 2008—a cost that includes mission personnel, unit level fuel consumption, intermediate and depot level repair, and contractor support. Since Fiscal 2003, this number has risen on average 9.8 percent per year.

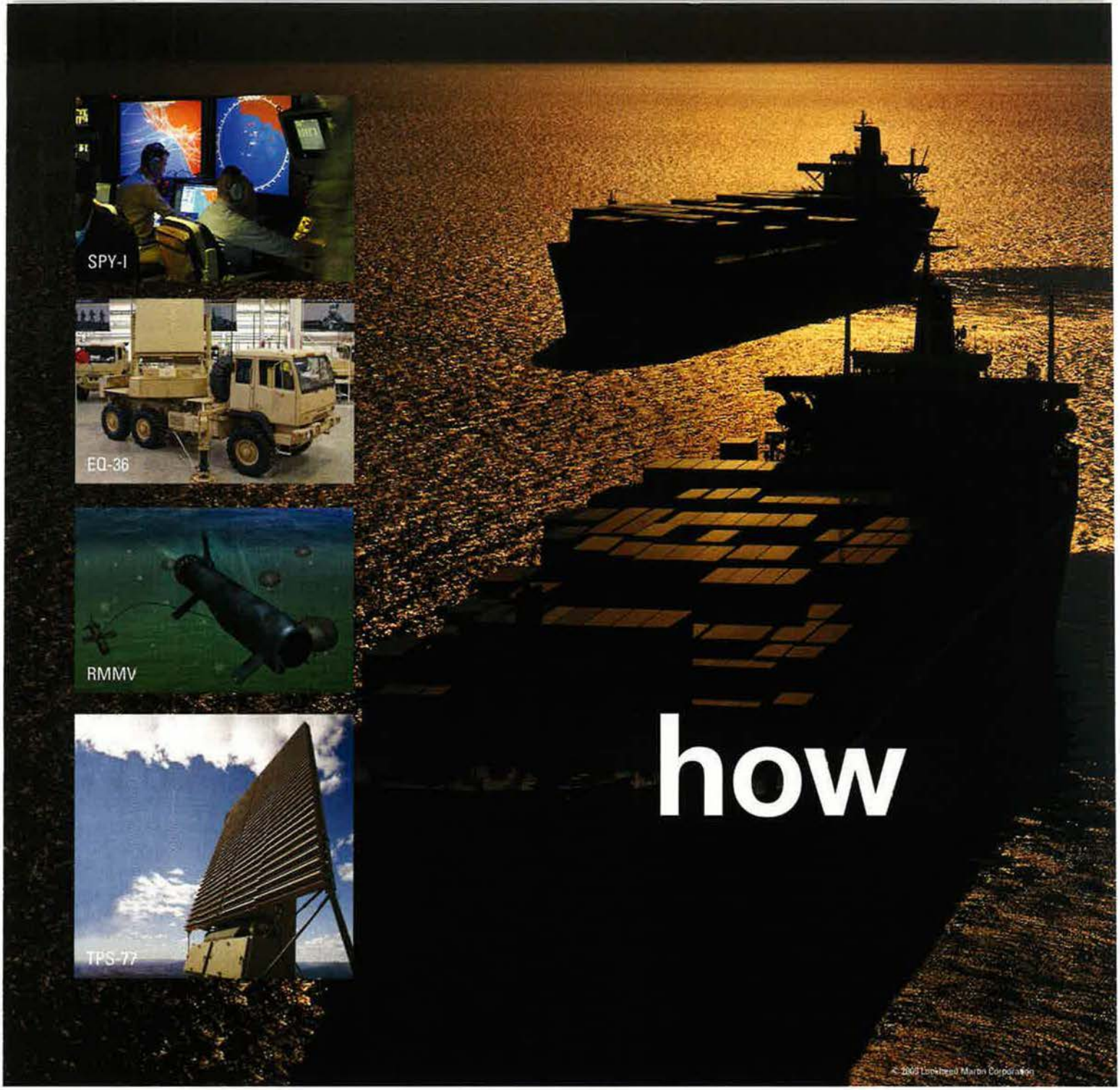
The bomber fleet—which is 33 years old on average—costs around $52,700 per operational flying hour. This cost per flying hour has gone up around 8.1 percent a year since 2003, and part of the higher overall flying cost is attributable to the size, complexity, and weight of the bombers.

Strategic airlift, tactical airlift, and command and control aircraft costs per flying hour have each gone up by double digits on average since 2003. Strategic airlifters have led the pack, with cost per flying hour growing by 17.2 percent a year on average.

To keep its aircraft ready for war with a sustainable level of effort, the service has initiated an effort to assess the "state and health" of maintenance throughout the Air Force, via a series of surveys at 13 operational bases across the service. This survey led to a full report to the Air Staff, which was still analyzing it this summer.

Teams of maintenance officers and senior enlisted airmen collaborated with analysts to perform a series of two-day visits at installations, preceded by a survey sent to all maintenance personnel at each location.

The service did not identify the specific locations, since the goal of the survey was not to analyze practices at



BETWEEN RELIABLE THREAT DETECTION AND COST-EFFECTIVE SOLUTIONS, THERE IS ONE IMPORTANT WORD: HOW.

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particular installations. "Our intent is ... to draw conclusions about the entire health of the maintenance community," McMahon said.

The Air Force's maintenance cadre has, however, recently witnessed some organizational tumult.

In 2008, the service announced it planned to meld aircraft maintenance units supporting bomber, fighter, and rescue aircraft into flying squadrons.

Gen. T. Michael Moseley, then Air Force Chief of Staff, signed off on the changes in May 2008. He said the purpose of the reorganization was to enhance the capabilities of the units by tying the maintainers in with the units they support.

The change was designed to give operations group and squadron commanders the authority and responsibility to ensure that the units are ready for combat and allow them to train together more regularly.

By August 2008, however, USAF's new leadership canceled the plan to realign the maintenance units, with the explanation that maintainers can best sustain and improve their skills when led by maintenance professionals.

It is inherently difficult to maintain a heavily used, high-performance fleet, but McMahon said some help is on the way. There will be opportunities to improve maintenance practices with new platforms such as the F-22, F-35, and C-130J.

The C-130J "has newer technology than a 1950s-era E [model]," so the maintenance community should be able to support it differently, he said. "We can utilize [fewer specialty codes] to do so. We will do that with a greater extent with the F-22 and F-35 as well."

McMahon's perspective is echoed from the flight line.

USAF photo by SrA. Domonique Simmons

Maintainers with the 7th Bomb Wing work on a B-1B during an operational readiness inspection at Dyess AFB, Tex.

Tweaking Things

CMSgt. Martin S. Pokrzywa, an equipment maintenance flight chief with the 135th Maintenance Squadron, Maryland Air National Guard, has deployed three times since 2005 to Southwest Asia with the C-130J. "We took the right people and the right numbers. ... Maintenance never took a break," he said at Martin State Arpt., Md.

A veteran of C-130B and E models, Pokrzywa said maintenance practices in Afghanistan and Iraq were markedly different with the J. "The newer technology and the systems that are built in [and] that diagnose problems help a lot," he said.

The ground maintenance system is fully networked with memory cards, so "anything that goes on is recorded digitally." Throughout the Maryland Guard's deployments, maintainers collected failure data for every imaginable component of the C-130J, Pokrzywa said.

"We tweaked things every way," he said, to determine what problems were environmental and what were system related. Every time the unit returned home, the technical data would be updated. The benefit for C-130J maintainers, he noted, was simple—more time on the aircraft, less time chasing parts, thanks to better data management.

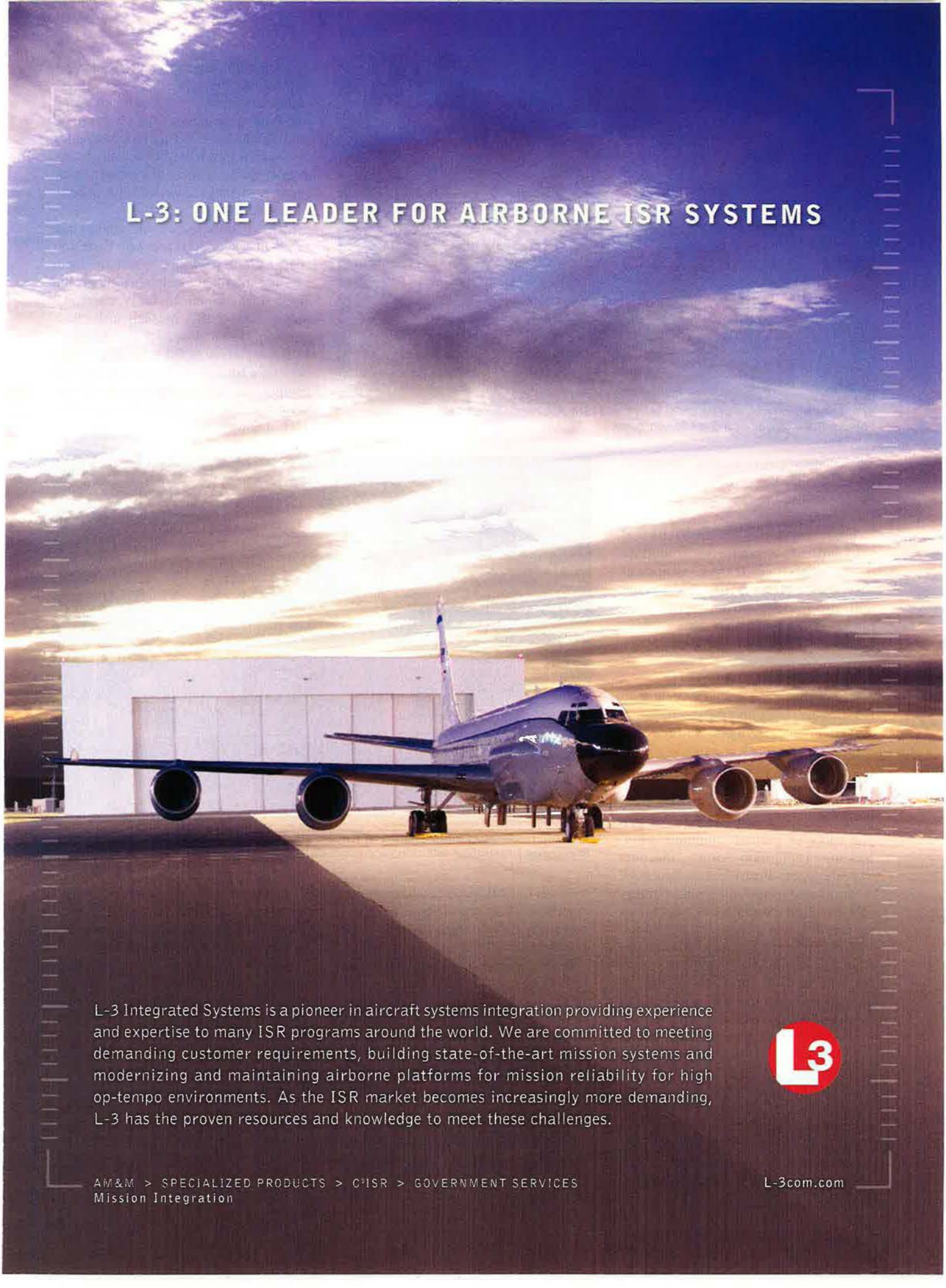
"We used to have what was called '100 percent repair capability,'" Pokrzywa said. "We could tear the engine apart, radars, etc. ... We don't do that with a J model."

Instead, more time is spent repairing the aircraft itself, and less on fixing parts. USAF has driven this approach to streamline the repair process—to make sure the maintenance community has an expeditionary mindset.

"We need to focus all our training on deploying the folks and being able to

USAF photo by SSgt. Joshua Garcia

TSgt. Eric Peterson replaces KC-135 fan assembly blades just checked by TSgt. Joseph Vigil.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USAF photo by James M. Bowman

SrA. Kyle Robinson, a crew chief with the 315th Aircraft Maintenance Squadron, checks the exterior of a C-17 for damage.

repair the aircraft in theater," Pokrzywa added. Otherwise, "we're not going to be able to give the aircrews reliable and safe aircraft."

There are a number of factors at work influencing readiness. In addition to the operations tempo, manpower shortages, and an aging fleet, many units are stressed during "split operations"—where part of a unit deploys and the other stays at home.

A Logistics War

The problem is especially acute with low-density, high-demand assets, such as certain intelligence-surveillance-reconnaissance aircraft and special operations systems, but is not limited to LD/HD resources.

"Operations in Afghanistan are a logistics war," said McMahon. "When you think of ground communication, lack of sea communication, ... this puts a greater stress on airlift requirements." Acute problems with materials, fatigue, and structural issues such as wing boxes are creating new strains on the airlifters.

Preventive maintenance, at home station or in the depot, is one of the areas the Air Force is focusing on to improve as its fleet gets older. In order to keep the deployed logistical tail light, new processes are being tested back at home.

If there has been a tangible maintenance benefit from the grueling operations tempo since 2001, it has been the newfound ability to adapt to challenges of all kinds, regardless of platform.

MSgt. William L. Burdette III, a C-130J crew chief with the Maryland ANG's 135th Aircraft Maintenance Squadron, said his unit's multiple deployments with the C-130J helped amass a wealth of technical data that helped solidify issues with parts, tooling, and supply chain management.

By the end of 2006, for example, C-130J units had learned to put protective barriers on vulnerable parts of the aircraft, such as antennae, due to heavy operations in and around unimproved airstrips in Afghanistan and other locations.

Schedules for components such as filters and the pneumatic system were more precise.

"Rather than wait for something to fail, you come up with a scheduled maintenance program," said Burdette. "Those things are all incorporated in the tech data now."

Even with better technology and preventive maintenance, there are critical tasks that will require skilled maintainers' attention, regardless of the platform, he said. After the C-130J arrived, mechanics had to adjust what they looked at—rather than every component and subsystem of the aircraft, they focused on other aspects of maintenance.

"They learned to focus on ... things like cracks in windows, tire pressure. There's no diagnostic to check that," Burdette added.

"If you look at availability across the fleet, it has remained fairly constant," said the Air Staff's McMahon. It "isn't serendipity that allowed that to happen."

Better parts availability has helped. The service's Total Not Mission Capable for Supply rate, the percent of aircraft that are not flyable due to parts shortages, has inched downward.

USAF photo by Sue Sapp

A C-130 undergoes maintenance at Robins AFB, Ga. The Air Force is focusing on improving preventive maintenance procedures fleetwide.

In Fiscal 2001, the total Air Force's TNMCS rate sat at 12 percent. Since then, the number has steadily gone down, hitting 7.6 percent in Fiscal 2008.

Hard work, parts, and the trickle of new equipment have helped hold readiness rates fairly steady. In Fiscal 2001, the availability rate (excluding aircraft assigned to a depot, or unit possessed but not available for missions) was 63.7 percent.

In the years since, the rate has fluctuated in the 66 percentile range—hitting a peak of 67.9 percent in Fiscal 2007, before dipping to 65.6 in Fiscal 2008.

"That's a lot of hard work on the flight line and the back shops across the Air Force," McMahon concluded. ■

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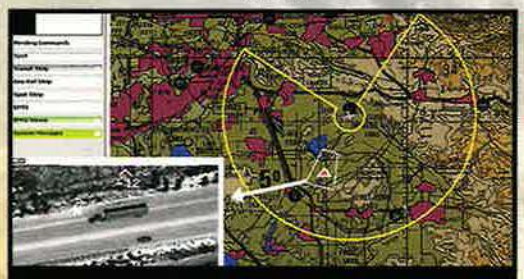

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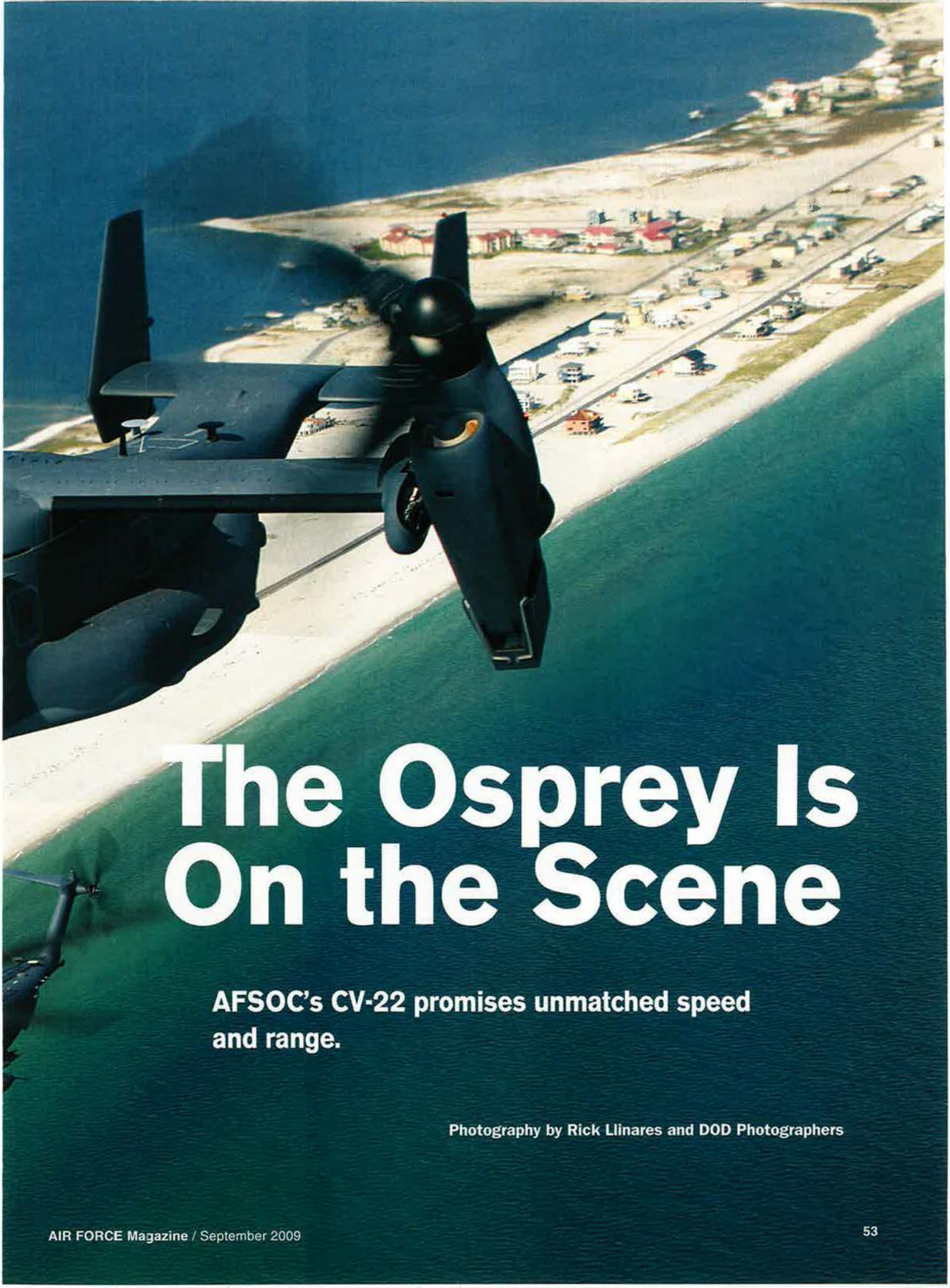
A CV-22 Osprey tilt-rotor, the newest aircraft of the 1st Special Operations Wing, forms up with one of the last MH-53 Pave Low helicopters, which the Air Force flew for nearly 40 years. The MH-53s now are retired. The two aircraft are shown over Santa Rosa Island, Fla., during a training exercise.



The Osprey Is On the Scene

AFSOC's CV-22 promises unmatched speed and range.

Photography by Rick Llinares and DOD Photographers

*The MH-53 Pave Low earned its battle stars in some of the most significant operations of recent decades, and was one of the iconic platforms of Air Force special operations forces. Its replacement, the CV-22, offers the ability to take off and land like a helicopter but fly long distances with the speed of a turboprop. **|1|** Ospreys and a Pave Low over the Gulf of Mexico.*

USAF photo by 1st Lt. Lauren Johnson

|2| SSgt. Jason Cirioni performs a maintenance check on a CV-22 in Mali during the 2008 Exercise Flintlock in Africa. |3| Two CV-22s of the 8th Special Operations Squadron prepare to take on fuel from an MC-130P Combat Shadow during Flintlock, which was the first operational deployment for the USAF Osprey. A CV-22 was used to infiltrate and extract a ground SOF team to a location 575 miles from its operating base in Mali. |4| 1st Special Operations Wing technicians keep the unique Ospreys flying. Note the wide window in the rear door.

USAF photo by TSgt. Armando Carrion

I1I *Routine maintenance on a CV-22 being performed by SrA. Elijah Loughridge (on stand), SrA. Donald Munn, and Bell Boeing technician John Samples.* ***I2I*** *An MC-130P makes ready to top off a CV-22 during a mission.* ***I3I*** *Army Golden Knights parachute demonstration team members jump in tandem from a CV-22 over MacDill AFB, Fla.* ***I4I*** *An Osprey on the Hurlburt Field, Fla., flight line. Engine nacelles are usually tilted upward on the ground for rotor clearance. The 1st SOW will eventually field 23 Ospreys.* ***I5I*** *An MH-53 and two CV-22s over Santa Rosa Island. The last missions for the MH-53 were flown out of Hurlburt Field. The Air Force will eventually operate 50 CV-22s, which are equipped with myriad night/adverse weather gear and signature reduction and navigational enhancements over the Marine Corps version from which they are derived.*

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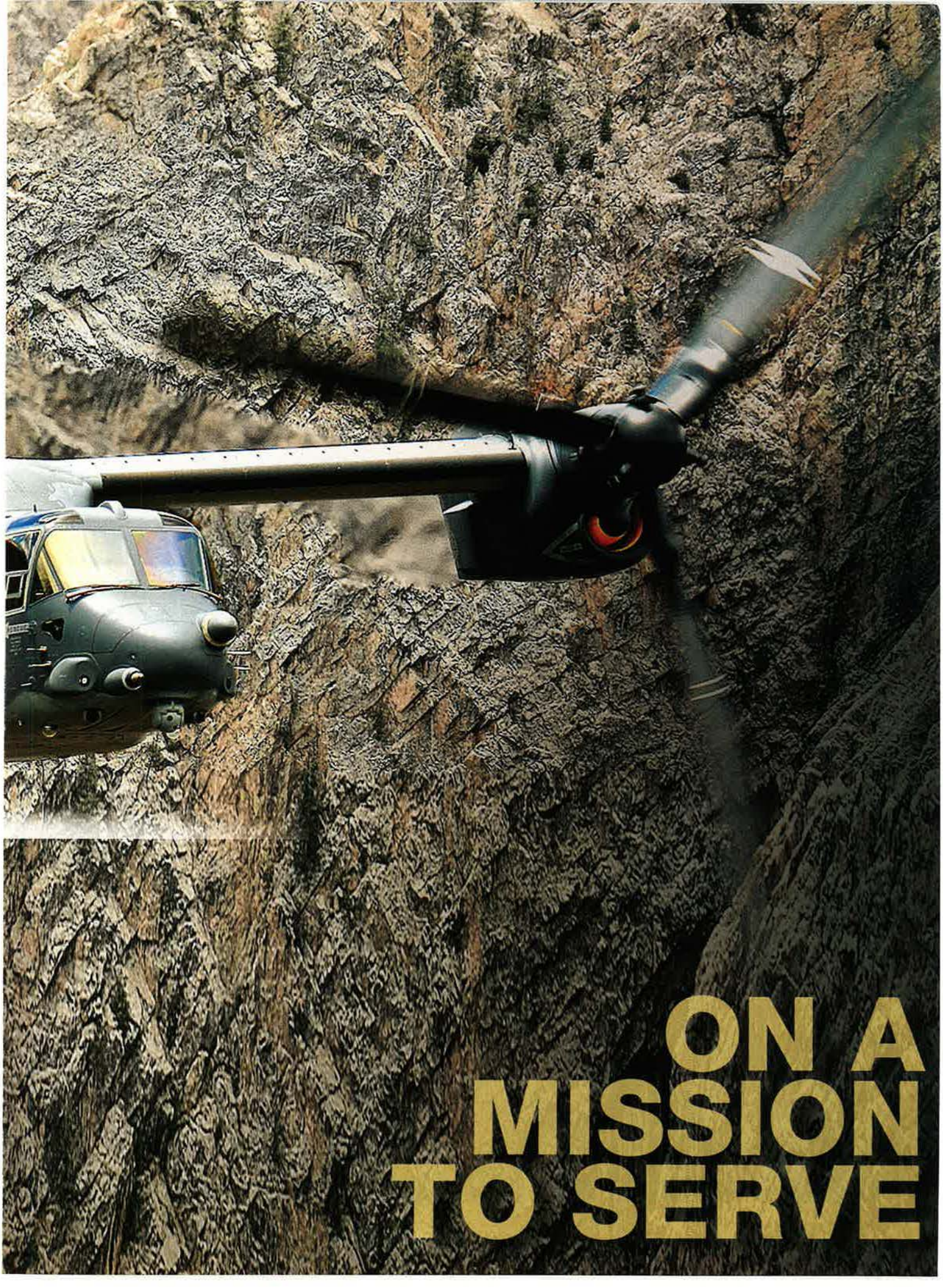
ON A
MISSION
TO SERVE

|1| Troops from Mali and Senegal rehearsed infiltration and extraction maneuvers alongside US and European special operations forces during Flintlock. Here, they board a CV-22 with rotors turning. |2| A CV-22's rotors transition forward after takeoff from Hurlburt Field. In the foreground is an MC-130. |3| Two Navy SEALS are hoisted aboard a CV-22 during a training mission. Like the Pave Low, the Osprey is garnished with a host of sensors, antennae, and defensive systems. It carries a regular crew of six. |4| Lt. Gen. Michael Wooley, then AFSOC commander, pilots the CV-22 on a "beauty pass" at an Air Force 60th anniversary celebration at Hurlburt in 2006. |5| Special Forces perform a fast-rope demonstration from CV-22s at Hurlburt in October 2008. Visiting members of Congress got to see the CV-22 perform a variety of missions.

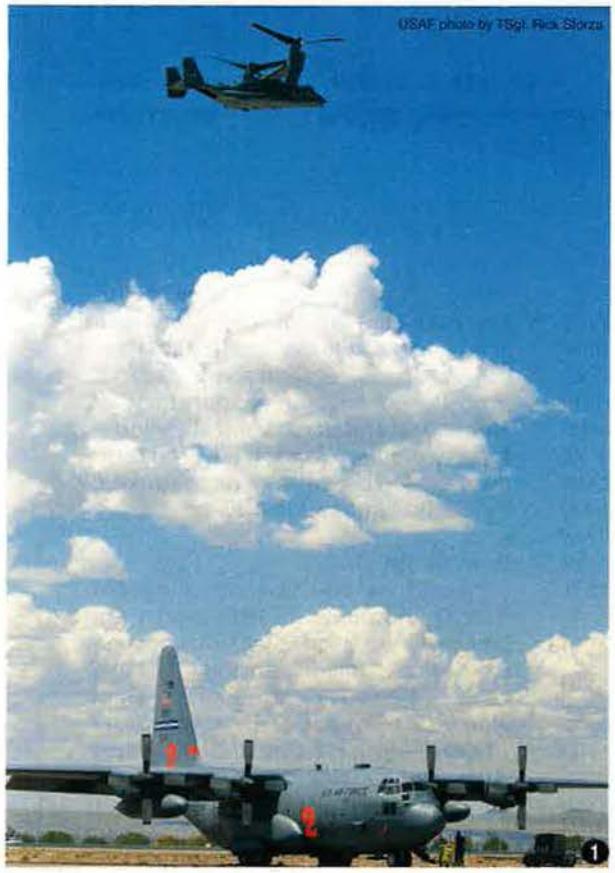

Photo by Sgt. Kieran Cuddihy

I1I *An Osprey hovers over a C-130 on the ramp at the US Forest Service's Albuquerque Air Tanker Base, N.M. Both aircraft were at the base to take part in Modular Airborne Firefighting System training.* ***I2I*** *A CV-22 is refueled by an MC-130P Combat Shadow of the 67th Special Operations Squadron during Flintlock. The CV-22 can self-deploy over continental distances—something the Pave Low couldn't do. Note the size of the Osprey compared to the tanker.* ***I3I*** *A CV-22 "dusts off" after deploying a quick reaction force (note prone special operators appearing to be rocks) during Emerald Warrior, an exercise at Hurlburt Field in February. In addition to its crew, the CV-22 can carry 24 fully equipped combat troops.* ***I4I*** *An Osprey maneuvers into refueling position behind an MC-130P Combat Shadow from the 9th SOS during a firepower demonstration at Eglin AFB, Fla.* ***I5I*** *About 100 airmen of the 1st Special Operations Wing deployed to Mali for Flintlock. One walks the wing of a CV-22 during a maintenance check.*

The CV-22 has had a long development, first rolling out in 1985 and twice canceled by the Defense Department. Congress consistently restored the program, however, in no small part because of the aircraft's unique capabilities for special operations. Indications are that AFSOC will find the long wait well worth it. ■

Verbatim

By John T. Correll, Contributing Editor

Are the Thinkers Thinking?

"Some of the concerns I had 20 years ago still loom large. First, are our professional military education schools creating the strategic thinkers we need? And second, are the services identifying strategic thinkers, and are these thinkers being offered the right career opportunities? We simply can't afford to squander the talents of our strategic thinkers, and must make sure they are not discouraged in their military careers, whether serving in joint positions or in the services. Because our nation needs more strategic thinkers, we must support the war colleges and actively encourage service members who seek mastery in the art of warfare."***—Rep. Ike Skelton (D-Mo.), chairman of the House Armed Services Committee, Naval War College graduation, June 19.***

Airpower Restrictions

"Airpower contains the seeds of our own destruction if we do not use it responsibly. We can lose this fight."***—Army Gen. Stanley A. McChrystal, US commander in Afghanistan, on restricting air strikes in order to reduce civilian casualties,*** **New York Times,** ***June 22.***

To Turn the Tide

"I believe that we have to start to turn the tide with respect to the Taliban in the next 12 to 18 months. And I believe the forces that we have and the strategy that we have and the approach that we have will allow us to do that."***—Adm. Michael G. Mullen, Chairman of the Joint Chiefs of Staff, on the outlook in Afghanistan, National Press Club, July 8.***

Go for the Bomber

"The military plans to spend hundreds of billions of dollars on several thousand short-range strike aircraft that must operate from forward land bases or carriers, both of which are increasingly vulnerable. These programs should be scaled back in favor of greater investment in longer-range systems, such as a next generation bomber and the Navy's long-range unmanned strike system."***—Andrew F. Krepinevich Jr., Center for Strategic and Budgetary Assessments,*** **Foreign Affairs,** ***July-August.***

The Decapitation

"Since Gates was using the Air Force budget as a pot of money to pay other services' bills, he had to change out the more experienced team for one that might be more accommodating."***—Retired Air Force Lt. Gen. Thomas G. McInerney and retired Army Maj. Gen. Paul E. Vallely on the firing last year of the Secretary and Chief of Staff of the Air Force by Secretary of Defense Robert M. Gates, HumanEvents.com, June 24.***

Legal Beagles Make Sure

"There are some who believe that somehow we have created this command to exercise military authority in the homeland and that is not the case. Trust me. I've got about 16 lawyers who follow me around every day just to make sure I don't trip over that line."***—Gen. Victor E. Renuart Jr., commander of US Northern Command, Center for Strategic and International Studies, June 16.***

How Much Do We Need?

"Air Force heavy-lift aircraft and tankers—enough until you can't see the sun, if we must surge into combat."***—Ed Timperlake, former director for international technology security assessment, Office of the Secretary of Defense,*** **Washington Times,** ***July 10.***

Battle for Access

"Given the proliferation of sophisticated weapons in the world's arms markets, potential enemies—even relatively small powers—will be able to possess and deploy an array of longer-range and more precise weapons. Thus, the projection of military power ... could become hostage to the ability to counter long-range systems even as US forces begin to move into a theater of operations and against an opponent. The battle for access may prove not only the most important, but the most difficult."***—US Joint Forces Command 2008 report, quoted by Michele Flournoy, undersecretary of defense for policy, and Shawn Brimley, strategist in the Office of the Secretary of Defense, US Naval Institute*** **Proceedings,** ***July.***

Those Words Again

"One of the reasons the nomenclature is not used is that 'war' carries with it a relationship to nation states in conflict with each other and of course terrorism is not necessarily derived from the nation state relationship. In some respects, 'war' is too limiting."***—Secretary of Homeland Defense Janet A. Napolitano explaining (again) why the term "war on terrorism" has been junked,*** **Financial Times,** ***June 30.***

Enough for One

"Would we like to have additional F-22s? Of course. ... [However] I am personally convinced that 187 is enough for a single major campaign. I have no doubt that we can prevail."***—Gen. Norton A. Schwartz, Air Force Chief of Staff, Airmen's Call at Elemendorf AFB, Alaska, July 6.***

Unilateral Obsolescence

"There are some who believe that failing to invest adequately in our nuclear deterrent will move us closer to a nuclear-free world. In fact, blocking crucial modernization means unilateral disarmament by unilateral obsolescence. This unilateral disarmament will only encourage nuclear proliferation, since our allies will see the danger and our adversaries the opportunity."***—Sen. Jon Kyl (R-Ariz.) and Richard Perle, former assistant secretary of defense,*** **Wall Street Journal** ***op-ed, June 29.***

Airpower Realities

"Ordinarily, preplanned targets are thoroughly vetted in advance of an air strike to ensure intelligence has identified the correct target and that collateral damage will be held to a minimum. ... In the 35 air strikes that caused collateral damage during 2006 and 2007, only two occurred as a result of preplanned strikes. There are several interesting aspects of this situation. First, given that there were 5,342 air strikes flown by US forces during those two years, the number causing collateral damage was a mere 0.65 percent. ... Second, more than 95 percent of the 35 air strikes resulting in collateral damage were troops-in-contact situations—those instances when the rigorous safeguards taken at the air operations center to avoid just such mistakes were bypassed."***—Military analyst and historian Phillip S. Meilinger,*** **Armed Forces Journal,** ***July.***

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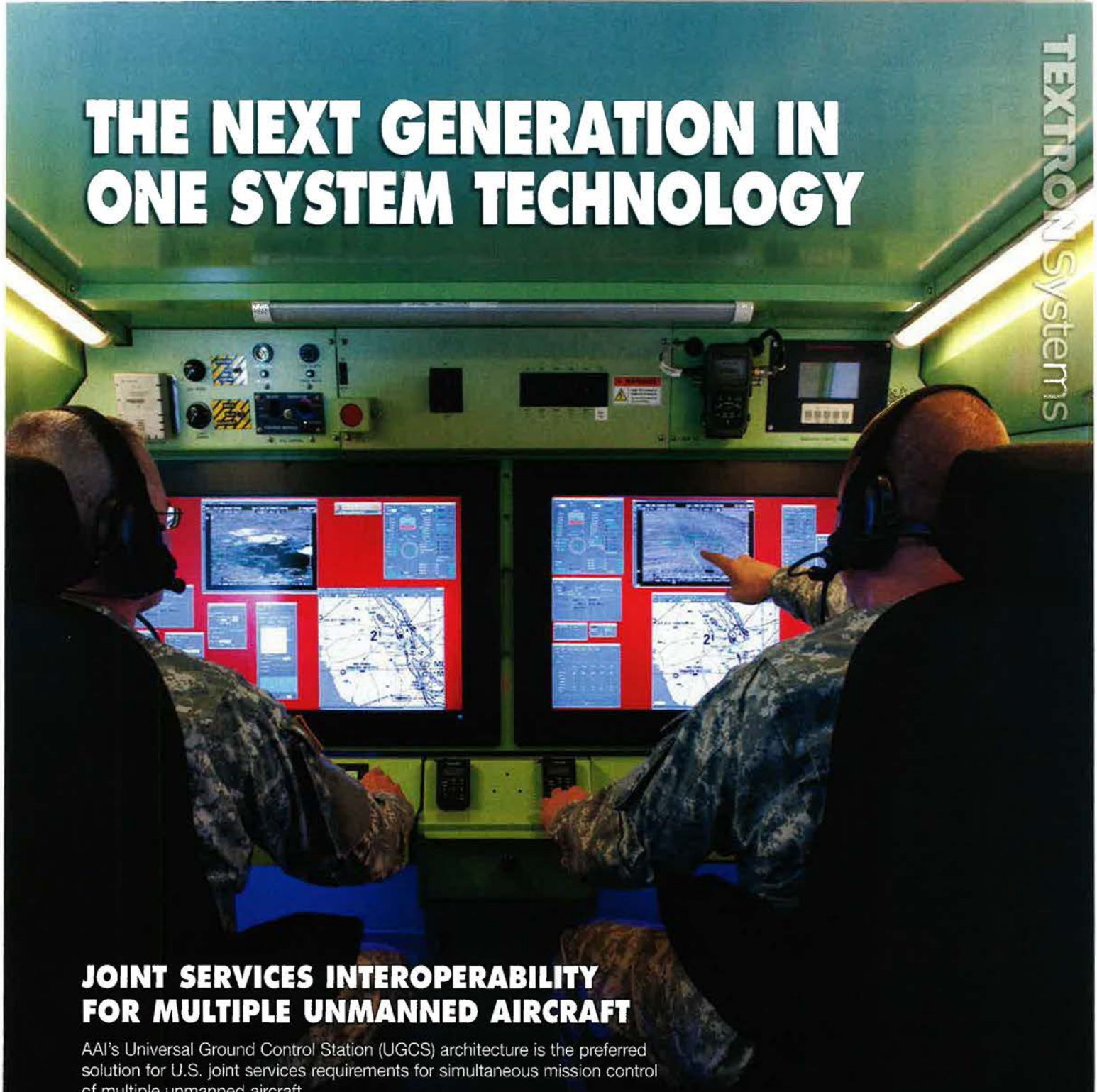

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We're Not Worthy ...

USAF photo. Text by Andrea K. Dudney

In this December 1951 photo, Air Force mechanics, some of them students, complete the inspection of a pair of futuristic General Electric turbojet engines on a B-47 Stratojet bomber. The Strategic Air Command aircraft was undergoing maintenance at Sheppard Air Force Base, on the plains just north of Wichita Falls, Tex. These bomber engines, with their oddly shaped air intakes, were of the very latest design, and the sleek B-47, which had six of them, was the world's fastest bomber. ■

Over There

When America declared war in 1917, it had no combat airplanes and not a single squadron trained for war—but it did have Billy Mitchell.

By John T. Correll

The United States was late in entering World War I, which had been raging in Europe since 1914. It was not until April 1917 that the US declared war, after Germany resumed unrestricted submarine warfare with its U-boats sinking civilian ships.

That October, ground troops of the American Expeditionary Force took their positions in the trenches in Europe. The US air arm came close to missing the war altogether. It began operations at the front in March 1918 and engaged in its first aerial combat in April. That left only seven months before the armistice.

The US Air Service's contribution was less than that of the other Allies, but it gave a good account of itself and set the stage for postwar expansion.

The Great War was a big turning point for the US armed forces, especially the air forces. The nation had no tradition of preparation for war. In 1916, President Woodrow Wilson was outraged to learn from the newspapers that the War Department was working on plans for manpower mobilization in the event of war.

The US trailed far behind in military matters. Powered flight made its first appearance in the United States at Kitty Hawk, N.C., in 1903, but America could not hold its leadership and European nations moved ahead in numbers of airplanes produced and pilots trained. Even Belgium invested more in aviation.

Between December 1903, when the Wright brothers flew, and summer 1917, when US troops paraded in Paris, the US produced no more than 1,000 airplanes of all kinds and contributed little to the development of military aircraft or tactics.

In 1917, the Aviation Section of the Army Signal Corps had fewer than 250 airplanes. The best of them was the JN-4 Curtiss Jenny. An earlier model, the JN-3, had been used to chase Pancho Villa through Mexico in 1916, but the Jenny was not suitable for any military purpose except training.

Moreover, the nation could not suddenly begin producing combat airplanes. The US did not make any engines with the necessary combination of light weight and high horsepower. Not a single aviation squadron was trained for war.

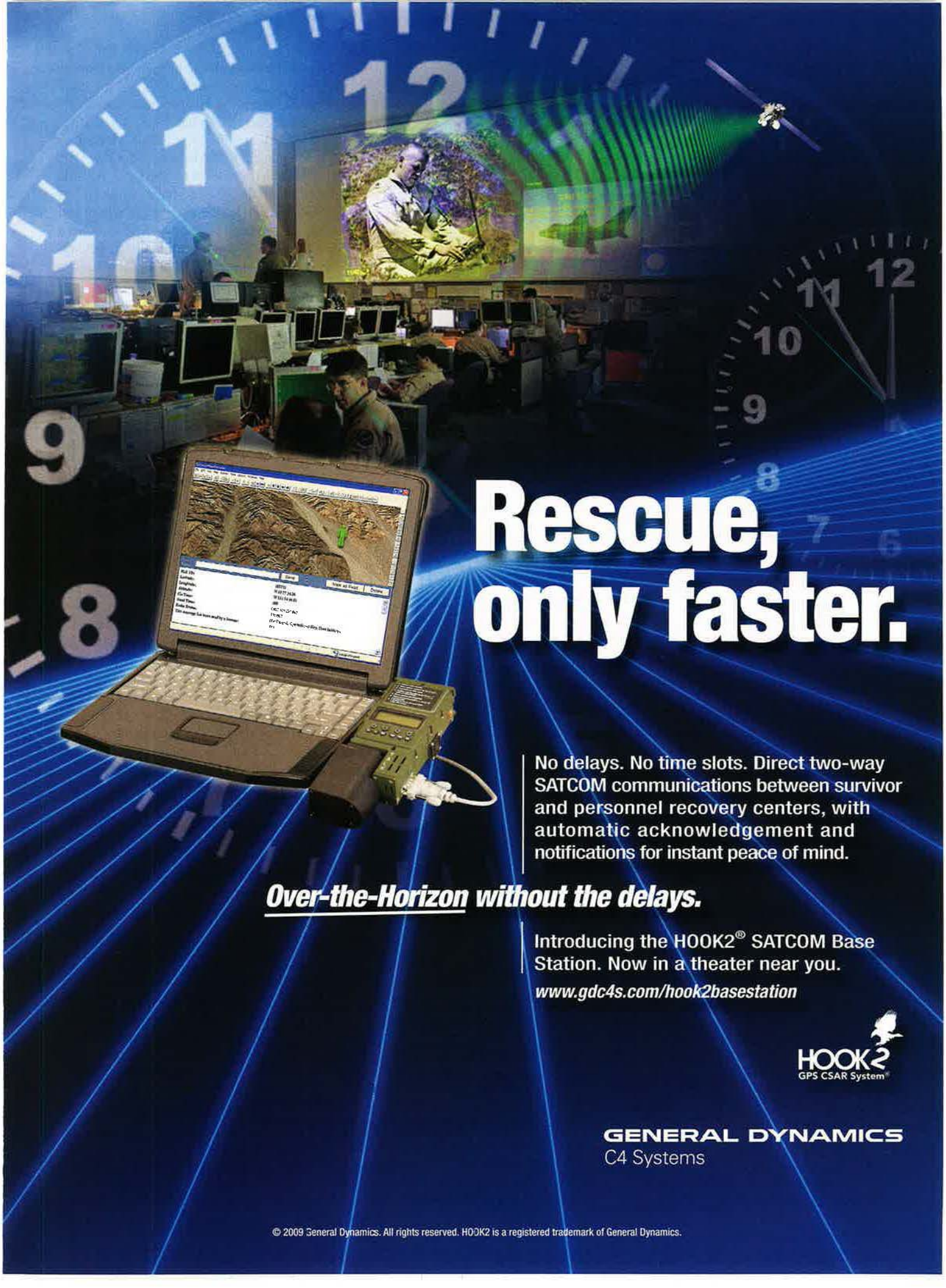
When the US declared war, it had in Europe only five aviation officers. Fortunately, one was Maj. William "Billy" Mitchell, who did not wait for special instructions to get started. On his own authority, Mitchell set up an office in Paris and was there and holding forth when Gen. John J. Pershing and the American Expeditionary Force staff arrived.

By then, Mitchell had already given Wilson and the War Department a strong nudge about airpower. At his instigation, the French Premier, Alexandre F. J. Ribot, on May 24 dispatched a cablegram asking Wilson to send to France in 1918 some 4,500 airplanes, 5,000 pilots, and 50,000 mechanics. This was needed, he said, to "enable the Allies to win the supremacy of the air."

The Ribot cable was favorably received in Washington, where war fever was running at full tilt. The War Department concurred summarily with Ribot's proposal May 27, and on July 24, Congress appropriated $640 million for an aircraft program. Never in its history had the US voted so large a sum for a single purpose.

The program that Congress approved called for 345 combat squadrons, of which 263 were to be in Europe by July 1918. The target was revised the next year, setting the objective at 202 combat squadrons in the combat area and 22,000 airplanes by July 1919. It was an ambitious goal, but when the war ended in November 1918, the Air Service had 45 squadrons at the front and was pushing hard.

The Air Service might have actually reached 202 squadrons had the war lasted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A 1918 recruiting poster for the Army Air Service showed the US bald eagle battling the war bird of Imperial Germany in an air-to-air battle.

another year. The AEF ground and air units infused fresh blood into a tiring Allied effort. The Germans feared, with some cause, that American resources would tip the scales in the outcome of the war.

US airmen mostly flew whatever kinds of airplanes could be obtained from the Allies. Except for the DH-4 reconnaissance-bombers, manufactured on license from the British, nearly all US combat aircraft came from France or Britain, with a few supplied by the Italians. At the end of the war, 80 percent of the airplanes in American service were French-made.

Ten thousand pilots were eventually trained. Dozens of flying schools were set up in the US, but most pilots received some or all of their training in France.

Combat aircraft for advanced training were not available in the United States. The best known of the overseas schools was the US Aviation Instruction Center at Issoudun, 125 miles south of Paris, where Maj. Carl A. Spaatz was commander. Edward V. "Eddie" Rickenbacker, who went to France as a sergeant and was Mitchell's chauffeur for a while, learned to fly at Issoudun and was commissioned there.

On To France

By the armistice, 28 training schools in the US had graduated 14,176 enlisted mechanics. Others trained overseas. Even so, there was a shortage of mechanics throughout the war.

American volunteers had been flying with British and French forces since 1915. The most famous of the volunteer units was the Lafayette Escadrille, initially called the Escadrille Americaine but changing its name in 1916 after the Germans complained to the US government, which was still neutral. In 1918, pilots from the Lafayette Escadrille transferred to US service as the nucleus of the 103rd Pursuit Squadron.

In the summer of 1917, Pershing divided his Air Service into the Zone of the Advance, responsible for combat operations, and the Zone of the Interior, responsible for logistics and related matters.

Billy Mitchell was promoted to lieutenant colonel and put in charge of the Zone of the Advance. His program sustained a setback in November 1917, when Brig. Gen. Benjamin D. Foulois arrived to become chief of Air Service for the AEF.

As Mitchell described it, Foulois brought along with him a "shipload" of staff officers, "almost none of whom had ever seen an airplane." Mitchell denounced them as "incompetent" and "carpetbaggers." Pershing called the Foulois staff "a lot of good men running around in circles."

In May 1918, Pershing called in his West Point classmate, Brig. Gen. Mason M. Patrick, an engineer, and made him chief of Air Service over both Foulois and Mitchell. The feud persisted. In June, Foulois tried to have Mitchell sent home, but Pershing did not want to lose him. Everyone, including Foulois, recognized Mitchell's special ability as a combat leader.

The matter was finally settled when Foulois overcame his personal feelings and, at his suggestion, Mitchell was given the primary combat role—commander of Air Service for the First Army. Foulois took a position as assistant chief of AEF Air Service under Patrick. Mitchell was the dominant American airman for the rest of the war, rising in October 1918 to the grade of brigadier general as chief of Air Service for the First Army Group, which incorporated all AEF combat forces.

A succession of US squadrons arrived in France in fall and winter of 1917-18. Many of them were assigned to the Toul sector, toward the eastern end of the vast front that stretched across Europe from the Belgian coast to Switzerland. The opposing armies around Toul faced each other in long-established static positions. Day-to-day, not much happened. Both sides used this area between the Meuse and the Moselle Rivers for training new forces.

The first American squadrons flew the Nieuport 28, an elegant and agile fighter with an unfortunate reputation for shedding the fabric from its upper wing when pulling out of a dive. The French did not fly it themselves, preferring the Spad XIII, which was also available by the time the first Nieuport 28s were produced. There were not enough Spads to go around, so the Americans got the Nieuports, which the French were glad to sell. Billy Mitchell called the Nieuport "second class," but some American pilots liked it better than the Spad.

The 94th and 95th Aero Squadrons received their Nieuports in March and began flying patrols over the lines. On the misty Sunday morning of April 14, observation

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*MEET THE NEW **BOSS***

Staff map by Zaur Eylanbekov

In one of the most important and decisive battles of World War I, Mitchell and his pilots made more than 3,000 flights over the battle lines at St. Mihiel.

balloons reported two German airplanes approaching Gengault aerodrome near Toul where the 94th "Hat in the Ring" squadron was based. 2nd Lt. Alan F. Winslow and 1st Lt. Douglas Campbell raced to their Nieuports and took off. They almost collided with the two German aircraft dropping out of the clouds. Winslow shot down the first one, an Albatros D.V. Moments later, Campbell shot down the other intruder, a Pfalz D.III.

These are generally regarded as the first American aerial victories of World War I. However, a case can be made that the first victory should be credited to Lt. Stephen W. Thompson of the AEF, who shot down a German airplane while flying as a volunteer gunner with a French unit Feb. 5.

Likewise, it can be argued that the first US aerial combat of the war was not by the squadrons in the Toul sector but instead by pilots and airplanes of the former Lafayette Escadrille, which merged with the US 103rd Aero Squadron in February 1918. The unit continued its combat operations—but remained under French command until July.

Several balloon companies were formed in the Toul sector, in addition to the fighter, observation, and bombardment squadrons. The balloonists did not get much training in their primary mission, adjustment of artillery, since there was little firing by batteries in the sector, but they did gain proficiency in maneuvering their balloons.

It was an inspiration to airmen when the Royal Air Force was formed as the world's first independent air force in April 1918. The US was not ready for such a step, but in May the air arm was moved out of the Signal Corps and established as the Army Air Service.

The transition period in the Toul sector came to an end with what Mitchell called "the last grand attack of the German Army." Beginning in March 1918, Germans launched a series of offensives, hoping to win the war before the flow of American resources became decisive. The first thrusts were at the northern sections of the front, toward Amiens on the Somme and Ypres in Belgium. The third blow was against Allied positions along the Marne. On June 3, the Germans reached Chateau-Thierry, 56 miles east of Paris.

St. Mihiel Salient

Mitchell moved his units from Toul northwest to the vicinity of Chateau-Thierry, where more than half the German fighter squadrons on the Western Front were operating. All three of the "Flying Circuses" were there.

The "Red Baron," Manfred von Richthofen, was dead by then, but his Circus, Jagdgeschwader 1, was capably led by Hermann W. Goering. The American fliers in their Nieuport 28s were pitted against some of Germany's most experienced pilots in the best German fighter, the Fokker D.VII. The Americans began receiving Spads to replace their Nieuports in July, but the conversion was not completed until August. The first Spad was flown in by Eddie Rickenbacker.

The US squadrons were often outnumbered four to one, and they took heavy losses, but the American airmen flew hundreds of strafing, escort, and patrol missions in support of the French and British ground forces. They inflicted a share of losses on the German Air Force.

Among the US casualties was Lt. Quentin Roosevelt, youngest son of Teddy Roosevelt, shot down and killed in his Nieuport 28 behind enemy lines July 14.

The French, stiffened by American ground and air forces, held on at the Marne and threw back the Germans, whose bid to win the war with the summer offensive failed. Furthermore, the balance of power shifted. When the offensive began in March, the Germans had more troops than the Allies, but that summer they took casualties at twice the rate the Allies did and lost their advantage in numbers. American troops, flowing into the battle at the rate of 250,000 a month, widened the gap. In late August, with the Germans dislodged from the Marne, Mitchell moved his pursuit squadrons up to Rembercourt near Verdun for the next phase of the war.

South of Verdun, a bump in the German line extended westward into France, coming to a point at St. Mihiel on the Meuse River. This was the St. Mihiel Salient, 14 miles deep and about 24 miles wide at the base. It had been there since the first months of the war. Pershing, assigned to wipe out the salient, assembled a force of 16 US Army divisions and a French Army corps. Mitchell was in command of the supporting airpower.

Bad weather moved in and Pershing's engineers advised a delay in the operation because of the rain. Mitchell, the most junior member of the staff, disagreed. He had flown a personal reconnaissance over the salient Sept. 10 and had seen considerable movement toward the rear. He said the Germans were retreating and that the time was opportune to strike.

Pershing was of similar mind and launched his attack at 5 a.m. Sept. 12. Despite the bad weather, hundreds of attack and observation aircraft got airborne that day. As the Army surged forward, US airplanes flew over the battlefield at 164 feet, strafing the enemy trenches and road traffic.

Never before had so large an air fleet been employed in war. Mitchell was in control of 1,481 aircraft, of which 609 were from American squadrons. The others were mainly French and British aircraft, with a few Italians and Portugese.

Mitchell, tutored in the offensive by his mentor, Maj. Gen. Hugh M. Trenchard of the Royal Air Force, used a third of his force in direct support of the ground troops and the rest for bombing and strafing the enemy rear. "Our Air Service, with that

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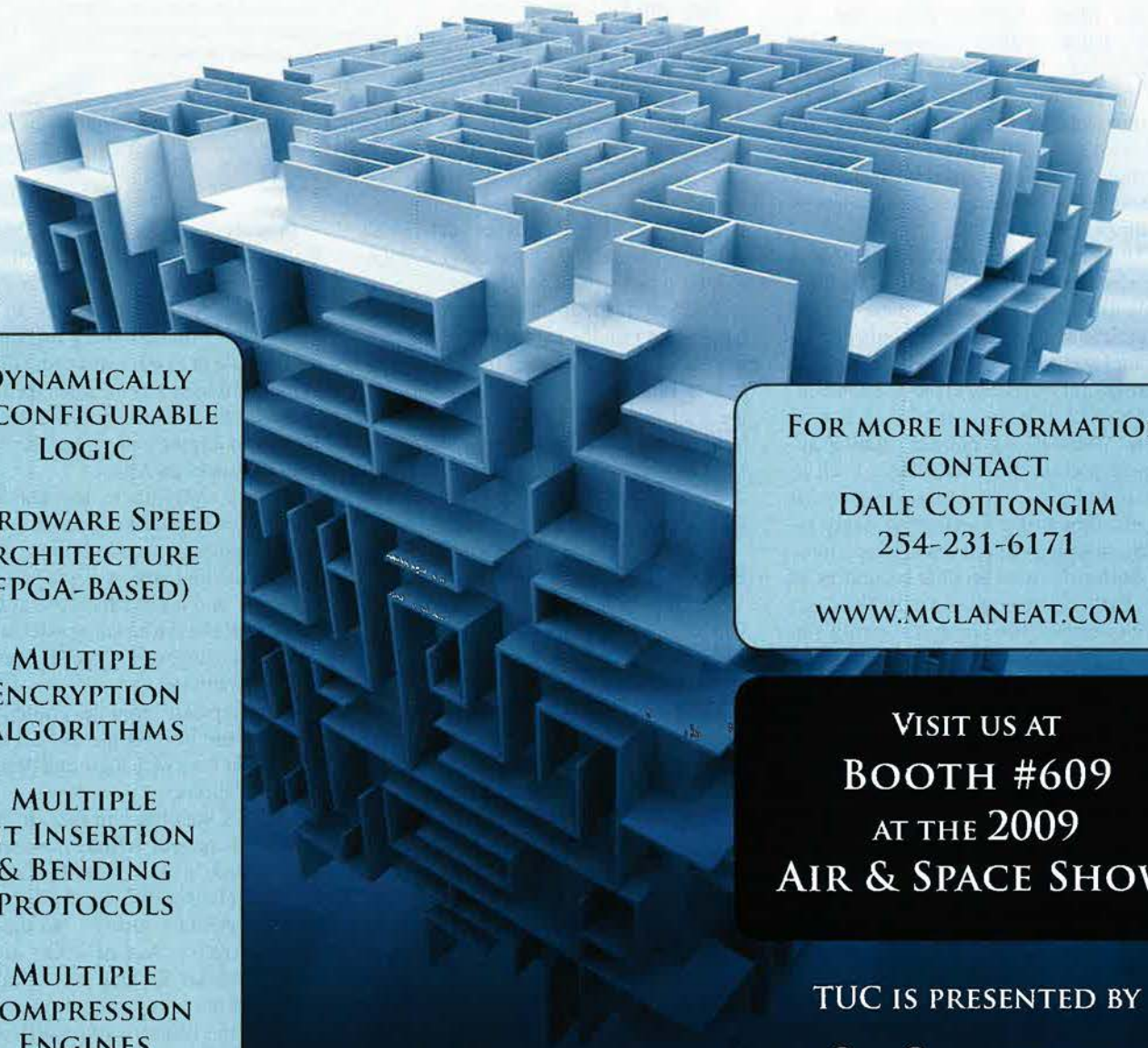

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of the Allies, went over the [battle] lines, and I was much pleased with the fact that virtually no German airplanes got over our ground troops," Mitchell said.

The battle was over in a few days. The Germans retreated and the Allies regained the area around St. Mihiel for the first time since 1914. The American airmen, who made 3,300 flights over the battle lines, had done well, as had Mitchell, who coordinated the large operation with notable skill. Pershing praised the air component, which he said had been the eyes of the Army and led it on to victory.

The fighting in September included the dramatic combat run of 2nd Lt. Frank Luke Jr., who shot down 14 German balloons and four enemy aircraft before he was shot down himself and killed on Sept. 29.

The Meuse-Argonne Battle, the last major battle of the war, began Sept. 26. The Germans had fallen back to the heights on the east bank of the Meuse, north of Verdun, and to the Argonne Forest on the west side of the river. It was rugged territory, and the positions were strongly defended, but Pershing had 820,000 troops to throw against them.

This time, Mitchell did not have a force the size of the one at St. Mihiel. He controlled 842 airplanes, a large share of them American. They attacked not only enemy ground and air troops at the front but also German units massing in the rear echelon.

The US airmen introduced a new tactic, "low-flying pursuit," which assigned patrols of five airplanes each to six-mile fronts. Sweeping along at two levels, they broke up German Army attacks on Allied ground forces. The armies on both sides took terrible casualties as the battle continued through October. In November, the Germans' string ran out, and the Great War ended when they signed an armistice on terms dictated by the Allies.

World War I was essentially a ground war, with set-piece engagements fought by army divisions operating from static battle lines. The big killer was artillery, raining down destruction on fixed positions along the front. When the war ended, 9.4 million troops had been killed and another 15 million wounded. The number of civilians who died could not be determined precisely.

The Great War was the first large conflict in which submarines, machine guns, and tanks were employed—but the most important of the new weapons was the airplane. It replaced the horse cavalry for scouting and reconnaissance and then evolved to other roles that included pursuit, bombardment, and strafing. Airpower was not yet the major factor in warfare it would become. Airplanes and aerial munitions were still at too early a stage in their development for that.

The American Air Service combat force had grown rapidly, especially in the last months of the war, jumping from 10 squadrons in June 1918 to 45 by November. At the armistice, the US Air Service had 740 airplanes in squadrons at the front. That accounted for a little more than 10 percent of the total aircraft strength of the Allies, up from five percent in August.

Back In the Skies

US airmen in World War I shot down 781 enemy airplanes and 73 balloons. They flew 150 bombing raids, the deepest penetrating 160 miles behind German lines. The price of success was 569 American airmen killed or wounded, 654 dead because of illness or accident, and loss of 289 airplanes in combat (including 57 flown by US pilots in British and French units) and 48 balloons.

Seventy-one American pilots became aces, led by Rickenbacker with 26 victories. The term "ace" originated with the French newspapers in 1915. At first, it referred to an excellent pilot but was soon defined as one who had achieved a certain number of aerial victories. The qualifying number varied but it was eventually set at five.

In early January 1919, the Prince of Wales—who was later to become the Duke of Windsor—visited the Air Service at its new headquarters on the Rhine and went flying with Mitchell along the valley of the Moselle in a two-seat Spad. Later that month, Mitchell was awarded the Legion of Honor by France. In a short time, the American airmen had earned the respect of their European Allies.

Airmen, rallying to the flamboyant Mitchell, believed that airpower would be the dominant weapon of the future. The war had proved that airpower was more than a novelty, and it was obvious that further value would be forthcoming as technology improved. However, wartime experience had not validated airpower as a strategic element separate from the ground force. Mitchell and his disciples would have to argue their case with logic and peacetime demonstrations.

The US was back in the air, having broken its prewar lethargy in aviation. The nation was not ready to follow Britain and establish the Air Force as a separate military service, but the Army Reorganization Act of 1920 did recognize the Air Service as a combatant branch of the arm, on an organizational par with the Infantry and Artillery. The long climb toward an independent Air Force had begun. ■

Principal Aircraft of the Army Air Service

Breguet 14 (French). B-2 variant was France's workhorse bomber. Also came in a reconnaissance variant (A-2). B-2 variant had clear panel "windows" on sides of observer's cockpit.

Curtiss JN-4 Jenny (US) trainer. Most famous American airplane of the war. Trained 95 percent of all US and Canadian pilots. Engines not powerful enough for combat. Mainstay of barnstorming aviators of 1920s.

DeHavilland DH-4 (British/US) reconnaissance-bomber. Built on license in the United States using the American "Liberty" engine. Only US-built airplane to see combat. The Air Service preferred the Breguet for bombing and the Salmson for observation.

Nieuport 28 (French). The AEF's first pursuit fighter. Despite design flaws, effective against German Albatros and Pfalz, but outclassed by Fokker D.VII.

Salmson 2A2 (French). AEF's main reconnaissance airplane. Also employed as a bomber.

Sopwith F-1 Camel (British), so called because of the humped fairing over the nose guns. Pursuit fighter, highly maneuverable but comparatively slow. More aerial victories (1,294) than any other Allied aircraft of the war.

Spad XIII (French). Best Allied fighter of the war, matching the best German fighter, the Fokker D.VII. Fast, superb speed in the dive. The airplane of aces Frank Luke Jr. and Eddie Rickenbacker.

John T. Correll was editor in chief of Air Force *Magazine for 18 years and is now a contributing editor. His most recent article, "The Legend of Frank Luke," appeared in the August issue.*

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Deputy Assistant Chief of Staff
Charles R. Henderson

Associate Assistant Chief of Staff
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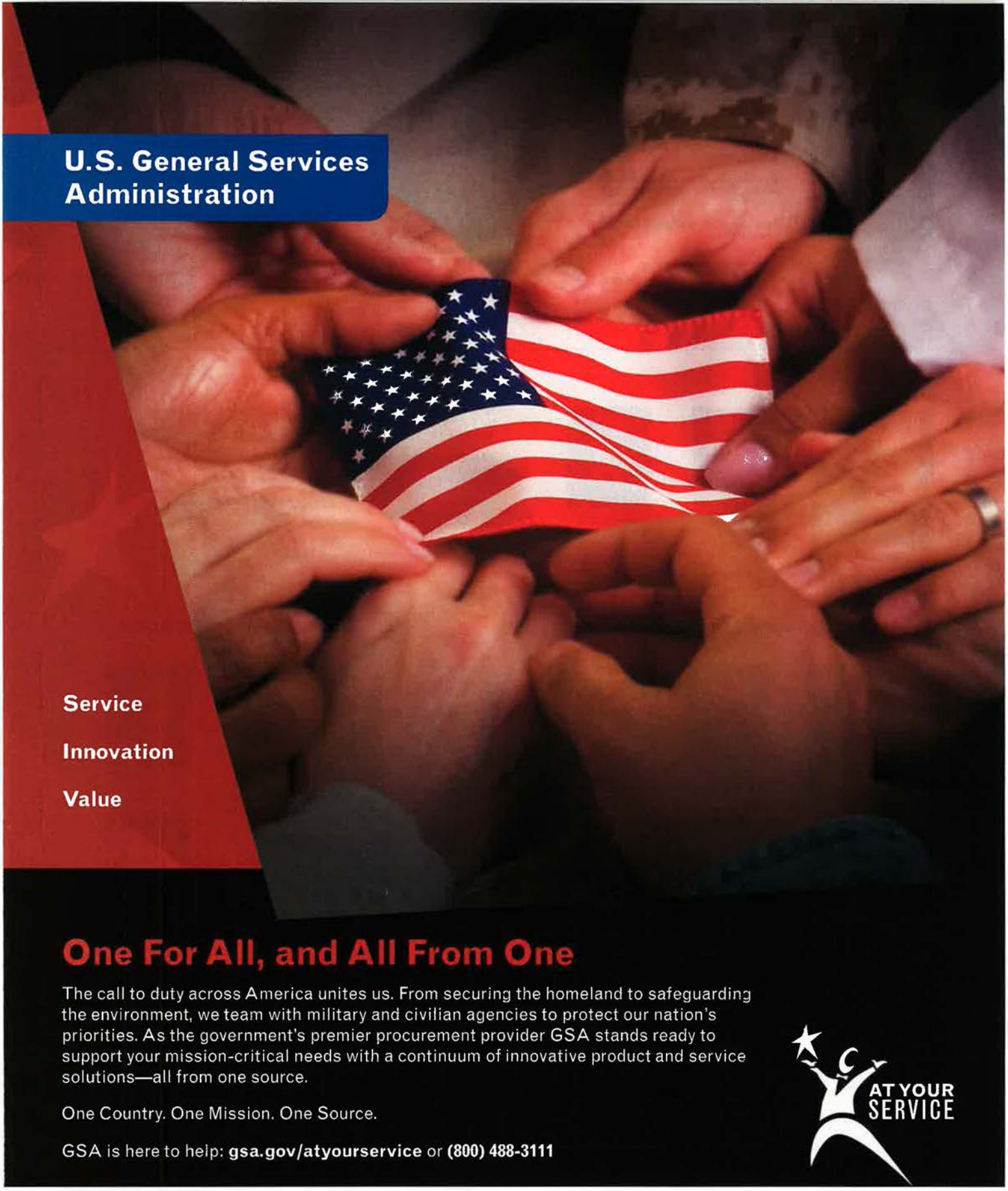

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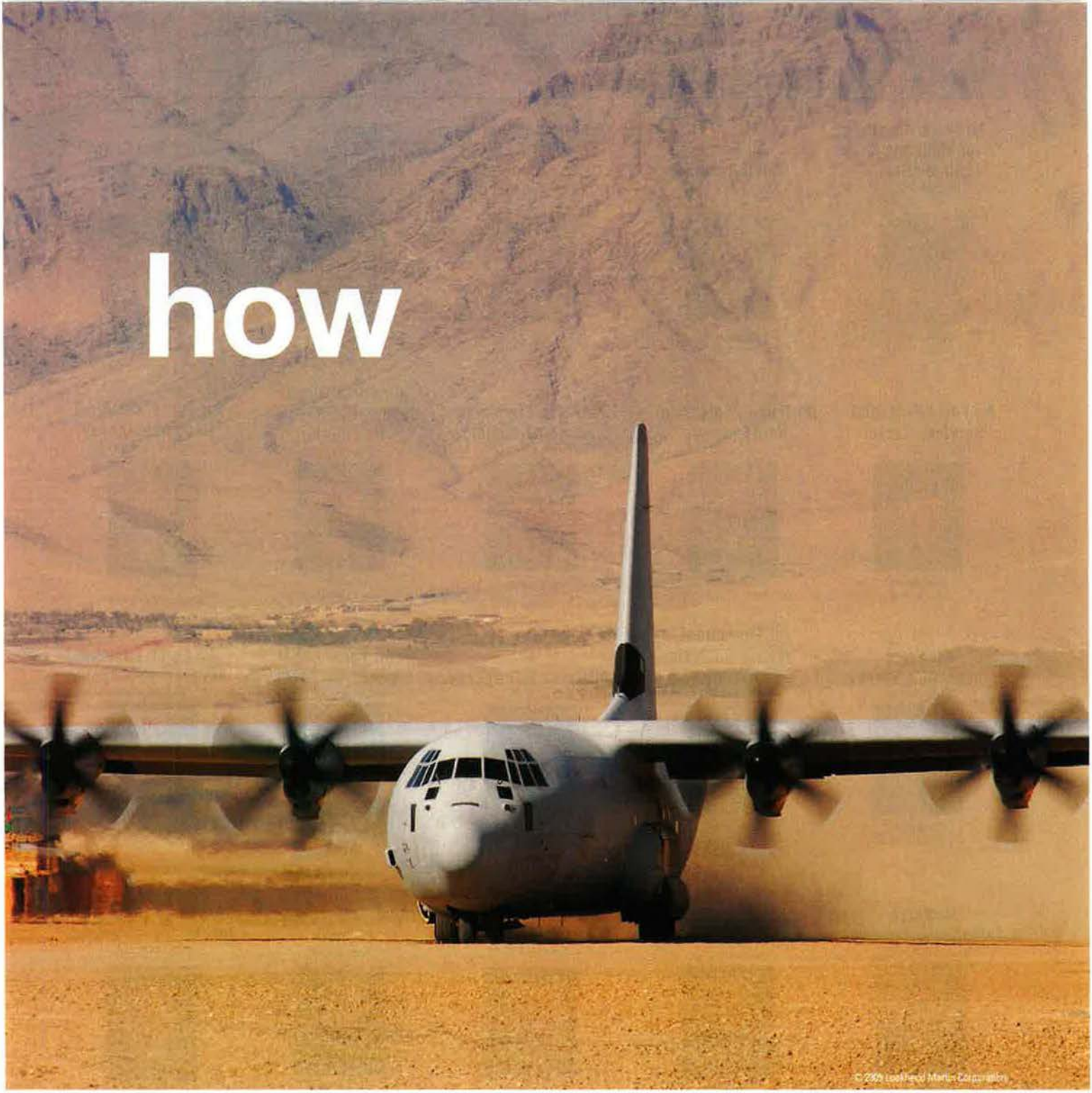

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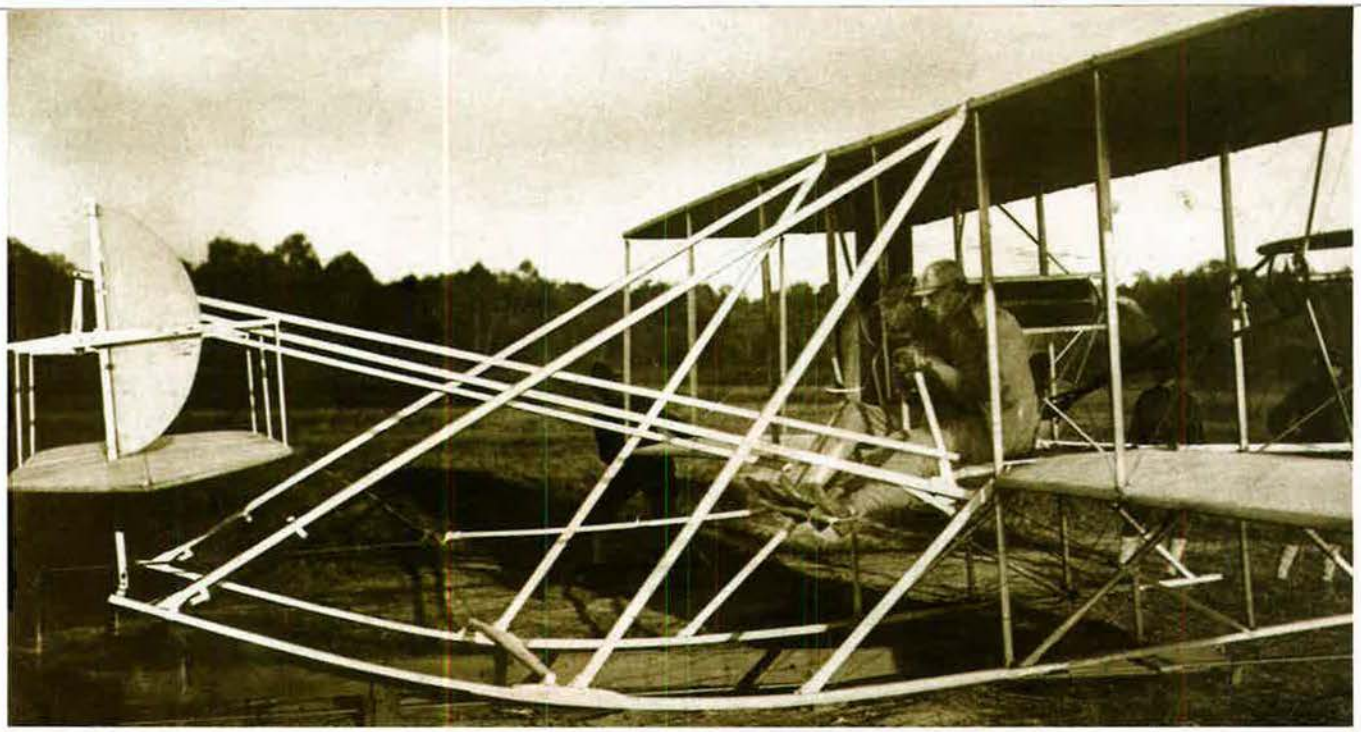


Photo courtesy of the Humphreys Collection, CPAM

Wilbur Wright and 1st Lt. Frederick Humphreys ready for takeoff at College Park Airport in 1909.

The College Park Century

At this airport in 1909, Wilbur Wright taught the first two military pilots to solo.

By Peter Grier

In the early summer months of 1909, 1st Lt. Frank P. Lahm often floated over the Washington, D.C., area in a balloon, looking for a suitable place to establish a military airfield. He saw a number of possible locations, but one in particular intrigued him.

It was a large, flat parcel of land in the town of College Park, Md., just north of the capital. It was next to the tracks of the Baltimore and Ohio Railroad, making it easy to get supplies to the site, which was large enough to provide lodging for personnel.

The deal was done. On Aug. 25, 1909, the US Army signed a lease for 160 acres there, at a rate of $200 a month. Trees were felled, a well and pump installed, and a shed built. By Oct. 6, the Army's first new airplane, purchased from Orville and Wilbur Wright, had arrived via wagon.

Thus was born College Park Airport, the oldest continually operating airfield in the world. This fall marks its centennial. Tucked inside the Washington Beltway, near a busy urban subway line, it is still in use for civilian general aviation.

A century ago, it was ready for a first step in aviation: the training of military pilots. "In a lot of ways, this really is the birthplace of military aviation," says Warren Kasper, program curator at the College Park Aviation Museum.

At this airport in 1909, Wilbur Wright taught the first two military pilots to solo. In 1911, College Park was the military home for initial aerial reconnaissance and bombing tests. In 1912 1st Lt. (later General of the Air Force) Henry H. "Hap" Arnold set an altitude record while flying from the base.

Lahm's fame was such that the Army had assigned him to help oversee acceptance trials for the US military's first airplane. This was easy duty: The young cavalry officer was a noted US aeronaut, having won the inaugural Gordon Bennett Cup—a balloon race from France to England—three years earlier.

The military trials had begun in September 1908, but the original location—the parade ground at Ft. Myer, Va.—was cramped and the fort's commanding of-

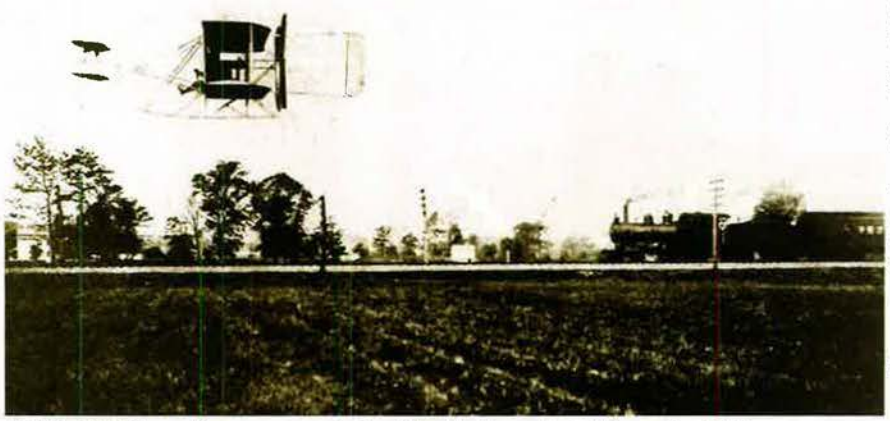
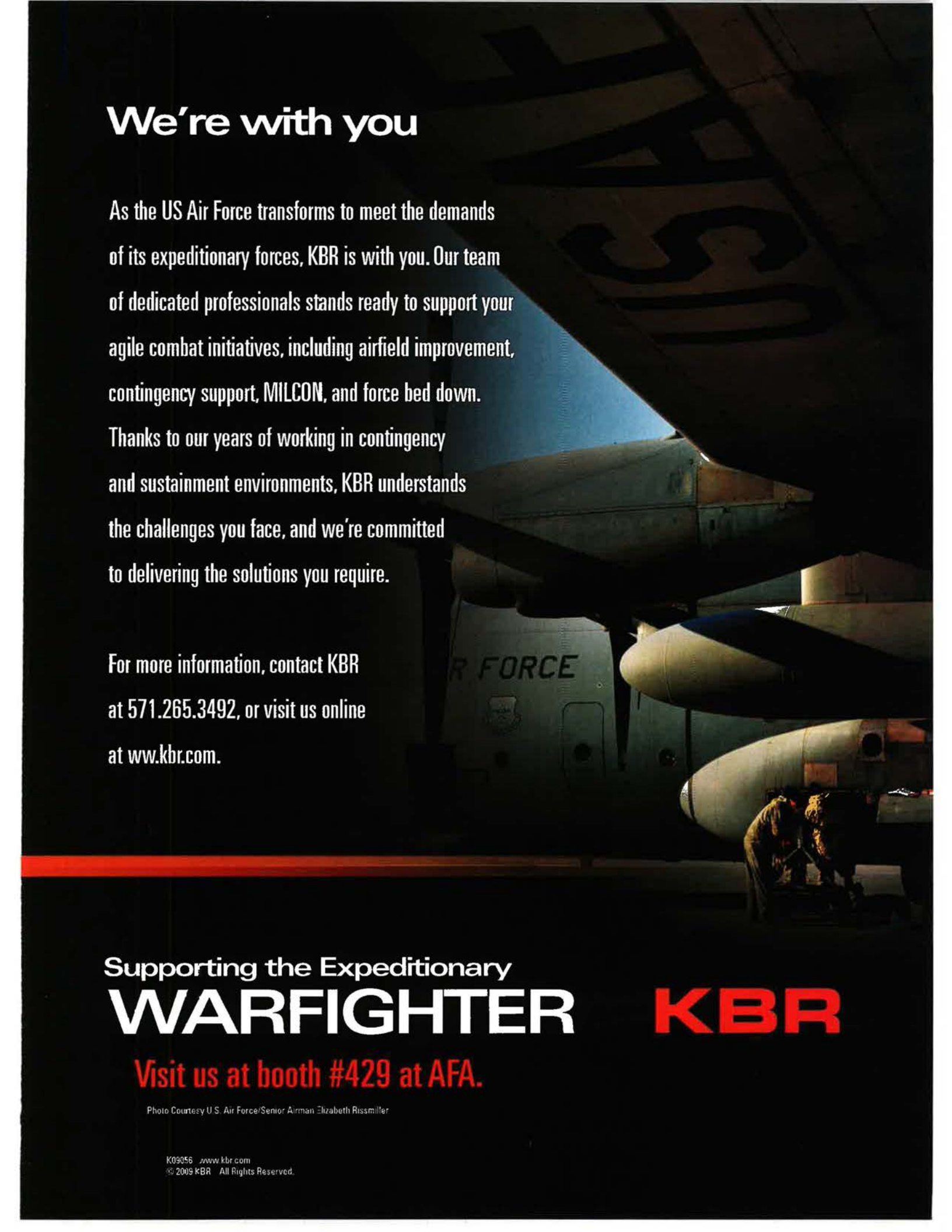


Photo courtesy of the Prince George's County Historical Society

A Wright Military Flyer races a train at the College Park Airport in 1909.



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ficer was not happy about the situation. So Lahm went out ballooning, looking for a better field, and at length settled on College Park.

The age of flight had just begun. On Aug. 2, 1909, the Army officially accepted delivery of its first airplane, following a Wright brothers demonstration at Ft. Myer. But there was another item in the Wright contract with the military: training. The Wrights were obligated to teach two officers to fly the delicate pusher-prop biplane.

Lahm was an obvious choice for one of these slots. Initially, the second spot was to go to 1st Lt. Benjamin D. Foulois, who, like Lahm, was a member of the Army's Aeronautical Board and an outspoken advocate for aircraft. In September 1909, however, Foulois suddenly was ordered to attend an international aeronautical conference in France. He was replaced by yet another Aeronautical Board member, 1st Lt. Frederick E. Humphreys.

Ten enlisted men were also assigned to the field. Some had helped out with the Wright trials at Ft. Myer; others had previously been assigned to balloon units. They lived in the new field's shed, with the aircraft. During down times, they were required to practice telegraphy.

The officers, plus Wilbur Wright, stayed in private homes across the railroad tracks, in College Park proper, home of what is now the University of Maryland.

On Oct. 7, 1909, Wilbur Wright unpacked the airplane from its crates, and reassembled it in the presence of his students, according to an Air Force Historical Foundation account. Just after five in the evening, Wright asked Lahm to crank up the engine. On the eighth attempt, the power plant sputtered to life. Further instruction was put off to the next day.

On Oct. 8, crowds began to arrive via carriages and autos. In those days, College Park was distant from Washington, but not distant enough. Brig. Gen. James Allen, chief of the Signal Corps, arrived for the occasion. Weather was ideal, and at about 3:30 p.m., Wright climbed aboard the aircraft, launched it down its starting monorail, and took off.

He circled the field for a few minutes, then landed. Satisfied with the aircraft's performance, he asked Lahm to join him, and they flew to an altitude of about 150 feet, returning after five minutes. Wright then took Humphreys up.

"And it was with these simple activities ... that the College Park Aviation School was opened," states the Air Force Historical Foundation.

Photo via College Park Aviation Museum

An aerial photograph of College Park Airport taken in 1929, when it was used to test radio navigation aids. The airport's remote location was part of its original appeal.

Throughout October, Wilbur Wright and his pupils flew nearly every day except Sundays. Flights typically began before 7 a.m., or in late afternoon, after the day's breezes had died down. The flights were short, with the student pilots taking over for the calmer portions.

On Oct. 19, five minutes into a flight and with Lahm at the controls, the engine suddenly died. Wright took over, and calmly guided the airplane to a graceful landing. Thinking the problem might be a balky magneto, Wright tinkered with the engine for hours, but could find nothing wrong. Finally, at the end of the day, he opened the gas tank and discovered that the airplane had simply run out of fuel.

A Popular Spectacle

"The joke is on me, boys," he said, according to news reports of the era. "The bird won't fly without gasoline."

Crowds continued to be a problem. On at least one occasion, spectators dashing across the field during landing came within a hair of causing a terrible accident. Given the novelty of flight, reporters were in constant attendance. By Oct. 26, the day on which both Lahm and Humphreys were scheduled to solo, hundreds of people were gathered around the edges of the field.

Humphreys went first, simply because it was his turn. At 8:15 a.m., he took off, circled the area, and made a perfect landing, hurdling a tree stump as he did so.

"I suppose I ought to congratulate you, but it is such a matter of course," said Wright.

Lahm followed, flying for about 12 minutes. Neither pilot rose above 30 feet, but it was the beginning of independent US military flight.

As winter approached, the flying year was drawing to a close. Foulois returned from Paris, and also received some instruction, but did not have enough time to solo. The Wright contract with the government was completed, but Wilbur made two last flights on Nov. 2. That would be the last time he ever flew in public, and among the last times he would ever pilot an aircraft at all. In subsequent years, Wilbur Wright spent much of his time fighting to protect the brothers' patents. He died of typhoid in 1912.

After November 1909, military flight did not return to College Park for two years. Key members of Congress had been skeptical about the military utility of flight, and of the Army's ability to manage the development of flying machines. In 1910, Congress denied the Army's request for an additional $200,000 for aircraft operations.

But by the fall of 1910, the Army's Wright aircraft, Signal Corps No. 1, was worn and weary. Flight technology had advanced. And on March 3, 1911, Congress appropriated $125,000 for Army aviation.

The Army bought five new aircraft—and sent their original machine back to the Wrights, for refurbishment and eventual display at the Smithsonian.

Now the Signal Corps needed a site for a larger aviation school. College Park was nearby and ready. It was another historic moment for military aviation.

"At the time, they were really organizing what they were planning to do with airplanes, and where they would fit into the military," says Kasper of the aviation museum.

This time, the Army leased a larger plot of land—200 acres along the B&O line. Four hangars housed the Army's new

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Photo via College Park Aviation Museum

A parasol wing aircraft on the runway in 1960. The field is still open for civilian general aviation, but security concerns since 9/11 have slowed traffic considerably.

airplanes—two Wright Bs, two Curtiss types, and one Burgess-Wright. They were maintained by enlisted mechanics in a detachment which grew to 39 personnel by the end of the year.

Among the first group of instructors was a young second lieutenant named Hap Arnold.

The Curtiss aircraft were not powerful enough to carry more than one person, so students learned via the "grass-hop" method. Students first taxied the aircraft from one end of the field to the other. Then, using increasing amounts of power, they hopped up for quick flights, learning takeoffs, landings, and turns in the process.

The Wright aircraft had dual controls and more power. Instructors took pilots aloft, letting them get the feel of the controls and making wide turns until they were deemed ready for a solo.

When throttled back for landing, the Wright engines leaked gas, which was caught by a metal pan under the wing.

"Since in about 50 percent of the landings the dripping gas caught on fire, ground crews or 'volunteers' had to stand by with firefighting equipment," notes an Office of Air Force History study.

By this time, officers were billeted in Washington. They had to arise early to make it to College Park for 6:30 a.m. takeoffs. In the long summer twilight, evening flights could stretch to 8:30 p.m.

In the fall of 1911, the Army conducted a number of experiments at College Park that produced aviation firsts. Pilots photographed the airport from an altitude of 600 feet, inaugurating the era of aerial photography. They tried out methods of signaling via puffs of smoke discharged by compressed air, in an early test of what became skywriting. They dropped practice bombs into on-base goldfish ponds.

When the school packed up and moved to Augusta, Ga., for winter training, a number of civilian flight organizations and nascent aeroplane companies moved onto the field. The civilians never left, and College Park Airport was born.

Military flying resumed there in April 1912. On June 1, Arnold set a new altitude record of 6,450 feet. A week later, the Army made its first try at firing a machine gun from an aircraft: Two pilots took off in a Wright B with a low-recoil Lewis automatic weapon resting on the airplane's crossbar footrest. They flew over a 6 foot by 7 foot cheesecloth target three times, at an altitude of 250 feet. They made five hits. The next day, with a better target, they did even better, with 14 hits out of 44 shots fired.

Imaginery Air Battles

"Though these experiments made good newspaper copy, a General Staff officer made it clear to reporters that airplanes were suitable only for reconnaissance and that thoughts of air battles were purely the produce of the young fliers' 'fertile imaginations,'" says the Office of Air Force History.

By November, the Signal Corps had eight aircraft of various types at College Park, along with one civilian mechanic, 39 enlisted men, and 14 flying officers. With winter weather approaching, the school was split, with the Curtiss aircraft, pilots, and mechanics sent to San Diego to work with Glenn H. Curtiss at his school. The Wright Bs, with their personnel, returned to Augusta.

The next spring, Congress considered legislation to buy the College Park site, but the head of the Signal Corps recommended against it. The Army's lease expired on June 30, 1913.

"By 1913, the Army was out of business at College Park," says Kasper.

The College Park Airport itself continued as a thriving private air hub as the aircraft industry developed. In 1918, the Post Office Department launched air mail service from the field. In the 1920s, vertical flight pioneer Emile Berliner experimented with helicopter designs there.

In the late 1920s and early 1930s, the National Bureau of Standards used it as a field site to test new radio navigation aids.

From 1927 until 1959, the airfield was run by George Brinckerhoff, who hosted air shows and taught hundreds of civilians how to fly at his own flying school.

The Maryland-National Capital Park and Planning Commission bought the airfield in 1973, following an effort by supporters to save one of the nation's most historic aviation sites. The College Park Aviation Museum, opened in 1998, is an affiliate of the Smithsonian.

Today the 70 acres of College Park Airport and the College Park Aviation Museum often ring with the sounds of children—summer camp or school groups on organized visits. They, and adult visitors, can see a restored 1919 airmail hangar and the directional compass rose built into the field. They can visit the museum's 27,000-square-foot building, just off the runway, and view a replica of a Wright Model B, a Curtiss JN-4D Jenny, and a Berliner helicopter—a pioneering vertical flight craft flown at College Park in the 1920s.

For decades, College Park was the Washington area's primary general aviation airport, and its runway reverberated with landings and takeoffs of Cessnas, Pipers, and Ercoupes.

The runway still is in use, but traffic is "much slower" than just a few years ago, according to curator Kasper.

Sept. 11, 2001 was a fault line in the history of College Park Airport.

College Park is inside Washington's protected airspace. Pilots must now undergo a background check before they can use the airfield. Their airplanes must carry transponders, and they must receive government permission to come and go.

Ironically, an airfield once chosen for its distance from Washington is, a century later, damaged by the fact that it is now too close to the Capitol, White House, and other centers of US government power. ■

Peter Grier, a Washington editor for the Christian Science Monitor, *is a longtime defense correspondent and a contributing editor to* Air Force *Magazine. His most recent article, "Russia on the Rebound?" appeared in the August issue.*

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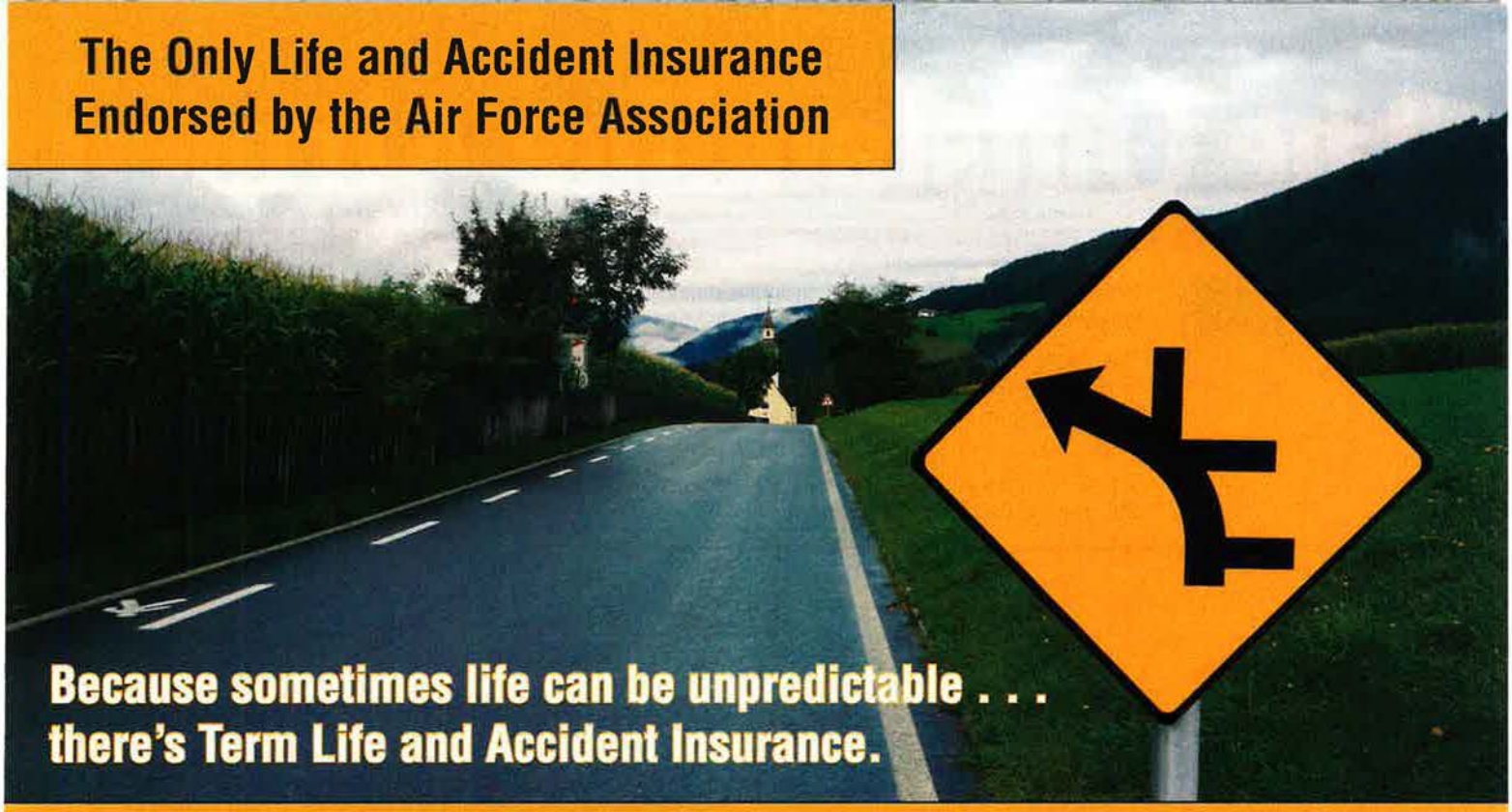

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The 12 selectees are awarded the Outstanding Airman of the Year Ribbon with the bronze service star device and wear the Outstanding Airman badge for one year.

By Tamar A . Mehuron, Associate Editor

SSgt. Johanna S. Aviles. Network Operations Center Technician, Space Communications Operations Squadron (Air Force Space Command), El Segundo, Calif.—Aided the first MQ-9 Reaper unmanned aerial vehicle flights over Afghanistan. ... Provided 48 UAV imagery reports to the Federal Emergency Management Agency, helping identify 72 California wildfires. ... Fixed chronic message system outage; wrote a technical support guide to minimize downtime. ... Relocated 250 network devices efficiently, avoiding intelligence-surveillance-reconnaissance sortie delays. ... Managed several maintenance teams installing

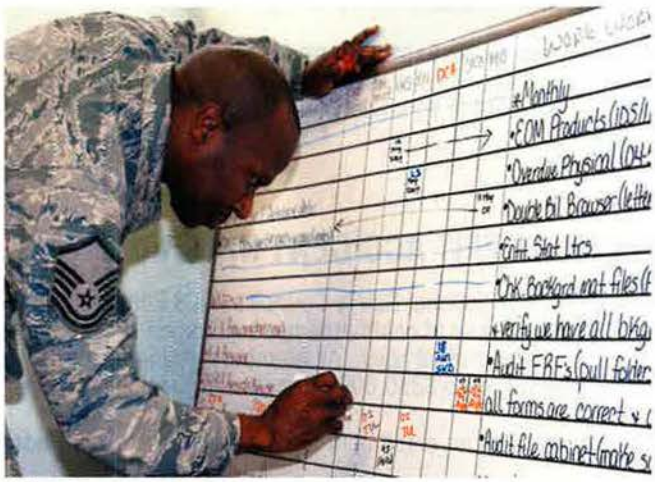
SSgt. Johanna S. Aviles

fiber optic cable and completed task eight months early. ... Spearheaded fiber installation course, instructing technicians on termination skills. ... Oversaw a $725,000 network upgrade, including leading a 12-member team whose efforts doubled MQ-1 Predator UAV armed recon/interdiction missions. ... Led team to fuse six networks into a single platform, providing battlespace situation awareness to UAV and U-2 pilots.

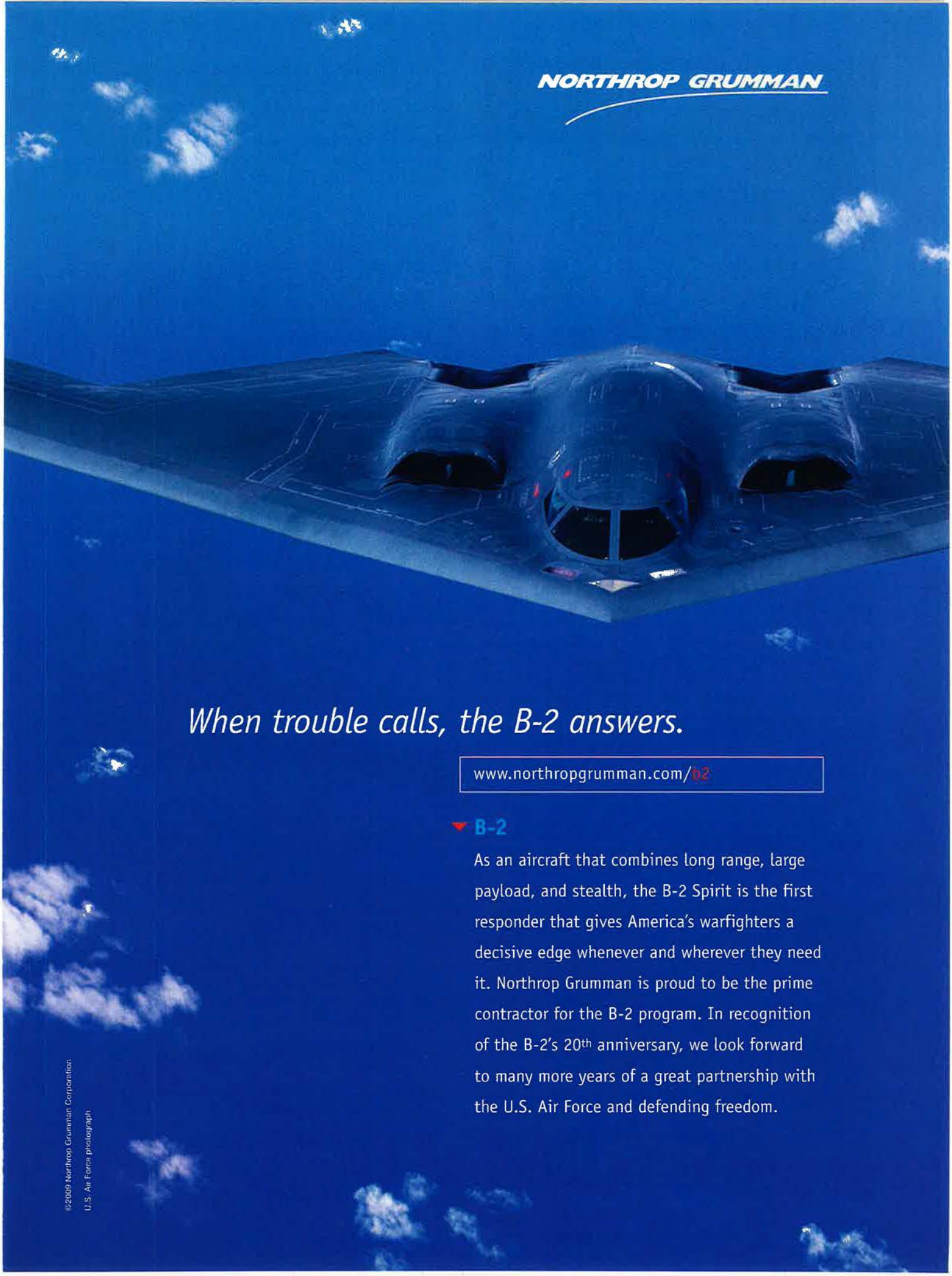
SMSgt. Mary A. Bechdel. Operations Superintendent, 13th Intelligence Squadron (Air Force Intelligence, Surveillance, and Reconnaissance Agency), Beale AFB, Calif.—Filled chief master sergeant position. ... Managed and

SMSgt. Mary A. Bechdel

trained 380 airmen in executing wartime ISR operations, guiding unit that served as eyes and ears for combat search and rescue missions and convoys. ... Reported hundreds of potential improvised explosive devices and identified an attack on convoy and called for close air support. ... Prepared 79 airmen for ISR combat operations and leadership duties. ... Led Distributed Common Ground Station



MSgt. Tyrone F. Bingham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SrA. Channel H. Bolton-Scholl

integration with ISR operations. ... Oversaw US Northern Command ISR operations, aiding California firefighters, and followed with a new ISR concept of operations to support civil disaster relief activities. ... Helped organize RQ-4 Global Hawk UAV missions supporting US Southern Command operations, including counterdrug actions. ... Integrated more than 60 Reservists into active duty ISR operations. ... Prepared three Air National Guard sites for work with U-2 and RQ-4 reconnaissance data.

MSgt. Tyrone F. Bingham. Host Aviation Resource Management Superintendent, 170th Operational Support Squadron (Air National Guard), Offutt AFB, Neb.—Maintained flight records for more than 1,700 aviators, more than the average USAF wing. ... Supported 16 Air National Guard C-130s that conducted 360 missions in Afghanistan. ... Ensured crews had up-to-date combat mission data. ... Completed more than 360 mission reports on Operation Enduring Freedom activities for the Tanker Airlift Control Center. ... Provided critical flight summary data to investigation board reviewing an OEF C-130 mishap. ... Developed continuation training plan to work around manning shortage and deployments. ... Created new procedures to track disbursements in annual flying incentive pay. ... Engineered aviation suspense tracking board that increased visibility and improved on-time mission rate. ... Devised new, streamlined aircrew member in-processing procedures.

TSgt. Manuel J. Herrera

SrA. Channel H. Bolton-Scholl. Aircraft Maintenance Technician, 446th Maintenance Squadron (Air Force Reserve Command), McChord AFB, Wash.—Provided excellent maintenance support in the aeromedical evacuation of an injured National Science Foundation scientist from Antarctica to New Zealand. ... During month-long deployment in support of Operation Deep Freeze, served as ground/flying crew chief, launching and recovering 918 passengers and 621 cargo tons. ... Deployed for six months to Sather AB, Iraq, supporting more than 16,000 aircraft missions that included moving more than 1,000 distinguished visitors and 38,000 tons of cargo. ... Identified and quickly repaired or replaced critical components, from cracked engine nose dome to faulty starter in auxiliary power unit, to ensure minimal aircraft downtime. ... Assisted with dismantle and recovery of C-130 in Baghdad. ... On deployment, helped maintain State Department L-100 and USAF C-17, recommending fix for thrust reverser fault.

MSgt. John T. Carter. Security Forces Resources, 100th Security Forces Squadron (US Air Forces in Europe), RAF Mildenhall, England—During a 210-day deployment to Iraq, halted a bomb-laden vehicle, preventing loss of life.

MSgt. John T. Carter

... Received the Joint Service Commendation Medal. ... Directed a raid on an insurgent stronghold, nabbing two terrorists and thwarting the kidnapping of an Army major. ... Led a joint sting operation and nabbed an IED-maker. ... Evacuated bunker following a mortar attack, administering lifesaving first aid. ... Set up and managed tactical security operations for brief refueling of Air Force One. ... Directed 6,000 mounted and foot patrols. ... Searched and vetted thousands of Iraqi nationals, obtaining vital intelligence. ... Resolved equipment account discrepancies. ... Funneled excess equipment to several geographically separated security forces in Britain and excess ammunition to deployed units. ... Exemplary flight chief, providing training and realistic exercises that enabled high unit quality control pass rate.

TSgt. Manuel J. Herrera. Explosive Ordnance Disposal Craftsman, 375th Civil Engineer Squadron (Air Mobility Command), Scott AFB, Ill.—Spearheaded hundreds of IED missions in Iraq and helped capture 36 terrorists. ... Led several key operations that disrupted weapons flow into Iraq and resulted in capture of 19 high-value terrorists. ... Guided recovery and disposal of nearly 5,000 IEDs

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TSgt. Benjamin P. Horton

or unexploded ordnance items, sharply reducing enemy weapons stockpile. ... Planned route clearance missions that secured thousands of miles and helped cut enemy attacks by 43 percent in six months. ... Conducted a dozen post-blast analyses, collecting evidence to counter IED attacks and help convict numerous insurgents. ... Designed/fielded IEDs training route in daily use by 400 soldiers of US Army's 10th Mountain Division. ... Led team at Secret Service request on 14-day, four-country trip by the President and 18 other VIPs. ... Updated lifesaving technique, which was disseminated throughout Southwest Asia. ... Honored as AMC Civil Engineer Military Technician of the Year; received Bronze Star Medal and Air Force Combat Action Medal.

TSgt. Benjamin P. Horton. Explosive Ordnance Disposal Craftsman, 775th Civil Engineer Squadron (Air Force Materiel Command), Hill AFB, Utah—Risked his life to save eight-man infantry unit about to enter a booby-trapped building. ... Used smoke grenades to hide his position during an ambush and cleared unexploded ordnance threat under sniper fire. ... Removed four injured troops from wreckage of an IED attack and cleared a medevac landing zone to get them out quickly. ... Secured IEDs in a collapsing courthouse, retrieving valuable documents. ... Investigated 40 blast sites and gathered evidence of enemy tactics. ... Raided 14 weapons cache sites, destroying thousands of munitions. ... Directed hundreds of road-clearing missions, destroying scores of IEDs and helping keep Iraqi supply routes open and secure. ... Led hazardous devices search team helping Secret Service during Presidential visit to New York City. ... Identified and corrected a critical flaw during a joint service Small Diameter Bomb test. ... Awarded Bronze Star Medal for heroism while deployed to Iraq.

TSgt. Marisol M. Lozada

TSgt. Jennifer S. Laufer. Chaplain Assistant, 42nd Air Base Wing (Air Education and Training Command), Maxwell AFB, Ala.—Took on the responsibilities of a master sergeant and was key to revamping the unit chaplain program and averting burnout for shorthanded staff while they maintained spiritual outreach to 70,000 military and civilian personnel and dependents. ... Served as combat spiritual leader, while deployed to Iraq, during dozens of rocket attacks, providing vital assistance to soldiers and injured troops. ... Conducted inaugural Joint Services Turkmen Mosque visit. ... Managed Kirkuk AB, Iraq, chapel, redirecting resources and creating electronic schedule program that saved man-hours. ... Identified visitation teams to contact and mentor 3,000 airmen, helping boost Kirkuk mission effectiveness. ... Created continuity procedures that enabled effective deployed changeover in hours rather than days. ... Helped initiate Air Force-wide Ministry Center funds review, identifying thousands of dollars in annual savings. ... Launched volunteer weekend assistance program, saving chaplain man-hours.

TSgt. Jennifer S. Laufer

TSgt. Marisol M. Lozada. NCOIC, Mental Health Flight, 27th Special Operations Medical Group (Air Force Special Operations Command), Cannon AFB, N.M.—Sole wing certified alcohol and drug abuse counselor. ... Created alcohol and drug abuse prevention team (ADAPT) recidivism tracking database employed across the service. ... Developed ADAPT outcome metrics process, lauded by Air Force IG. ... Revised traumatic stress response team procedures. ... Advocated unit's need for educational equipment and resources, leading to securing necessary funding. ... Enhanced fellow mental health workers' readiness skills by sharing research on War on Terror deployment cases. ... Identified and corrected discrepancies in mental health, ADAPT, and family advocacy records. ... Served as mentor to junior mental health military and civilian workers.

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MSgt. Christopher W. Pollock

... Successfully employed new traumatic stress response procedures to sustain hundreds of base personnel following a local community tragedy.

MSgt. Christopher W. Pollock. Pavements and Construction Equipment Craftsman, 18th Civil Engineer Squadron (Pacific Air Forces), Kadena AB, Japan—Led four-hour firefight in Afghanistan, killing five insurgents and wounding nine. ... Received Bronze Star Medal. ... Executed major construction projects at Kandahar, Afghanistan, and six forward operating bases (FOBs). ... Spearheaded multimillion dollar Army Materiel Command beddown in Afghanistan. ... Led reconstruction at Farah Airfield, replacing failed landing zone and enabling more than a thousand close air support missions. ... Built Romanian tactical operations center. ... Spearheaded Joint Logistics Command's troop transition and surge, providing facility for 3,000 soldiers. ... Guided Kandahar reconstruction to provide three times current capacity to maintain NATO forces. ... Opened Qalat FOB in less than a month, to enable operations along the Pakistan border. ... Restored airfield drainage system. ... Led 63-member team to provide expert maintenance of airfield and roads. ... Prepared 450 engineers for contingency operations.

SrA. Alexander W. Royal. Tactical Air Control Party, 13th Air Support Operations Squadron (Air Combat Command), Ft. Carson, Colo.—Named 2008 TACP of the Year. ... Served as dismounted TACP on several high-value individual (HVI) raids, providing security for joint terminal attack controller to direct close air support during extended action. ... Engaged in one-hour firefight, killing three enemy combatants, as JTAC called in CAS. ... Provided TACP support to US Army and coalition forces through numerous missions and firefights. ... Directed Joint STARS ground surveillance support to target areas and correlated intelligence with UAV coverage. ... Planned CAS for HVI raid, tracking movement to house and enabling target's capture. ... Assisted JTAC in 700 hours of joint CAS planning and control for scores of raids and operations. ... Modified an Army Mine-Resistant, Ambush-Protected vehicle with a Remotely Operated Video Enhanced Receiver (ROVER) for TACP operations. ... Established two battalion tactical operations centers, installing and testing TACP equipment. ... Trained 75 soldiers and special operations forces on CAS remote-video operations. ... Created battalion TACP brief for new soldiers, and instructed 56 soldiers. ... Trained Army fire support staff in UAV control operations. ... Received Army Combat Action Badge.

SrA. Alexander W. Royal

SMSgt. Jeffery E. Steagall

SMSgt. Jeffery E. Steagall. Manager, Communications and Information Inspections, Hq., Air Force Space Command (Air Force Space Command), Peterson AFB, Colo.— Led 80-member flight in providing near 100 percent network systems continuous operations in US Central Command area of responsibility. ... Conducted several and planned dozens of armed maintenance convoys. ... Directed repair of hundreds of personal computers at AOR depot, cutting repair time in half. ... Managed critical convoy communications circuit. ... Directed network use after AOR fiber optics cut crippled theater communications; kept more than 50 mission platforms operational. ... Conducted an AOR network health evaluation. ... Managed resolution to 90 service outages, rerouting critical communications to provide command and control for thousands of combat sorties. ... Led rewrite for AFSPC nuclear enterprise inspection assessments, taking charge of 13 initiatives. ... Planned and executed the first AFSPC no-notice focused inspection, identifying 20 mission-critical errors. ... Planned and implemented Air Force-directed communications squadron reorganization, completing revamp four months early. ■

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AFA Almanac

By Frances McKenney, Assistant Managing Editor

Chapters of the Year

Year	Recipient(s)
1953	San Francisco Chapter
1954	Santa Monica Area Chapter (Calif.)
1955	San Fernando Valley Chapter (Calif.)
1956	Utah State AFA
1957	H. H. Arnold Chapter (N.Y.)
1958	San Diego Chapter
1959	Cleveland Chapter
1960	San Diego Chapter
1961	Chico Chapter (Calif.)
1962	Fort Worth Chapter (Tex.)
1963	Colin P. Kelly Chapter (N.Y.)
1964	Utah State AFA
1965	Idaho State AFA
1966	New York State AFA
1967	Utah State AFA
1968	Utah State AFA
1969	*(no presentation)*
1970	Georgia State AFA
1971	Middle Georgia Chapter
1972	Utah State AFA
1973	Langley Chapter (Va.)
1974	Texas State AFA
1975	Alamo Chapter (Tex.) and San Bernardino Area Chapter (Calif.)
1976	Scott Memorial Chapter (Ill.)
1977	Thomas B. McGuire Jr. Chapter (N.J.)
1978	Thomas B. McGuire Jr. Chapter (N.J.)
1979	Brig. Gen. Robert F. Travis Chapter (Calif.)
1980	Central Oklahoma (Gerrity) Chapter
1981	Alamo Chapter (Tex.)
1982	Chicagoland-O'Hare Chapter (Ill.)
1983	Charles A. Lindbergh Chapter (Conn.)
1984	Scott Memorial Chapter (Ill.) and Colorado Springs/Lance Sijan Chapter (Colo.)
1985	Cape Canaveral Chapter (Fla.)
1986	Charles A. Lindbergh Chapter (Conn.)
1987	Carl Vinson Memorial Chapter (Ga.)
1988	Gen. David C. Jones Chapter (N.D.)
1989	Thomas B. McGuire Jr. Chapter (N.J.)
1990	Gen. E. W. Rawlings Chapter (Minn.)
1991	Paul Revere Chapter (Mass.)
1992	Central Florida Chapter and Langley Chapter (Va.)
1993	Green Valley Chapter (Ariz.)
1994	Langley Chapter (Va.)
1995	Baton Rouge Chapter (La.)
1996	Montgomery Chapter (Ala.)
1997	Central Florida Chapter
1998	Ark-La-Tex Chapter (La.)
1999	Hurlburt Chapter (Fla.)
2000	Wright Memorial Chapter (Ohio)
2001	Lance P. Sijan Chapter (Colo.)
2002	Eglin Chapter (Fla.)
2003	Hurlburt Chapter (Fla.)
2004	Carl Vinson Memorial Chapter (Ga.)
2005	Central Florida Chapter
2006	Enid Chapter (Okla.)
2007	Central Oklahoma (Gerrity) Chapter
2008	Lance P. Sijan Chapter (Colo.)
2009	Paul Revere Chapter (Mass.)

Gold Life Member Card Recipients

Awarded to members whose AFA record, production, and accomplishment on a national level have been outstanding over a period of years.

Name	Year	Card No.
Gill Robb Wilson	1957	1
Jimmy Doolittle	1959	2
Arthur C. Storz Sr.	1961	3
Julian B. Rosenthal	1962	4
Jack B. Gross	1964	5
George D. Hardy	1965	6
Jess Larson	1967	7
Robert W. Smart	1968	8
Martin M. Ostrow	1973	9
James H. Straubel	1980	10
Martin H. Harris	1988	11
Sam E. Keith Jr.	1990	12
Edward A. Stearn	1992	13
Dorothy L. Flanagan	1994	14
John O. Gray	1996	15
Jack C. Price	1997	16
Nathan H. Mazer	2002	17
John R. Alison	2004	18
Donald J. Harlin	2009	19

AFA Member of the Year Award Recipients

State names refer to recipient's home state at the time of the award.

Year	Recipient(s)	Year	Recipient(s)
1953	Julian B. Rosenthal (N.Y.)	1981	Daniel F. Callahan (Fla.)
1954	George A. Anderl (Ill.)	1982	Thomas W. Anthony (Md.)
1955	Arthur C. Storz (Neb.)	1983	Richard H. Becker (Ill.)
1956	Thos. F. Stack (Calif.)	1984	Earl D. Clark Jr. (Kan.)
1957	George D. Hardy (Md.)	1985	George H. Chabbott (Del.) and Hugh L. Enyart (Ill.)
1958	Jack B. Gross (Pa.)		
1959	Carl J. Long (Pa.)	1986	John P. E. Kruse (N.J.)
1960	O. Donald Olson (Colo.)	1987	Jack K. Westbrook (Tenn.)
1961	Robert P. Stewart (Utah)	1988	Charles G. Durazo (Va.)
1962	*(no presentation)*	1989	Oliver R. Crawford (Tex.)
1963	N. W. DeBerardinis (La.) and Joe L. Shosid (Tex.)	1990	Cecil H. Hopper (Ohio)
		1991	George M. Douglas (Colo.)
1964	Maxwell A. Kriendler (N.Y.)	1992	Jack C. Price (Utah)
1965	Milton Caniff (N.Y.)	1993	Lt. Col. James G. Clark (D.C.)
1966	William W. Spruance (Del.)	1994	William A. Lafferty (Ariz.)
1967	Sam E. Keith Jr. (Tex.)	1995	William N. Webb (Okla.)
1968	Marjorie O. Hunt (Mich.)	1996	Tommy G. Harrison (Fla.)
1969	*(no presentation)*	1997	James M. McCoy (Neb.)
1970	Lester C. Curl (Fla.)	1998	Ivan L. McKinney (La.)
1971	Paul W. Gaillard (Neb.)	1999	Jack H. Steed (Ga.)
1972	J. Raymond Bell (N.Y.) and Martin H. Harris (Fla.)	2000	Mary Anne Thompson (Va.)
		2001	Charles H. Church Jr. (Kan.)
1973	Joe Higgins (Calif.)	2002	Thomas J. Kemp (Tex.)
1974	Howard T. Markey (D.C.)	2003	W. Ron Goerges (Ohio)
1975	Martin M. Ostrow (Calif.)	2004	Doyle E. Larson (Minn.)
1976	Victor R. Kregel (Tex.)	2005	Charles A. Nelson (S.D.)
1977	Edward A. Stearn (Calif.)	2006	Craig E. Allen (Utah)
1978	William J. Demas (N.J.)	2007	William D. Croom Jr. (Tex.)
1979	Alexander C. Field Jr. (Ill.)	2008	John J. Politi (Tex.)
1980	David C. Noerr (Calif.)	2009	David R. Cummock (Fla.)

H. H. Arnold Award Recipients

Until 1986, AFA's highest aerospace award was the H. H. Arnold Award. Named for the World War II leader of the Army Air Forces, it was presented annually in recognition of the most outstanding contributions in the field of aerospace activity. In 1986, the Arnold Award was redesignated AFA's highest honor to a member of the armed forces in the field of national security. It continues to be presented annually.

1948	W. Stuart Symington, Secretary of the Air Force
1949	Maj. Gen. William H. Tunner and the men of the Berlin Airlift
1950	Airmen of the United Nations in the Far East
1951	Gen. Curtis E. LeMay and the personnel of Strategic Air Command
1952	Sens. Lyndon B. Johnson and Joseph C. O'Mahoney
1953	Gen. Hoyt S. Vandenberg, former Chief of Staff, USAF
1954	John Foster Dulles, Secretary of State
1955	Gen. Nathan F. Twining, Chief of Staff, USAF
1956	Sen. W. Stuart Symington
1957	Edward P. Curtis, special assistant to the President
1958	Maj. Gen. Bernard A. Schriever, Cmdr., Ballistic Missile Div., ARDC
1959	Gen. Thomas S. Power, CINC, SAC
1960	Gen. Thomas D. White, Chief of Staff, USAF
1961	Lyle S. Garlock, Assistant Secretary of the Air Force
1962	A. C. Dickieson and John R. Pierce, Bell Telephone Laboratories
1963	The 363rd Tactical Recon. Wing and the 4080th Strategic Wing
1964	Gen. Curtis E. LeMay, Chief of Staff, USAF
1965	The 2nd Air Division, PACAF
1966	The 8th, 12th, 355th, 366th, and 388th Tactical Fighter Wings and the 432nd and 460th TRWs
1967	Gen. William W. Momyer, Cmdr., 7th Air Force, PACAF
1968	Col. Frank Borman, USAF; Capt. James Lovell, USN; and Lt. Col. William Anders, USAF, Apollo 8 crew
1969	*(No presentation)*
1970	Apollo 11 team (J.L. Atwood; Lt. Gen. S. C. Phillips, USAF; and astronauts Neil Armstrong and USAF Cols. Buzz Aldrin and Michael Collins)
1971	John S. Foster Jr., Dir. of Defense Research and Engineering
1972	Air units of the Allied Forces in Southeast Asia (Air Force, Navy, Army, Marine Corps, and the Vietnamese Air Force)
1973	Gen. John D. Ryan (Ret.), former Chief of Staff, USAF
1974	Gen. George S. Brown, USAF, Chm., Joint Chiefs of Staff
1975	James R. Schlesinger, Secretary of Defense
1976	Sen. Barry M. Goldwater
1977	Sen. Howard W. Cannon
1978	Gen. Alexander M. Haig Jr., USA, Supreme Allied Commander, Europe
1979	Sen. John C. Stennis
1980	Gen. Richard H. Ellis, USAF, CINC, SAC
1981	Gen. David C. Jones, USAF, Chm., Joint Chiefs of Staff
1982	Gen. Lew Allen Jr. (Ret.), former Chief of Staff, USAF
1983	Ronald W. Reagan, President of the United States
1984	The President's Commission on Strategic Forces (the Scowcroft Commission)
1985	Gen. Bernard W. Rogers, USA, SACEUR
1986	Gen. Charles A. Gabriel (Ret.), former Chief of Staff, USAF
1987	Adm. William J. Crowe Jr., USN, Chm., Joint Chiefs of Staff
1988	Men and women of the Ground-Launched Cruise Missile team
1989	Gen. Larry D. Welch, Chief of Staff, USAF
1990	Gen. John T. Chain, CINC, SAC
1991	Lt. Gen. Charles A. Horner, Cmdr., CENTCOM Air Forces and 9th Air Force
1992	Gen. Colin L. Powell, USA, Chm., Joint Chiefs of Staff
1993	Gen. Merrill A. McPeak, Chief of Staff, USAF
1994	Gen. John Michael Loh, Cmdr., Air Combat Command
1995	World War II Army Air Forces veterans
1996	Gen. Ronald R. Fogleman, Chief of Staff, USAF
1997	Men and women of the United States Air Force
1998	Gen. Richard E. Hawley, Cmdr., ACC
1999	Lt. Gen. Michael C. Short, Cmdr., Allied Air Forces Southern Europe
2000	Gen. Michael E. Ryan, Chief of Staff, USAF
2001	Gen. Joseph W. Ralston, CINC, EUCOM
2002	Gen. Richard B. Myers, USAF, Chm., Joint Chiefs of Staff
2003	Lt. Gen. T. Michael Moseley, Cmdr., air component, CENTCOM, and 9th Air Force
2004	Gen. John P. Jumper, Chief of Staff, USAF
2005	Gen. Gregory S. Martin, Cmdr., AFMC
2006	Gen. Lance W. Lord, Cmdr., AFSPC
2007	Gen. Ronald E. Keys, Cmdr., ACC
2008	Gen. Bruce Carlson, Cmdr., AFMC
2009	Gen. John D. W. Corley, Cmdr., ACC

John R. Alison Award Recipients

Established in 1992, the John R. Alison Award is AFA's highest honor for industrial leadership.

1992	Norman R. Augustine, Chairman, Martin Marietta
1993	Daniel M. Tellep, Chm. and CEO, Lockheed
1994	Kent Kresa, CEO, Northrop Grumman
1995	C. Michael Armstrong, Chm. and CEO, Hughes Aircraft
1996	Harry Stonecipher, Pres. and CEO, McDonnell Douglas
1997	Dennis J. Picard, Chm. and CEO, Raytheon
1998	Philip M. Condit, Chm. and CEO, Boeing
1999	Sam B. Williams, Chm. and CEO, Williams International
2000	Simon Ramo and Dean E. Wooldridge, missile pioneers
2001	George David, Chm. and CEO, United Technologies
2002	Sydney Gillibrand, Chm., AMEC; and Jerry Morgensen, Pres. and CEO, Hensel Phelps Construction
2003	Joint Direct Attack Munition Industry Team, Boeing
2004	Thomas J. Cassidy Jr., Pres. and CEO, General Atomics Aeronautical Systems
2005	Richard Branson, Chm., Virgin Atlantic Airways and Virgin Galactic
2006	Ronald D. Sugar, Chm. and CEO, Northrop Grumman
2007	Boeing and Lockheed Martin
2008	Bell Boeing CV-22 Team, Bell Helicopter Textron, and Boeing
2009	General Atomics Aeronautical Systems Inc.

W. Stuart Symington Award Recipients

Since 1986, AFA's highest honor to a civilian in the field of national security has been the W. Stuart Symington Award. The award, presented annually, is named for the first Secretary of the Air Force.

1986	Caspar W. Weinberger, Secretary of Defense
1987	Edward C. Aldridge Jr., Secretary of the Air Force
1988	George P. Schultz, Secretary of State
1989	Ronald W. Reagan, former President of the United States
1990	John J. Welch, Asst. SECAF (Acquisition)
1991	George Bush, President of the United States
1992	Donald B. Rice, Secretary of the Air Force
1993	Sen. John McCain (R-Ariz.)
1994	Rep. Ike Skelton (D-Mo.)
1995	Sheila E. Widnall, Secretary of the Air Force
1996	Sen. Ted Stevens (R-Alaska)
1997	William Perry, former Secretary of Defense
1998	Rep. Saxby Chambliss (R-Ga.) and Rep. Norman D. Dicks (D-Wash.)
1999	F. Whitten Peters, Secretary of the Air Force
2000	Rep. Floyd Spence (R-S.C.)
2001	Sen. Michael Enzi (R-Wyo.) and Rep. Cliff Stearns (R-Fla.)
2002	Rep. James V. Hansen (R-Utah)
2003	James G. Roche, Secretary of the Air Force
2004	Peter B. Teets, Undersecretary of the Air Force
2005	Rep. Duncan Hunter (R-Calif.)
2007	Michael W. Wynne, Secretary of the Air Force
2008	Gen. Barry R. McCaffrey, USA (Ret.)
2009	Sen. Orrin G. Hatch (R-Utah)

AFA Lifetime Achievement Award Recipients

First presented in 2003, the award recognizes a lifetime of work in the advancement of aerospace.

2003	Maj. Gen. John R. Alison, USAF (Ret.); Sen. John H. Glenn Jr.; Maj. Gen. Jeanne M. Holm, USAF (Ret.); Col. Charles E. McGee, USAF (Ret.); and Gen. Bernard A. Schriever, USAF (Ret.)
2004	Gen. Russell E. Dougherty, USAF (Ret.), and Florene Miller Watson
2005	Sen. Daniel K. Inouye, William J. Perry, and Patty Wagstaff
2007	CMSAF Paul W. Airey, USAF (Ret.)
2008	Col. George E. Day, USAF (Ret.); Gen. David C. Jones, USAF (Ret.); and Harold Brown
2009	Doolittle Raiders, Tuskegee Airmen, and James R. Schlesinger

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President, 1946-47
Chairman, 1947-49

Edward P. Curtis
Chairman, 1946-47

Thomas G. Lanphier Jr.
President, 1947-48
Chairman, 1951-52

C. R. Smith
President, 1948-49
Chairman, 1949-50

Robert S. Johnson
President, 1949-51

Carl A. Spaatz
Chairman, 1950-51

Harold C. Stuart
President, 1951-52
Chairman, 1952-53

Arthur F. Kelly
President, 1952-53
Chairman, 1953-54

George C. Kenney
President, 1953-54
Chairman, 1954-55

John R. Alison
President, 1954-55
Chairman, 1955-56

Gill Robb Wilson
President, 1955-56
Chairman, 1956-57

John P. Henebry
President, 1956-57
Chairman, 1957-58

Peter J. Schenk
President, 1957-59

James M. Trail
Chairman, 1958-59

Howard T. Markey
President, 1959-60
Chairman, 1960-61

Julian B. Rosenthal
Chairman, 1959-60

Thos. F. Stack
President, 1960-61
Chairman, 1961-62

Joe Foss
President, 1961-62
Chairman, 1962-63

John B. Montgomery
President, 1962-63

W. Randolph Lovelace II
President, 1963-64
Chairman, 1964-65

Jack B. Gross
Chairman, 1963-64

Jess Larson
President, 1964-67
Chairman, 1967-71

Robert W. Smart
President, 1967-69

George D. Hardy
President, 1969-71
Chairman, 1966-67
Chairman, 1971-72

Martin M. Ostrow
President, 1971-73
Chairman, 1973-75

Joe L. Shosid
President, 1973-75
Chairman, 1972-73
Chairman, 1975-76

George M. Douglas
President, 1975-77
Chairman, 1977-79

Gerald V. Hasler
President, 1977-79
Chairman, 1976-77

Victor R. Kregel
President, 1979-81
Chairman, 1981-82

Daniel F. Callahan
Chairman, 1979-81

John G. Brosky
President, 1981-82
Chairman, 1982-84

David L. Blankenship
President, 1982-84
Chairman, 1984-85

Edward A. Stearn
Chairman, 1985-86

Martin H. Harris
President, 1984-86
Chairman, 1986-88

Sam E. Keith Jr.
President, 1986-88
Chairman, 1988-90

Jack C. Price
President, 1988-90
Chairman, 1990-92

Oliver R. Crawford
President, 1990-92
Chairman, 1992-94

James M. McCoy
President, 1992-94
Chairman, 1994-96

Gene Smith
President, 1994-96
Chairman, 1996-98

Doyle E. Larson
President, 1996-98
Chairman, 1998-2000

Thomas J. McKee
President, 1998-2000
Chairman, 2000-02

John J. Politi
President, 2000-02
Chairman, 2002-04

AFA Chairmen of the Board and National Presidents (cont.)

Stephen P. Condon
President, 2002-04
Chairman, 2004-06

Robert E. Largent
President, 2004-06[a]
Chairman, 2006-08[b]

Joseph E. Sutter
Chairman, 2008-

[a] The office of National President, an elected position, was disestablished in 2006.
[b] AFA's Chairman of the Board also serves as Chairman of both AFA affiliates, the AFA Veteran Benefits Association and the Air Force Memorial Foundation.
[c] The position of Executive Director was replaced in 2006 by President-CEO.

Vice Chairmen for Field Operations

Joseph E. Sutter	2006-08
James R. Lauducci	2008-

Vice Chairmen for Aerospace Education

L. Boyd Anderson	2006-07
S. Sanford Schlitt	2007-

AFA National Treasurers

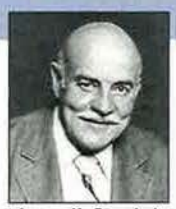
W. Deering Howe	1946-47
G. Warfield Hobbs	1947-49
Benjamin Brinton	1949-52
George H. Haddock	1952-53
Samuel M. Hecht	1953-57
Jack B. Gross	1957-62
Paul S. Zuckerman	1962-66
Jack B. Gross	1966-81
George H. Chabbott	1981-87
William N. Webb	1987-95
Charles H. Church Jr.	1995-2000
Charles A. Nelson	2000-05
Steven R. Lundgren	2005-

AFA National Secretaries

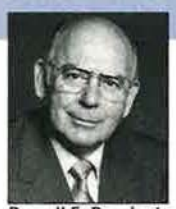
Sol A. Rosenblatt	1946-47
Julian B. Rosenthal	1947-59
George D. Hardy	1959-66
Joseph L. Hodges	1966-68
Glenn D. Mishler	1968-70
Nathan H. Mazer	1970-72
Martin H. Harris	1972-76
Jack C. Price	1976-79
Earl D. Clark Jr.	1979-82
Sherman W. Wilkins	1982-85
A. A. "Bud" West	1985-87
Thomas J. McKee	1987-90
Thomas W. Henderson	1990-91
Mary Ann Seibel	1991-94
Mary Anne Thompson	1994-97
William D. Croom Jr.	1997-2000
Daniel C. Hendrickson	2000-03
Thomas J. Kemp	2003-06
Judy K. Church	2006-

AFA Executive Directors/President-CEOs

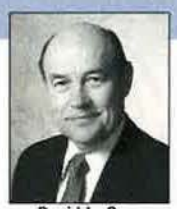
Willis S. Fitch
Executive Director
1946-47



James H. Straubel
Executive Director
1948-80



Russell E. Dougherty
Executive Director
1980-86



David L. Gray
Executive Director
1986-87

John O. Gray
Executive Director
1987-88

Charles L. Donnelly Jr.
Executive Director
1988-89

John O. Gray
Executive Director
1989-90

Monroe W. Hatch Jr.
Executive Director
1990-95

John A. Shaud
Executive Director
1995-2002

Donald L. Peterson
Executive Director, 2002-06[c]
President-CEO, 2006-07

Michael M. Dunn
President-CEO
2007-

The Twelve Founders

John S. Allard, Bronxville, N.Y.
Everett R. Cook, Memphis, Tenn.
Edward P. Curtis, Rochester, N.Y.
Jimmy Doolittle, Los Angeles
W. Deering Howe, New York
Rufus Rand, Sarasota, Fla.
Sol A. Rosenblatt, New York
Julian B. Rosenthal, New York
James M. Stewart, Beverly Hills, Calif.
Lowell P. Weicker, New York
Cornelius Vanderbilt Whitney, New York
John Hay Whitney, New York

AFA's First National Officers and Board of Directors

This panel of officers and directors acted temporarily until a representative group was democratically elected by membership at the first national convention, in September 1947.

OFFICERS

President	Jimmy Doolittle
First Vice President	Edward P. Curtis
Second Vice President	Meryll Frost
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Secretary	Sol A. Rosenblatt
Assistant Secretary	Julian B. Rosenthal
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Cornelius Vanderbilt Whitney
John Hay Whitney

Dottie Flanagan Staff Award of the Year

A donation from the late Jack B. Gross, national director emeritus, enables AFA to honor staff members each quarter. Those members become eligible for the staff award of the year.

1992	Doreatha Major
1993	Jancy Bell
1994	Gilbert Burgess
1995	David Huynh
1996	Sherry Coombs
1997	Katherine DuGarm
1998	Suzann Chapman
1999	Frances McKenney
2000	Ed Cook
2001	Katie Doyle
2002	Jeneathia Wright
2003	Jim Brown
2004	Pearlie Draughn
2005	Ursula Smith
2006	Susan Rubel
2007	Ed Cook
2008	Michael Davis

Aerospace Education Foundation Chairmen of the Board

W. Randolph Lovelace II	1963-64
Laurence S. Kuter	1964-66
Walter J. Hesse	1966-69
J. Gilbert Nettleton Jr.	1969-73
George D. Hardy	1973-75
Barry M. Goldwater	1975-86
George D. Hardy	1986-89
James M. Keck	1989-94
Walter E. Scott	1994-96
Thomas J. McKee	1996-98
Michael J. Dugan	1998-2000
Jack C. Price	2000-02
Richard B. Goetze Jr.	2002-03
L. Boyd Anderson	2003-06*

Aerospace Education Foundation Presidents

John B. Montgomery	1963-64
Lindley J. Stiles	1964-66
B. Frank Brown	1966-67
Leon M. Lessinger	1967-68
L. V. Rasmussen	1968-71
Leon M. Lessinger	1971-73
Wayne O. Reed	1973-74
William L. Ramsey	1975-81
Don C. Garrison	1981-84
George D. Hardy	1984-86
Eleanor P. Wynne	1986-87
James M. Keck	1988-89
Gerald V. Hasler	1989-94
Thomas J. McKee	1994-96
Walter E. Scott	1996-98
Jack C. Price	1998-2000
Richard B. Goetze Jr.	2000-02
L. Boyd Anderson	2002-03
Mary Anne Thompson	2003-06*

* On April 1, 2006, the Air Force Association and the Aerospace Education Foundation combined their activities under the title AFA. L. Boyd Anderson, the last AEF Chairman, became Vice Chairman of AFA for a transitional period.

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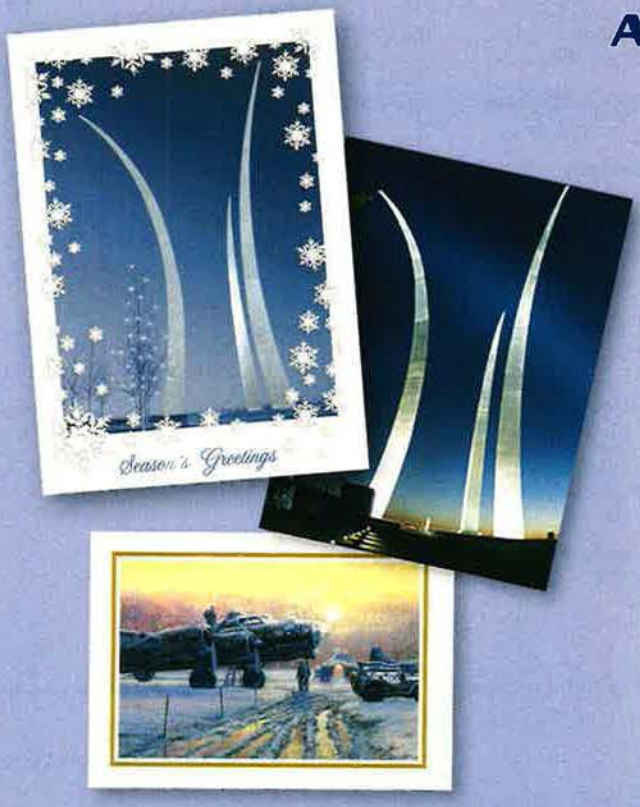

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AFA's Regions, States, and Chapters

These figures indicate the number of affiliated members as of June 30, 2009. Listed below the name of each region is the region president.

CENTRAL EAST REGION 11,161
Mason S. Botts

Delaware 557
Brig. Gen. Bill Spruance 139
Delaware Galaxy 418

District of Columbia 510
Nation's Capital 510

Maryland 2,145
Baltimore* 682
Central Maryland 381
Thomas W. Anthony 1,082

Virginia 7,646
Danville 50
Donald W. Steele Sr. Memorial 3,087
Gen. Charles A. Gabriel 1,254
Langley 1,404
Leigh Wade 126
Northern Shenandoah Valley 262
Richmond 597
Roanoke 325
Tidewater 335
William A. Jones III 206

West Virginia 303
Brig. Gen. Pete Everest 52
Chuck Yeager 251

FAR WEST REGION 11,054
Wayne R. Kauffman

California 10,308
Bob Hope 817
Brig. Gen. Robert F. Travis 719
C. Farinha Gold Rush 1,318
Charles Hudson 96
David J. Price/Beale 394
Fresno* 317
Gen. B. A. Schriever Los Angeles 615
General Doolittle Los Angeles Area* 1,106
Golden Gate* 573
High Desert 183
Maj. Gen. Charles I. Bennett Jr. 292
Monterey Bay Area 204
Orange County/Gen. Curtis E. LeMay 689
Palm Springs 394
Robert H. Goddard 571
San Diego 740
San Gabriel Valley 317
Tennessee Ernie Ford 537
William J. "Pete" Knight 426

Hawaii 746
Hawaii* 746

FLORIDA REGION 10,049
John T. Brock

Florida 10,049
Brig. Gen. James R. McCarthy 391
Cape Canaveral 1,074
Central Florida 1,418
Col. H. M. "Bud" West 318
Col. Loren D. Evenson 447
Eglin 1,327
Falcon 499
Florida Highlands 308
Gen. Nathan F. Twining 628
Gold Coast 680
Hurlburt 856
Jerry Waterman 1,125
John W. DeMilly Jr. 205
Miami 318
Red Tail Memorial 455

GREAT LAKES REGION 7,658
Ronald E. Thompson

Indiana 1,510
Central Indiana 434
Columbus-Bakalar 104
Fort Wayne 236
Grissom Memorial 288
Lawrence D. Bell Museum 212
Southern Indiana 236

Kentucky 684
Gen. Russell E. Dougherty 417
Lexington 267

Michigan 1,424
Battle Creek 102
Kalamazoo 139
Lake Superior Northland 139
Lloyd R. Leavitt Jr. 236
Mount Clemens 808

Ohio 4,040
Capt. Eddie Rickenbacker Memorial* 604
Frank P. Lahm 474
Gen. Joseph W. Ralston 289
North Coast* 264
Steel Valley 169
Wright Memorial* 2,240

MIDWEST REGION 3,065
Frank J. Gustine

Illinois 2,651
Chicagoland-O'Hare 1,075
Heart of Illinois 193
Land of Lincoln 318
Scott Memorial 1,065

Iowa 696
Fort Dodge 64
Gen. Charles A. Horner 266
Northeast Iowa 219
Richard D. Kisling 147

Kansas 718
Contrails 56
Lt. Erwin R. Bleckley 452
Maj. Gen. Edward R. Fry 210

Missouri 1,555
Earl D. Clark Jr. 279
Harry S. Truman 575
Spirit of St. Louis 701

Nebraska 1,455
Ak-Sar-Ben 1,180
Lincoln 265

NEW ENGLAND REGION 3,660
Ronald M. Adams

Connecticut 736
Flying Yankees/Gen. George C. Kenney 465
Lindbergh/Sikorsky 271

Massachusetts 1,755
Minuteman 303
Otis 256
Paul Revere 753
Pioneer Valley 273
Worcester* 170

New Hampshire 708
Brig. Gen. Harrison R. Thyng 708

Rhode Island 264
Metro Rhode Island 220
Newport Blue & Gold 44

Vermont 197
Green Mountain 197

NORTH CENTRAL REGION 3,058
Ronald W. Mielke

Minnesota 1,125
Gen. E. W. Rawlings 900
Richard I. Bong 225

Montana 278
Big Sky 278

North Dakota 462
Gen. David C. Jones 207
Happy Hooligan 136
Red River Valley 119

South Dakota 466
Dacotah 236
Rushmore 230

Wisconsin 727
Billy Mitchell 727

NORTHEAST REGION 6,117
Robert Nunamann

New Jersey 1,569
Brig. Gen. Frederick W. Castle 138
Hangar One 134
Highpoint 117
Mercer County 162
Sal Capriglione 251
Shooting Star 231
Thomas B. McGuire Jr. 536

New York 2,034
Albany-Hudson Valley* 349
Chautauqua 60
Gen. Carl A. "Tooey" Spaatz 187
Genesee Valley 227
Iron Gate 141
L. D. Bell-Niagara Frontier 317
Long Island 753

Pennsylvania 2,514
Altoona 62
Eagle 46
Greater Pittsburgh* 297
Joe Walker-Mon Valley 123
Lehigh Valley 231
Liberty Bell 638
Lt. Col. B. D. "Buzz" Wagner 114
Mifflin County* 98
Olmsted 287
Pocono Northeast 190
Total Force 165
York-Lancaster 263

NORTHWEST REGION 4,127
I. Fred Rosenfelder

Alaska 797
Edward J. Monaghan 559
Fairbanks Midnight Sun 238

Idaho 121
Snake River Valley 121

Oregon 1,102
Bill Harris 298
Columbia Gorge* 804

Washington 2,807
Greater Seattle 957
Inland Empire 646
McChord 1,204

ROCKY MOUNTAIN REGION 6,181
Joan Sell

Colorado 4,466
Gen. Robert E. Huyser 131
Lance P. Sijan 2,638
Mel Harmon 142
Mile High 1,555

Utah 1,343
Northern Utah 569
Salt Lake 367
Ute-Rocky Mountain 407

Wyoming 372
Cheyenne Cowboy 372

SOUTH CENTRAL REGION 6,813
Mark J. Dierlam

Alabama 2,134
Birmingham 380
Montgomery 1,375
Tennessee Valley 379

Arkansas 917
David D. Terry Jr. 697
Lewis E. Lyle 220

Louisiana 1,053
Ark-La-Tex 697
Maj. Gen. Oris B. Johnson 356

Mississippi 908
Golden Triangle 370
John C. Stennis 375
Meridian 163

*These chapters were chartered prior to Dec. 31, 1948, and are considerec original charter chapters; the North Coast Chapter of Ohio was formerly the Cleveland Chapter; and the Columbia Gorge Chapter of Oregon was formerly the Portland Chapter.

Tennessee	**1,801**
Chattanooga	131
Everett R. Cook	382
Gen. Bruce K. Holloway	655
H. H. Arnold Memorial	152
Maj. Gen. Dan F. Callahan	481
SOUTHEAST REGION	**7,286**
Donald R. Michels	
Georgia	**3,332**
Carl Vinson Memorial	1,184
Dobbins	1,565
Savannah	349
South Georgia	234
North Carolina	**2,183**
Blue Ridge	409
Cape Fear	244
Kitty Hawk	75
Pope	428
Scott Berkeley	392
Tarheel	635
South Carolina	**1,771**
Charleston	510
Columbia Palmetto	388
Strom Thurmond	423
Swamp Fox	450
SOUTHWEST REGION	**6,777**
James I. Wheeler	
Arizona	**3,992**
Cochise	132
Frank Luke	2,136
Prescott/Goldwater	394
Tucson	1,330
Nevada	**1,286**
Thunderbird	1,286
New Mexico	**1,499**
Albuquerque	1,009
Fran Parker	317
Llano Estacado	173
TEXOMA REGION	**12,488**
Terry Cox	
Oklahoma	**2,347**
Altus	221
Central Oklahoma (Gerrity)	1,299
Enid	415
Tulsa	412
Texas	**10,141**
Abilene	389
Aggieland	199
Alamo	3,657
Austin	648
Concho	251
Del Rio	110
Denton	459
Fort Worth	1,645
Gen. Charles L. Donnelly Jr.	314
Ghost Squadron	111
Northeast Texas	425
San Jacinto	1,046
Seidel-AFA Dallas	887

AFA Membership

Year	Total	Life Members	Year	Total	Life Members
1946	51,243	32	1978	148,711	1,541
1947	104,750	55	1979	147,136	1,869
1948	56,464	68	1980	156,394	2,477
1949	43,801	70	1981	170,240	3,515
1950	38,948	79	1982	179,149	7,381
1951	34,393	81	1983	198,563	13,763
1952	30,716	356	1984	218,512	18,012
1953	30,392	431	1985	228,621	23,234
1954	34,486	435	1986	232,722	27,985
1955	40,812	442	1987	237,279	30,099
1956	46,250	446	1988	219,195	32,234
1957	51,328	453	1989	204,309	34,182
1958	48,026	456	1990	199,851	35,952
1959	50,538	458	1991	194,312	37,561
1960	54,923	464	1992	191,588	37,869
1961	60,506	466	1993	181,624	38,604
1962	64,336	485	1994	175,122	39,593
1963	78,034	488	1995	170,881	39,286
1964	80,295	504	1996	161,384	39,896
1965	82,464	514	1997	157,862	41,179
1966	85,013	523	1998	152,330	41,673
1967	88,995	548	1999	148,534	42,237
1968	97,959	583	2000	147,336	42,434
1969	104,886	604	2001	143,407	42,865
1970	104,878	636	2002	141,117	43,389
1971	97,639	674	2003	137,035	42,730
1972	109,776	765	2004	133,812	42,767
1973	114,894	804	2005	131,481	43,094
1974	128,995	837	2006	127,749	43,266
1975	139,168	898	2007	125,076	43,256
1976	148,202	975	2008	123,304	43,557
1977	155,850	1,218	2009	120,507	43,782

AFA's Overseas Chapters

CHAPTER	LOCATION
	United States Air Forces in Europe (USAFE)
Charlemagne	Geilenkirchen, Germany
Dolomiti	Aviano AB, Italy
Lufbery-Campbell	Ramstein AB, Germany
Spangdahlem	Spangdahlem AB, Germany
United Kingdom	Lakenheath, UK
	Pacific Air Forces (PACAF)
Keystone	Kadena AB, Japan
MiG Alley	Osan AB, South Korea
Tokyo	Tokyo, Japan
	Supreme Headquarters Allied Powers Europe (SHAPE)
Gen. Lauris G. Norstad	Mons, Belgium

Profiles of AFA Membership

As of June 2009 (Total 120,507)

44% One-year members
19% Three-year members
36% Life members

15% Active duty military
52% Retired military
18% Former service
5% Guard and Reserve
5% No military service
3% Cadet
2% Spouse/widow(er)

Of AFA's service members:

72% are officers
28% are enlisted

Of AFA's retired military members:

70% are retired officers
30% are retired enlisted

AFA National Report

natrep@afa.org

By Frances McKenney, Assistant Managing Editor

Three-in-One Expo in Ohio

Air Force Association Chairman of the Board Joseph E. Sutter attended the inaugural US Air, Trade, and Technology Expo in Dayton, Ohio, in July.

AFA Ohio—led by State President John W. McCance of the **Wright Memorial Chapter**—hosted the six-day event with Dayton Defense, a group of area defense contractors.

The expo had its origins in a 2003 study that recommended focusing on second- and third-tier aerospace industry companies and using a one-two-three combination—technology conference, trade show, and air show. The aviation heritage of Dayton, as hometown of the Wright brothers, and the presence of Wright-Patterson Air Force Base, made it a logical location for this three-part endeavor.

US Rep. Michael R. Turner (R-Ohio) backed the expo and personally challenged McCance to carry it out, the AFA Ohio leader said.

AFA Ohio handled trade show operations and was liaison with senior Air Force leaders, while Dayton Defense took the lead for the tech summit. The annual Vectren Dayton Air Show was the third component.

The tech summit covered six main topics, including advanced manufacturing, sensors, and UAVs. Key presenters were Gen. Donald J. Hoffman, head of Air Force Materiel Command, and Lt. Gen. Ted F. Bowlds, Electronic Systems Center commander. US Rep. Howard P. McKeon (R-Calif.), the House Armed Services Committee ranking member, joined Lt. Gen. Larry D. James, the 14th Air Force commander, for a panel discussion.

Some 1,400 people attended the expo. The two-day air show, featuring the Thunderbirds, brought out 80,000 visitors.

At the US Air, Trade, and Technology Expo in Ohio, AFA Board Chairman Joe Sutter (standing) helps teachers with a model rocket project at an AFA-sponsored aerospace education workshop. Some of the expo proceeds funded AFA fellowships.

Truest Blue Tennessee Send-off

In Tennessee, the **Gen. Bruce K. Holloway Chapter** President, James N. Mungenast, and Treasurer Pauline K. Morrisey attended the final graduation ceremony for the Academy of Military Science at the I. G. Brown Training and Education Center.

The academy, located at McGhee Tyson Arpt., Tenn., had commissioned some 14,500 Air National Guard officers over the past 38 years. It moved to Maxwell AFB, Ala., this past July to partner with the Air Force's Officer Training School.

As part of the final graduation, Mungenast and Morrisey presented an AFA Academic Achievement Award to 2nd Lt. David B. Hopkins, one of the 94 members of Class O-2009-4. He is from the 157th Air Refueling Wing, Pease Intl. Tradeport ANGS, N.H.

Morrisey reported that the new second lieutenants received a "truest blue" send-off: Lt. Gen. Harry M. Wyatt III, director of the Air National Guard, commissioned the officers in a formal ceremony. The class then marched in a pass-in-review on the parade ground, and four F-16s and a P-51 flew overhead.

$22,000 Up for Grabs

When the **C. Farinha Gold Rush Chapter** in Sacramento, Calif., offered $22,000 in scholarships this spring, the competition was fierce.

Eleven college students and 33 high schoolers submitted applications for the 12 scholarships, said Janice Clawson, the chapter's communications VP.

The high school applicants had an average grade point average of 4.09. Mira Loma High School senior Monica Sing topped them all with a 4.61 GPA and received $1,000 from the chapter. Among other winners: Tyler Hanrion, an MBA candidate at California State University, Sacramento, was awarded a $1,000 Bank of America scholarship. He heads to undergraduate pilot training next year. Alexander Jelicich from Casa Roble High School received the largest award, the $5,000 SAFE Credit Union scholarship.

Chapter President Richard M. Stultz explained that funds for the scholarships come from several donors; the chapter matches funds, distributes, and administers the scholarships.

The dozen scholarship students and 13 military awardees received their honors at the chapter's annual awards banquet in April, held at a McClellan Park hotel. More than 130 guests were there.

The military awards recognized outstanding airmen of the year. They went to SMSgt. Perry McLaurin, TSgt. Jeremy Kemp, TSgt. John Sanders, SSgt. Thyatira Singleton, SrA. Lisa Maskey, SrA. Tyler Underwood, ANG SSgt. Re-

nae K. Bobbitt, and ANG MSgt. Manuel A. Hernandez.

Also receiving awards for outstanding performance were Coast Guard Petty Officer 1st Class Ryan Cooper, USCG Lt. Cmdr. Wesley Hester, and CSUS cadets Kathleen Redmond, Carrie E. Wright, and Roel Zamora.

More Chapter News

■ Lt. Gen. Robert J. Elder, then commander of 8th Air Force at Barksdale AFB, La., addressed a meeting of the **Lewis E. Lyle Chapter** at Hot Springs Village, Ark., in June. Along with Chapter President Josie Fernandez and chapter officers Leonard L. Buch, Morris D. Cash, and Ken Johnson, the luncheon crowd included World War II veterans, Army vets, and four members from the state's other AFA group, the **David D. Terry Jr. Chapter.** State President Jerry Reichenbach was among them. Elder spoke about the Mighty Eighth's history and future and took questions from the audience. Elder had been commander of 8th Air Force since 2006 and retired in July.

■ Nevada's **Thunderbird Chapter** Vice President Donald L. Sexton presented the State Teacher of the Year award in June to Joseph Barry. A biology and psychology teacher at Cimarron-Memorial High School in Las Vegas, Barry received the award during a robotics summer camp at the school. Richard A. Carranza, who was then a region superintendent, and school principal Karen Stanley were on hand for the award ceremony. Barry, who heads the school's science department, mentors Cimarron-Memorial's national championship robotics team.

■ For the **Blue Ridge Chapter,** the North Carolina State Convention—hosted by the **Scott Berkeley Chapter** at Seymour Johnson AFB, N.C., in June—was an award bonanza. The chapter took home the Chapter of the Year award, presented to Chapter President Kenneth Walters by Southeast Region President Donald R. Michels and State President David A. Klinkicht. The western North Carolina unit also earned an AFA Aerospace Education Achievement Award, for having completed three aerospace education goals, and its Chapter Teacher of the Year—Kyle Malmin, a second-grade teacher at Brevard (N.C.) Elementary School—was named State Teacher of the Year.

■ The **Enid Chapter** in Oklahoma got a comprehensive description of both AFA and the chapter into the local *Enid News and Eagle* newspaper in July. The article quoted AFA area leaders: Region President Terry J. Cox, outgoing State President James Jacobs, and Chapter President Dan Ohnesorge, who said that his members use AFA materials to educate themselves about Air Force issues and challenges. Both Cox and Jacobs stressed the importance of Community Partners. The article described activities that the chapter hosts or supports for nearby Vance Air Force Base: quarterly awards, Enlisted Appreciation Night, scholarships, and a VIP tent and reception at the air show. It noted that the chapter stages a flight camp for students and sends pilots from Vance into schools.

Sandy Schlitt (center), AFA vice chairman of the board for aerospace education, and Michael Hayden (fifth from left), former CIA director, meet with the Air and Space Basic Course Class 09D student leadership council at Maxwell AFB, Ala. Schlitt and Hayden also spoke at the Senior NCO Academy and Officer Training School there.

Airpower Classics

Artwork by Zaur Eylanbekov

F-105 Thunderchief

The rugged, supersonic F-105 Thunderchief carried out three-fourths of US strikes against heavily defended North Vietnamese targets, and it paid the price in heavy losses. This Republic fighter-bomber, known to all as the "Thud," suffered more than 350 losses in Vietnam, one of the highest loss rates ever sustained by a US combat aircraft. The aircraft had been developed to meet Air Force requirements for a supersonic, single-seat fighter-bomber able to deliver heavy loads of conventional bombs and rockets as well as nuclear bombs at high speeds over great distances. The F-105 was the heaviest US single-engine, single-seat fighter ever.

The first F-105 was delivered to the Air Force in 1958. It had all-metal 45-degree swept wings and tail plane, forward swept air intakes, and a ventral fin added for greater stability, while the original fuselage was modified into its distinctive "Coke bottle" design. The F-105D featured advanced automatic navigation and weapon delivery systems and had an internal bomb bay suitable for nuclear weapons. On their heroic Vietnam War forays, Thud pilots used externally mounted bombs and missiles. The Thud retained a Vulcan cannon, and pilots used it to achieve 27 MiG kills.

F-105Ds bore the brunt of the Rolling Thunder campaign (1965-68) to bomb targets in North Vietnam. The F-105F replaced the F-100F in the now-famous "Wild Weasel" radar-suppression mission. The later G models were optimized for the Wild Weasel role. The F-105 Wild Weasels carried both the AGM-78 Standard ARM and the AGM-45 Shrike anti-radiation missiles. Despite the huge size of the airplane, Thunderchiefs consistently shot down enemy fighters. In all, F-105s dropped a whopping 202,596 tons of bombs. The Thud continued in active duty service until 1980 and in Reserve service until 1984.

—Walter J. Boyne

This aircraft: F-105G #63-82661—*White Lightning*—as it looked in 1972 when assigned to 388th Tactical Fighter Wing at Korat RTAB, Thailand.

In Brief

Designed, built by Republic Aviation ★ first flight Oct. 22, 1955 ★ crew one or two ★ number built (USAF) 833 ★ one Pratt & Whitney J75-P-19W turbojet engine ★ **Specific to F-105D:** armament one 20 mm M61 Vulcan gun; up to four Sidewinder AIM-9B; nine LAU-3/A or 18/A rocket pods; two ECM pods ★ max load 14,000 lb ★ max speed 1,390 mph ★ cruise speed 600 mph ★ max range 1,840 mi ★ weight (loaded) 52,546 lb ★ span 34 ft 11 in ★ length 64 ft 5 in ★ height 19 ft 8 in.

Famous Fliers

Medal of Honor: Merlyn Dethlefsen, Leo Thorsness (Vietnam War). **Air Force Cross:** 40+ airmen, including Jack Broughton, Fred Cherry, James Kasler, James McInerney Jr., Karl Richter, Robinson Risner. **Notables:** Charles Horner, later the "air boss" of Desert Storm; Joseph Moore, record-setting 1,216 mph over 100 km course; Ed Rasimus, author of *When Thunder Rolled.*

Interesting Facts

Nicknamed (partial list) "Thud," "Lead Sled," "Super Hog," "Iron Butterfly," "Squash Bomber," and "Ultra Hog" ★ used briefly (six shows in 1964) by the Thunderbirds ★ equipped the first full USAF squadron flying only supersonic strike aircraft ★ grounded 10 times, most often for in-flight fires ★ destroyed North Vietnam's Paul Doumer Bridge in a famous Aug. 2, 1967 attack.

F-105s thunder across the sky at Hill AFB, Utah.

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