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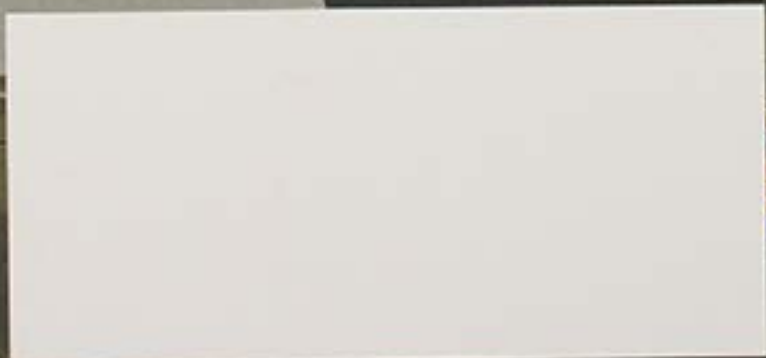
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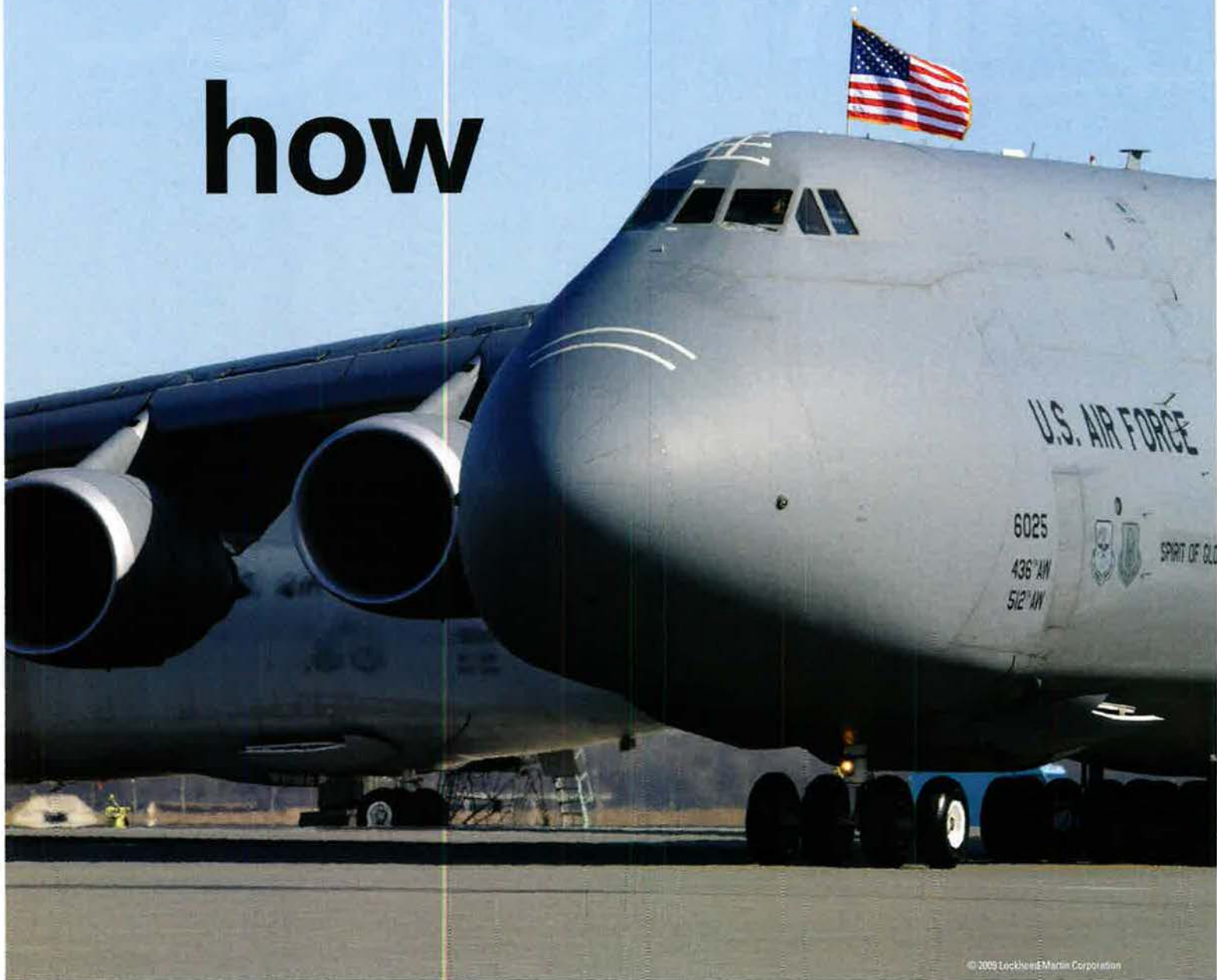
Fighter of the Future

F-35
AA-1

**Gunship Worries
Tankers: Playing With Fire
The Sagging Arsenal**



how



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MAGAZINE

July 2009, Vol. 92, No. 7



About the cover: F-35 AA-1 at Edwards AFB, Calif. See "Fighter of the Future," p. 22. Photo by Ted Carlson.

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AIR FORCE Magazine (ISSN 0730-6784) July 2009 (Vol. 92, No. 7) is published monthly by the Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Phone (703) 247-5800. Second-class postage paid at Arlington, Va., and additional mailing offices. **Membership Rate:** \$36 per year; \$90 for three-year membership. **Life Membership (nonrefundable):** \$500 single payment, \$525 extended payments. **Subscription Rate:** \$36 per year; \$29 per year additional for postage to foreign addresses (except Canada and Mexico, which are \$10 per year additional). Regular issues \$4 each. USAF Almanac issue \$6 each. **Change of address** requires four weeks' notice. Please include mailing label. **POSTMASTER:** Send changes of address to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association. Copyright 2009 by Air Force Association.

The Strategy's Last Stand?

"IF God really hates you, you may end up working on a Quadrennial Defense Review—the most pointless and destructive planning effort imaginable," warned Anthony H. Cordesman of the Center for Strategic and International Studies.

Cordesman, a renowned defense expert, was referring to the Pentagon's major, once-every-four-years assessment of US national defense. He guarantees it will waste time producing empty plans disconnected from reality. We offer another guarantee: It will re-examine, in stupefying detail, the nation's "two-war" defense strategy—with the presumption it must be changed.

In recent weeks, the Pentagon has launched a new QDR. It is advertised as a deep look, as were others in 1993 (the Bottom-Up Review), 1997, 2001, and 2005. Those all turned out to be naked budget-cut drills, but maybe this one will be different.

When it comes to the two-war issue, however, nothing will be different. Note the remark, on June 18, of Defense Secretary Robert M. Gates: "If there is one major aspect ... that I have insisted that we try and get away from, it is this construct that we've had, for such a long time, that we size our forces to be able to fight two major combat operations. I think that is not a realistic view."

With Gates having declared his skepticism, it may be worth recalling how the policy came to be. The two-war "strategy," so-called, is not a strategy at all. It is a force-sizing standard, committing the US to maintain defense forces sufficiently large and well-equipped to fight and win two big conventional wars, more or less at the same time.

From this plan flows requirements for conventional forces such as warships, tanks, fighters, bombers, and more.

Washington has long accepted a generalized need to field forces to fight in several theaters. In 1990, however, with Soviet power collapsing, the US faced basic questions about its forces, especially their size and mission. Gen. Colin L. Powell, Chairman of the Joint Chiefs of Staff, proposed a 1.6-million-man base force able to fight two "major regional contingencies" at a time.

His point was that the US should not, by going to war in one area, make itself

vulnerable to aggression on other fronts. This idea prevailed, and has stood ever since. However, it has been a lightning rod for criticism and serious challenges.

The first challenge came in the Clinton Administration's 1993 Bottom-Up Review. Secretary of Defense Les Aspin, having cut the defense budget, could not project force levels sufficient to cover two wars at the same time. Aspin tried to bridge that gap with a cut-rate idea called "Win-Hold-Win"—full armed response in one "major regional conflict" at a time, with a "holding" action

The two-war standard has withstood years of challenges. There is a good reason.

in between. The idea was laughed out of town.

Because Clinton never ceased cutting defense spending, the 1997 QDR revived consideration of a new, less demanding standard. Pentagon leaders, failing to come up with a plausible alternative, kept the two-war yardstick, though they changed MRC to MTW, for "major theater war." Another furtive effort—this one emanating from the National Security Council in 1999—fizzled under fire.

In 2001, as the Bush Administration carried out its first QDR, Secretary of Defense Donald H. Rumsfeld was said to be ready to kill the two-war standard. He was, in fact, skeptical. Even so, he wound up accepting it. Yet there was a twist. DOD said it would no longer preserve the option for two massive occupation forces—composed mostly of Army troops—but only one. Thus, the standard had become "two wars" with "one regime change."

Rumsfeld—who once claimed the two-war concept reflected an "obsession" with "few dangers" that "may be familiar rather than likely"—tried again in the 2005 QDR. In the end, he kept the standard, but, once again, it was with a twist. The final QDR report reaffirmed the need for a force able to "wage two nearly simultaneous conventional campaigns"—formerly known as "major theater wars." However, it said engagement in one large-scale, long-

duration irregular campaign—Iraq, for example—would be scored as equal to a conventional war.

From this history, we may draw several relevant conclusions.

It is painfully obvious that the two-war standard survived because—only because—no credible alternative existed. Planners could not shake the specter that a President, saddled with a one-war force, might be self-deterred in a crisis.

Equally obvious, the concept has shielded the military, to some degree, from tempting but unwise cuts in forces and programs.

Most dissatisfaction stems from cost, not strategic factors. To the extent that they exist, military complaints stem from the emergence of new threats such as mass-destruction weapons.

The concept can be adapted to fit new circumstances. Rumsfeld, for example, altered the structure twice, yet maintained a basic capability to fight two theater wars.

None of this is an argument for standing pat. It is sound strategy to prepare broadly for a range of threats, even if they cannot always be specified exactly in advance. All evidence is that Gates intends to do just that.

The question, however, is this: Can Secretary Gates find a way to cover all of his preferred military needs without, at the same time, falling back to a one-conventional-war standard? All signs are he does not think that would be a bad thing.

Evidently, some still do. One of them is David Ochmanek, the Pentagon official with day-to-day control over the QDR. Ochmanek, a former Air Force officer and RAND analyst, recently met with Christopher J. Castelli of *Inside the Pentagon*, a reliable trade publication. Ochmanek had this to say:

"We are a superpower. We have important interests in the Persian Gulf, in Europe, in Northeast Asia, and the East Asian littoral. We face challenges to those interests. So if we're going to continue to underwrite security alliances in those regions, we can't just focus on one part of the world at once."

That is reality. Any new strategy that ignores it runs the risk of becoming—to quote Cordesman—pointless and destructive. ■

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Like It or Lump It

In your May 2009 editorial, "The Air Force That Comes Next" [p. 2], you suggest that "the future Air Force won't be what its leaders expected it to be."

I would contend that it will be exactly what the Chief of Staff, Gen. Norton A. Schwartz, and the Secretary of the Air Force, Michael B. Donley, expected it to be when they took their new positions—positions [that were available], in part, from previous officeholders not embracing guidance from the Secretary of Defense and the White House.

The Air Force and other services have enough evidence to show that resisting the Defense Secretary's desire for a focus on "irregular" wars is not a course of action that will succeed. Neither will falling on our sword over our belief in the necessity for force modernization. Time has passed, as well, on the viability of the argument that jobs and economics make the case for beginning or continuing funding of weapons systems.

Quite simply, what we believed in the past is not acceptable to the nation's political leadership as a course to follow, and the sooner we get on board with their thinking—à la the guidance in the 2008 National Defense Strategy—the more relevant the US Air Force will be as an instrument of national policy. It's not a course we chose, but it's one we need to embrace.

Ronald K. Sable
Tucson, Ariz.

With respect to your May 2009 editorial, in which you state, "This is not the Air Force we wanted," who is the "we" that you are referring to? Is it the "we" that settled for a subsonic B-1? The "we" that has been wanting to retire the A-10? The "we" that has not given due importance to joint assignments?

I am not sure that I know who you are invoking. I welcome the fresh focus of USAF Chief of Staff Gen. Norton A. Schwartz.

It is certain, as you suggest, that our enemy has resorted to a different type

of warfare because of our dominance, but the fact still remains that we have a current enemy who is not devising air battles and strategies, or even discussing air superiority models. We must engage that current enemy, or at least contribute to his defeat more heartily.

While it is a good thing to think about fighting future air armadas in some sort of epic battles à la Britain in 1940, it is also important to fight the enemy with boxcutters that can turn airliners into weapons of destruction before they get off the ground and/or once they are in the air.

Maj. Hector I. Chavez,
USAF (Ret.)
Colorado Springs, Colo.

Thank you for keeping our Air Force constituency updated. Yes, probably never in the history of the US armed forces has a Secretary of Defense so blatantly targeted the Air Force over all other services for force structure and equipment cuts. I believe Mr. Gates has found his soft target and this will reap great benefits to his former organization, the CIA, using Air Force dollars deferred to intelligence activities. Secretary of Defense Gates' shortsightedness will eventually backfire, as this country has more inputs into the national defense sector than

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Publisher

Michael M. Dunn

Editor in Chief

Robert S. Dudney

Editorial

afmag@afa.org

Editor

Suzann Chapman

Executive Editors

Adam J. Hebert, John A. Tirpak

Senior Editor

Michael C. Sirak

Associate Editors

Tamar A. Mehuron

Marc V. Schanz

Contributing Editors

Walter J. Boyne, Bruce D. Callander,
John T. Correll, Rebecca Grant,
Peter Grier, Tom Philpott

Production

afmag@afa.org

Managing Editor

Juliette Kelsey Chagnon

Assistant Managing Editor

Frances McKenney

Editorial Associate

June Lee

Senior Designer

Heather Lewis

Designer

Darcy N. Harris

Photo Editor

Zaur Eylanbekov

Production Manager

Eric Chang Lee

Media Research Editor

Chequita Wood

Advertising

bturner@afa.org

Director of Advertising

William Turner
1501 Lee Highway
Arlington, Va. 22209-1198
Tel: 703/247-5820
Telefax: 703/247-5855



Air Force Association

1501 Lee Highway • Arlington, VA 22209-1198

Telephone: (703) 247-5800

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polcom@afa.org

Magazine

Advertising..... adv@afa.org

AFA National Report..... natrep@afa.org

Editorial Offices..... afmag@afa.org

Letters to Editor Column..... letters@afa.org

Air Force Memorial Foundation... afmf@afa.org

For individual staff members
first initial, last name, @afa.org
(example: jdoh@afa.org)

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just him. As a former member of the USAF Special Operations Command, the first thing I would do to counter the Secretary's blatant attack on the USAF establishment and programs is remove his newly entrenched CIA agents from the J-3 sector of USAF Special Operations Command. We didn't need them before Iraq and we don't need them now. Thank you, AFA editors, and keep the news flowing.

Lt. Col. Sid Howard,
USAF (Ret.)
Oklahoma City

Meeting Jimmy

John Correll's excellent article, "Doolittle's Raid," in the April issue of *Air Force Magazine* [p. 56] certainly jogged my memory on my first and only meeting with Doolittle.

It was in the mid-1970s. Doolittle was once again a civilian. The meeting was at a small private airfield in Rochester, Minn., home of the famed medical center, Mayo Clinic.

I was a newspaper reporter specializing in aerospace medicine and a close friend of Dr. Chuck Mayo, one of the sons of the founders of Mayo Clinic, Drs. Will and Charlie Mayo.

I didn't know it at the time, but Chuck Mayo and Doolittle were on the same board of directors of a large West Coast insurance company.

Chuck had tipped me off that I might want to go down to the airfield and interview some VIP. It turned out, of course, to be Doolittle. But I didn't know that.

I drove down in my beat-up Chevy and headed to the operations shack, where I met up with Chuck. He asked me if I'd had my interview and laughed at my puzzled expression. I hadn't seen anyone else around the C-47 that landed to pick up Chuck.

At his suggestion, I went over to the plane, but didn't see anyone who looked like a VIP.

Try again, Chuck advised me. I walked back to the plane, but the only person in sight was a below-average-height guy in a plain suit and a fedora. Not anyone special, I concluded. Then, Chuck showed up to board the plane and asked me about my interview. With whom? He nodded in the direction of the stranger in the fedora, who seemed to be examining the plane's tail.

"That's Jimmy Doolittle," Chuck said, his face wreathed in smiles.

I was tongue-tied. So close to one of my lifelong heroes, and I didn't even recognize him.

Chuck introduced me to Doolittle and told him I was a staff sergeant journalist in USAF during the Korean War, attached to the 76th Air Rescue Squadron of the 11th Air Rescue Group

(ARS), home base Hickam AFB, Hawaii.

Doolittle shook my hand warmly and pleasantly answered whatever questions I could mumble. Me and Medal of Honor recipient Jimmy Doolittle, leader of the raid off the carrier *Hornet* in April 1942 that was later depicted in the film, "Thirty Seconds over Tokyo." Wow!

I apologized for not recognizing him and said I always thought he looked like actor Spencer Tracy, who played his part in the movie.

"Yeah," he said. "I'm always being mistaken for him." He said he jokingly mentioned the frequent mistaken identity to Tracy once and the actor laughed and said, "Funny, I've never been mistaken for you." They became good friends.

Ken McCracken
Chatham, Ontario, Canada

Unmanned F-106

I enjoyed the article on the F-106's unintended pilotless flight and landing [*"Gary, You Better Get Back in It!" April, p. 68*].

I have one comment, however, about the F-106 involvement in a real shooting war. Unless I am so very mistaken, the F-106 did participate in the Vietnam War, but it may not have fired a shot at the enemy. There was a detachment of F-106 aircraft stationed at Udorn RTAB, Thailand, in the 1967-68 time frame. I was not connected to that organization but was aware that they flew CAP missions and on at least one occasion had a max-out effort after the 432 TR Wing experienced a multiple aircraft loss one day. I don't know the outcome of those efforts but do recall seeing them taxiing out for takeoff several times. Thanks for so many good articles and an outstanding publication at all times.

Maj. William M. Wellman,
USAF (Ret.)
Warner Robins, Ga.

May Almanac

I have been an AFA member for quite a few years and enjoy the coverage you provide in the annual Air Force Almanac issue. I have just received your 2009 Almanac issue and would like to offer a correction to the "Gallery of USAF Weapons" [*May, p. 121*]. I am a retired and former B-52 IP who is very interested in its continued saga. I work with B-52 weapons even now. Let's not belittle the B-52's awesome presence by misinforming the readership of its performance.

You have listed the B-52 (H only now) speed "(approx)" as "max level speed 449 mph." I have had it almost that fast on the deck, but that was a special case and not allowed by TO. This "max speed" has been in your

annual Almanac issue since at least 2002. The ole' BUFF is capable of 650 mph as derived from TO 1B-52H-1-1. I know from personal experience that this is very true. The BUFF can actually exceed this in level flight, but the Boeing structural engineers will not bless it. The B-52H has the engine power to exceed Mach 1 in level flight, but again it is not a good idea, and that's one of the reasons for a thrust gate.

Lt. Col. Bill Barton,
USAF (Ret.)
Niceville, Fla.

Most of the time you all get it right, but on p. 84 of the 2009 "USAF Almanac," there is an error. The wiring diagram shows Maj. Gen. Michael C. Gould as the 2nd Air Force commander, [but] as of May 2008, Maj. Gen. Alfred Flowers was the 2nd Air Force commander.

Col. Kenneth S. Klein,
USAF
Montgomery, Ala.

CSAR Is Always Joint

As a member of the Air Rescue Service for over 20 years I was upset by the comments by Secretary of Defense Robert M. Gates about the CSAR program [*"Washington Watch: The President's Budget," June, p. 8*]. His comment [that] we need a more joint outlook indicates that he has absolutely no concept of what CSAR is about. Over the years, as a flight engineer on H-3 and HH-53s, I participated in many rescues, some of Navy subs, many soldiers, marines, and our own Air Force [members], as well as more civilians than I can count. I have been refueled by Marine Corps KC-130s, and escorted by Army Apaches and Marine Corps Cobras, as well as our own HC- and MC-130s. I cannot think of a more "joint" endeavor than air rescue. The motto is, and always will be, "These things we do that others may live."

I have asked my comrades if they have ever bothered to ask if they were going after Air Force or members of other services. Their answer, like mine, was no.

I hope that we can create enough controversy to get this program back on track. As was posted on the revetment in Da Nang, "Fighter pilots have no fear, Jolly Green Giants are always near." I never remember an "Air Force only" there.

SMSgt. Russ Griffith,
USAF (Ret.)
Preston, Idaho

Vulnerable Bases Here at Home

The letter in the May issue [*"Vulnerable Bases," p. 4*] hit it. There is concern [here, stateside] that the move

of NORAD to Peterson AFB [Colo.] is not a good move. Cheyenne Mountain is one of the most secure facilities in the US. On the other hand, Peterson Air Force Base is vulnerable because it is adjacent to the Colorado Springs Airport and nearby roadways.

A 9/11-like incident could destroy Building 2 at Peterson, and car bombs make it vulnerable as well.

The move makes no sense!
Jim Johnson
Colorado Springs

A Square, Not a Box

In the "Air Force World" section of the May 2009 issue is a photo of a 100th ARW KC-135 with the title "The 'Box D'" [p. 15]. The tail marking originally belonged to the 100th Bomb Group (H) which flew B-17s from Thorpe Abbots Air Field in England during World War II.

The 100th BG always has (and still does) refer to the tail marking as "Square D."

Jim Bittle
Naples, Fla.

Gorgeous and Deadly

To state that the Hustler's crews were "fiercely loyal" is an understatement. Anybody who flew the B-58, and survived, typically will tell you it was the highlight of their aviation career. It was an honor and privilege to be a crew member in the Air Force's only operational Mach 2 bomber. There was, however, an error in the article under crew description: pilot, bomb-nav, weapon system officer. The Hustler did not have a WSO, the third member of the crew was a defensive systems officer (DSO) who operated the electronic countermeasures equipment (ECM), fired the M-61 20 mm Gatling gun, and was the performance engineer for takeoff, landing, and the entire flight envelope, including supersonic bomb runs at 50,000 feet. I was lucky enough to be part of the B-58 team at Grissom AFB, Ind. (formerly Bunker Hill), from 1966 until the aircraft was retired in 1970.

Maj. Tom Daniels,
USAF (Ret.)
Coral Gables, Fla.


As one crew member who is "fiercely loyal" to the B-58 Hustler, I would like to thank Walter J. Boyne for his presentation of the B-58 Hustler [*"Airpower Classics: B-58 Hustler," May, p. 152*]. He mentions the "high accident rate" two times in his article, and it's true that there were 26 of 116 lost. But a lot of those accidents were caused by "crew error," and not attributable to aircraft problems.

I recall an aircraft lost because the crew flew into a thunderstorm and encountered hail. The aircraft was abandoned, but two crew members survived and one was killed because his ejection capsule malfunctioned. In another instance, the crew computed takeoff information using less fuel than they actually had on board. The aircraft rotated too early—aircraft and crew were lost. One pilot lost control leveling off at altitude. He ejected—later the navigator/bombardier and DSO ejected. The aircraft was destroyed. There were also a number of accidents attributed to "bad landings." All in all, there were approximately 11 accidents that could not be blamed on the B-58.

Good pilots, good navigators/bombardiers, good DSOs, good maintenance, and good training made the B-58 one of the best bombers in Strategic Air Command. Our adversaries knew there were 40 Hustlers on combat-ready alert, each loaded with five nuclear weapons. The B-58 was gorgeous but she was also deadly!

Lt. Col. B. J. Brown,
USAF (Ret.)
Mountain Home, Ark.

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There go 3.5 wings; Skelton's skepticism; Accelerate the F-35?

Taking on "Additional Risk"

Air Force leaders in 2010 will shrink the fighter force by about 3.5 wings to save money, free up funds for other missions, and lower its manpower requirements.

This can be done, USAF leaders said, because the Pentagon leadership under Secretary of Defense Robert M. Gates perceives that the US will enjoy unchallenged air dominance until 2015 or so.

However, key members of Congress weren't immediately convinced, and wondered openly and forcefully in budget hearings whether USAF is unwisely divesting itself of needed capability.

Moreover, the Air Force itself acknowledges that, under the new scheme, its ability to prosecute two major combat operations at once will be "degraded." The two-war capability has always been shorthand for military sufficiency.

For all that, Secretary of the Air Force Michael B. Donley averred that USAF has a "window of opportunity" to "take some additional strategic risk" and reduce its tactical air forces by some 254 aircraft in Fiscal 2010. Five aircraft already were scheduled for retirement; the other 249 had been slated for inactivation, but over five years, not 12 months.

The 249 comprise 112 F-15s, 134 F-16s, and three A-10s. The other five were F-16s tagged to retire in Fiscal 2010.

The bulk of the aircraft—about 200—would come out of active units and the remainder from the Guard and Reserve. Air Force aides calculated the savings of these moves to be \$351 million in Fiscal 2010 and \$3.5 billion over the next five years.

The cuts will cause the Air Force to assume higher risk in meeting its national strategy obligations "during the next ... six to seven years," Donley said. The money and manpower saved by cutting fighters will be put toward missions considered higher priority, such as unmanned aerial vehicles, intelligence, surveillance, and reconnaissance, "and in the nuclear enterprise," he explained.

The idea is to emphasize the shift toward fifth generation fighters—specifically, the F-35, Donley continued. In combination with the F-22, now capped at 187 aircraft, and with enhanced fourth generation fighters, Donley said the fighter force will be "significantly better" in 2025 than it is today, despite the reduction in the number of overall fighters to about 16.5 fighter wing equivalents.

Donley said the budget includes more than \$1 billion in Fiscal 2010 alone to improve the F-22—the service later said more than \$7 billion is budgeted to enhance the F-22s over the next five years. Older fourth generation fighters which "are going to be around for a longer period of time" would also be modified and upgraded, Donley said. Among these upgrades will be infrared search-and-track systems for the F-15, which would give the aircraft more ability to detect stealthy adversaries; structural upgrades to help the aircraft last longer; software improvements; and additional weapons.

The fighter reductions are a move that "we think ... makes strategic sense," Donley said, although the Air Force declined

to explain in budget testimony what has changed in the strategic picture that makes a reduction in fighters acceptable. Gates said in April that he expects a Russian fifth generation fighter to be operational in about 2016 and a Chinese fifth gen fighter to reach service in about 10 years.



Lockheed Martin photo by Andy Wolke

Go faster, please.

In unclassified briefing slides intended to explain the fighter cuts and an overall "Combat Air Forces Restructuring," the Air Force nevertheless noted that "upgraded adversary fighter radars/avionics [are] narrowing the gap to fifth generation capabilities—we no longer hold [the] technological edge." In fourth generation fighters, advanced air-to-air missiles challenge the superiority of the AIM-120 AMRAAM, the best American radar-guided dogfight missile. When coupled with advanced electronic warfare capabilities in adversary aircraft, this "denies first-shot advantage" to USAF fighters.

Moreover, ground threats have gotten much tougher.

"We can no longer expect to encounter only Vietnam-era analog SAMs," or surface-to-air missiles, the Air Force noted in its briefing. The development of advanced, digital SAMs with greater range, mobility, and lethality make the battlefield "more dangerous for legacy fighter aircraft." Advanced threats are proliferating at an "unprecedented rate."

The briefing slides compared the inventory planned in last year's budget with that for this year, versus anticipated threats in 2015 and 2024. In 2015, the new planned force, with the fighter cuts, would achieve the goals of a single major combat operation "with manageable risk" as long as modernization—that is, F-35 purchases—continue apace. In 2024, the larger percentage of fifth gen fighters in the fleet "improves performance significantly," but the performance of the fleet in a second MCO would be "degraded due to swing requirements."

In a statement about the CAF restructuring, Chief of Staff Gen. Norton A. Schwartz said, "Make no mistake, we can't stand still on modernizing our fighter force. The Air Force's advantage over potential adversaries is eroding, and this

endangers both air and ground forces alike unless there is a very significant investment in bridge capabilities and fifth generation aircraft."

Airpower Shortchanged

The plan to sharply reduce the Air Force's fighter inventory while truncating production of the F-22 met with skepticism on Capitol Hill from members of Congress who expressed their concern that the service has cut beyond fat and muscle well into the bone.

"I'm not sure it meets the need," said Rep. Ike Skelton (D-Mo.), chairman of the House Armed Services Committee, of the plan in a hearing on the Air Force's budget.

"Is the Air Force shortchanging itself?" Skelton asked Donley and Schwartz. Both reiterated that the plan represents the most "affordable" option but allowed that it entails higher risk to national strategy.

Skelton said he has "concern" about the Air Force's readiness. He pointed out that the service has endured 18 years of "continuous combat" during which its gear has seen heavy use, leading to "detrimental effects ... such as engine and structural fatigue, deterioration, corrosion, and increased rates of component failures."

Of the planned cut of 3.5 wings of fighter force structure, Skelton said, "We're going to have to look at this very closely and understand what risks this plan might entail, whether the reinvested savings will net us an overall increase in the Air Force's ability to meet our national security requirements."

HASC ranking member Rep. John M. McHugh (R-N.Y.), now nominated to be Secretary of the Army, said he had yet to be convinced that very much analysis had gone into the "sweeping decisions" resulting in the Air Force's downsizing.

"I still have a degree of skepticism as to how much of this rebalancing was principally driven by realistic military requirements and the analytical rigor rather than budgetary pressures." McHugh was particularly incensed that the Administration had by late May failed to provide a future years defense program, but was asking Congress to go along with the spending plan nonetheless.

The FYDP is "required under Section 221 of Title 10 of the United States Code," he noted. Making such far-reaching decisions before conducting the Quadrennial Defense Review—which a parade of Pentagon witnesses said would justify the budget actions—is putting the cart before the horse, McHugh said.

In response to continued questioning about the F-22, Schwartz said that the F-22 lost out to higher priority programs, and that he would indeed want more than 187 of them if there were not such tough budget restrictions in place.

"Two [hundred] forty-three is the right number and 187 is the affordable force," Schwartz said.

Schwartz also said that the Air Force is in the midst of a "long discussion" about how it sizes its aircraft squadrons. It hasn't been decided, he indicated, whether "an 18-aircraft fighter squadron [is] the optimal size, or 15 or 12, in some cases, rather than, say, 24," which has long been the Air Force standard. It will be important to figure this out, Schwartz said, because USAF is "trying to achieve sort of a critical mass on maintenance and aircraft sustainment. ... We may decide or we may propose that it makes sense to have fewer larger squadrons rather than more smaller squadrons."

Options From the CBO

Speeding up purchases of the F-35 would be one of the most cost-effective ways for the armed services to reverse a growing deficit in fighter aircraft while still preserving technological superiority, according to a new report from the Congressional Budget Office.

In a May report, "Alternatives for Modernizing US Fighter Forces," the CBO said that by spending just \$5 billion more (in

2009 dollars) over the next 24 years, the Air Force could buy 164 more F-35s than they are now planning and modernize their fleets faster and with greater capability. That's possible, the CBO said, because getting the fighters sooner would eliminate the need to modify and structurally extend the lives of current "legacy" fighters such as the F-15, F-16, F/A-18 and AV-8B, which the F-35 program will replace with several variants of the multirole fighter.

The wild card, CBO said, is whether the F-35 will hit any major snags in flight testing or production. Significant delays could leave the services with fewer aircraft, and they would be substantially below par with modern foreign fighters.

A drawback to the accelerated alternative would be that fighter spending accounts in the early years of F-35 production would have to be about 35 percent higher per year, but would buy out the program five years earlier than now planned. That would, in turn, give the Pentagon some cushion to put production funds toward an F-22 replacement in the late 2020s.

The CBO looked at seven options altogether. In the second option, the Air Force and Navy would buy more F-16s and F/A-18s, respectively, and fewer F-35s, but on the Fiscal 2009 schedule. This option would cost \$8 billion more than the Fiscal 2009 scheme, and \$3 billion more than the F-35 acceleration alternative. It would keep up inventories of fourth gen fighters while the F-35 comes on line, but would leave the services with more nonstealthy aircraft for a longer period of time, leading to higher combat losses against projected threats.

Under a third alternative that would keep the service fighter inventories at the desired levels, the F-35 would be canceled and the services would simply buy more legacy types, but outfitted with state-of-the-art radars and other systems. This option would be \$48 billion cheaper than the 2009 budget plan, and result in a force able to carry as many bombs but with a sharp reduction in targets hit and aircraft safely recovered.

"The lack of stealth aircraft that would result ... would be viewed by some observers as a significant shortcoming," the CBO said. The aircraft "would not enjoy the survivability advantages conveyed by stealth technology." This wouldn't matter much against "lesser adversaries," but against a near-peer, longer wars, bigger combat losses, and a "loss of tactical flexibility" would result, and there would also have to be a much bigger investment in electronic warfare.

Under a fourth alternative, the F-35 program would be halved, and the bomb-carrying capability lost would not be made up. The number of fighter aircraft, across the services, would drop from 3,500 to 2,100, and the savings would be about \$67 billion versus the 2009 budget plan. This alternative would put the US air forces on more of a par with other countries, such as Russia and China. Alternative 5 would try to recapture some of the lost bomb-dropping capability by buying about 1,000 unmanned systems like the MQ-9 Reaper for the Air Force and 225 for the Navy. This option would cost \$20 billion more for both services than Alternative 4.

The last two options would shift bomb-dropping capability from fighters to bombers. In Alternative 6, the Air Force would buy just 325 F-35s and 250 medium-range stealth bombers, while the Navy and Marine Corps would buy 410 F-35s and 275 stealthy unmanned combat aircraft. This option would cost "two percent less in constant dollars but four percent more on a net-present-value basis" versus the 2009 spending plan. The seventh alternative would beef up the sixth option force by buying another 1,000 Reaper-class aircraft, at a cost of \$20 billion more.

Under Alternatives 6 and 7, the services would give up some fighter capability and flexibility but gain longer range and preserve overall tonnage of bombs that could be carried compared to the Fiscal 2009 force.

The CBO noted that the option chosen for the Fiscal 2010 budget request comes closest to its Alternative 1 than any of its other postulated options. ■

Roadside Bombs Kill Four

Lt. Col. Mark E. Stratton II, 39, and SrA. Ashton L. M. Goodman, 21, died May 26 of wounds sustained from an improvised explosive device near Bagram Airfield, Afghanistan.

Stratton, of Houston, was serving as commander of the Panjshir Provincial Reconstruction Team. He was assigned to the Joint Staff at the Pentagon. Goodman, of Indianapolis, was also serving with the Panjshir PRT, having deployed from the 43rd Logistics Readiness Squadron at Pope AFB, N.C.

In a separate incident, Duane G. Wolfe, 54, civilian deputy director of the 30th Mission Support Group at Vandenberg AFB, Calif., was killed May 25 in an IED attack on his convoy southeast of Fallujah, Iraq. Wolfe, of Port Hueneme, Calif., was a commander in the Navy Reserve serving in Iraq with the US Army Corps of Engineers' Gulf Region Division.

An IED also took the life of 1st Lt. Roslyn L. Schulte, 25, on May 20 near Kabul, Afghanistan. Schulte, a St. Louis native, was an intelligence-surveillance-reconnaissance operations officer supporting the Combined Security Transition Command-Afghanistan. She was assigned to the 613th Air and Space Operations Center at Hickam AFB, Hawaii.

Pilot Killed in T-38 Crash

Capt. Mark P. Graziano, 30, who was in training as a test pilot at Edwards AFB, Calif., was killed May 21 in the crash of a T-38 Talon trainer aircraft near California City about nine miles north of the base. Emergency responders declared Graziano dead at the scene.

Maj. Lee V. Jones, a senior navigator undergoing test navigator training at the USAF Test Pilot School, was injured when he ejected from the training jet aircraft. Emergency responders transported him to a nearby medical facility, where he was listed in stable condition.

The Air Force was investigating the cause of the mishap.

USAF Leadership Changes

Gen. William M. Fraser III, the Air Force vice chief of staff since October 2008, will move into the commander's chair at Air Combat Command, headquartered at Langley AFB, Va.

The Senate on May 21 confirmed the nomination of Fraser to take over ACC from Gen. John D. W. Corley. The latter is retiring this fall after having led ACC since October 2007.

The soon-to-be-vacant vice chief's post will be taken by Gen. Carrol H. Chandler, the commander of Pacific Air Forces since November 2007. Chandler was nominated to the position on May 19. As of mid-June, he had not been confirmed by the Senate.

Also on May 21, Lt. Gen. William L. Shelton, chief of warfighting integration and chief information officer in the Air Force Secretariat since December 2008, received Senate confirmation to be the next Air Force assistant vice chief of staff. He will replace Lt. Gen. Frank G. Klotz whom the Senate approved on May 7 to be the commander of Air Force Global Strike Command, the service's nuclear-centric major command that is standing up in the fall.

New Senior Enlisted Leader

CMSgt. James A. Roy was slated to become the Air Force's new top enlisted airman on June 30, replacing CMSAF Rodney J. McKinley, who announced his retirement in February. Roy will be the 16th Chief Master Sergeant of the Air Force.

Air Force Chief of Staff Gen. Norton A. Schwartz announced Roy's appointment May 8. Schwartz called Roy, who had been serving as the command chief master sergeant for US Pacific Command, a "worthy successor" to McKinley, who became CMSAF in June 2006.

Roy entered the Air Force in 1982 and served initially as a heavy equipment operator and subsequently in various supervisory positions in civil engineering units. He has served as command chief at wing, numbered air force, and joint levels.

9th AF and AFCENT To Split

The Air Force announced in May that it wants to separate Air Forces Central's forward warfighting element from the rear day-to-day oversight component of 9th Air Force.

Air Force Chief of Staff Gen. Norton A. Schwartz told lawmakers May 19 during a House Armed Services Committee

USAF photo by SSgt. Jason Lake



hearing that the split would be temporary but is necessary to put "100 percent focus on the operations currently under way" in Afghanistan and Iraq.

Schwartz indicated that the three-star head of AFCENT—currently Lt. Gen. Gary L. North—would take less than 50 people with him to establish a forward headquarters in Qatar to focus on the fight.

Heading 9th AF at Shaw AFB, S.C., would be a two-star general with a one-star vice commander. Schwartz called

this action "imminent," pending Congressional approval.

Concern Over Air Strikes

Defense Secretary Robert M. Gates on May 11 said the US makes "a tremendous effort" to avoid civilian casualties in Afghanistan, but must still do an even better job. His comments came after an air strike against Taliban insurgents May 4 in Farah province caused the death of Afghan civilians, leading Afghan

President Hamid Karzai to call on the US to end all air attacks.

According to the interim report from US Central Command's investigation released May 20, the strike killed an estimated 60 to 65 Taliban extremists and possibly 20 to 30 civilians. But video footage clearly shows enemy forces entering the targeted buildings, and there are reports that the Taliban may have used the civilians as human shields.



06.09.2009

At Bagram Airfield in Afghanistan, an F-15E pilot and weapon system operator, both unidentified, saddle up to take off and deliver rapid close air support to US forces battling the Taliban there. These crew members and aircraft belong to the 336th Expeditionary Fighter Squadron, assigned to fly CAS and airborne ISR missions in the War on Terror. As more US and coalition ground troops deploy into Afghanistan, demand for precision air support steadily increases.

USAF photo by SrA. Tiffany Trojca



Air Force Faces F-22 Shutdown Decision

With the Office of the Secretary of Defense's intent to cap F-22 production at 187, the Air Force is faced with the decision as soon as this summer on how to handle the shutdown of the Lockheed Martin production line.

Options range from closing down the line completely, which would preclude reconstitution, to retaining some tooling in storage for future repairs, F-22 life extensions, or even a line restart at some point for additional cost, officials in the F-22 program office at Wright Patterson AFB, Ohio, said in a May 14 interview.

The ultimate decision rests with the Office of the Secretary of Defense and Air Force leadership. But at the program office level, "we are proposing that you at least keep enough tooling so that down the road, if you had damage, or you wanted to do something in terms of extending the life, you have got the tooling to work on this airplane," explained Glenn Miller, a support contractor in the program office.

He referred to this option as "shut down with restart capability."

No matter what option is chosen for the shutdown, the price tag will not be borne in a single year.

"It's a three-year lead time" to build aircraft. "so, if you think about it, it's kind of a three-year shutdown process," Miller said.

The Air Force has included \$64 million in its Fiscal 2010 budget proposal to apply toward the shutdown. Miller and Vince Lewis, chief of capabilities planning and integration in the F-22 office, said there would also have to be funding included in Fiscal 2011 and 2012 for this purpose.

The last of the 187 F-22s are scheduled to come off the assembly line in early 2012.

New Eyes in the Sky: The very first MC-12 Liberty—USAF's newest intelligence-surveillance-reconnaissance platform—to be used in-theater ends its first combat sortie on June 10 at Joint Base Balad, Iraq. The MC-12 is a special-mission, medium-altitude, manned turboprop aircraft.

Army Gen. David H. Petraeus told National Public Radio May 29 that the issue of avoiding civilian casualties remains a great challenge. "We don't want our forces going into combat with one hand tied behind their back, but we also cannot take actions that might produce tactical victories but undermine the efforts strategically," he said.

F-22s Deploy Again to Pacific

Contingents of 12 F-22 Raptor stealth fighters and hundreds of airmen left Elmendorf AFB, Alaska, and Langley AFB, Va., in May for four-month deployments to Andersen AFB, Guam, and Kadana AB, Japan. These deployments are the fifth and sixth time that Raptors have shifted to the Western Pacific since February 2007 as part of a normal US rotation of forces.

C-27 Fleet Size in Limbo

The Pentagon's Fiscal 2010 budget proposal to move the C-27 Spartan program solely under the Air Force, and no longer have a joint Army-USAF initiative, leaves open the question of how many of these tactical airlifters are needed and how this decision will impact the National Guard.

The 2010 budget request trimmed the projected C-27 buy from 78 to 38. The 38 C-27s are intended to replace the Army's 42 elderly C-23 Sherpas. But testifying before the Senate Armed Services Committee May 21, Air Force Secretary Michael B. Donley said the final number has yet to be decided.

Donley said he sees 38 C-27s "as the floor, not the ceiling." Past studies have shown that the 78 number—54 would have gone to the Army, while the Air Force would have received 24—is still a valid need, he said.

At the same hearing, Chief of Staff Gen. Norton A. Schwartz said the Air Force would soon present a report on the issue to Deputy Secretary of Defense William J. Lynn. However, this may not be for public consumption initially, he noted.

Secretary of Defense Robert M. Gates justified the smaller C-27 fleet size during a May 13 hearing of the House Armed Services Committee, saying there is excess capacity within the C-130 Hercules transport fleet that makes a smaller C-27 fleet possible.

He said there are "over 200 C-130s that are available and uncommitted" that could fulfill the tactical airlift mission. Further, he noted, "The C-27 has half the payload of a C-130 and costs two-thirds as much; it can use exactly one percent more runways or airstrips than the C-130."

The notion that cutting C-27 numbers would hinder the National Guard from performing its homeland mission is "not sustainable," Gates added.

The deployments include two firsts: the inaugural overseas tour of Elmendorf's 525th Fighter Squadron (to Andersen) since its reactivation in fall 2007, and the initial overseas stint of Langley's 94th FS since the unit transitioned from the F-15 to the F-22.

Members of Air Force Reserve Command's 477th Fighter Group are accompanying the 525th FS, while airmen from the Virginia Air National Guard's 192nd Fighter Wing deployed with the 94th FS.

TacSat-3 Achieves Orbit

The Air Force Research Laboratory's Tactical Satellite 3, or TacSat-3 for short, successfully reached low Earth orbit May 19. It was launched into space from NASA's regional launch facility on Wallops Island, Va., aboard a Minotaur I booster.

The 880-pound TacSat-3 is the first operationally responsive space mission

to comprise payloads based on recommendations from combat commanders. "We are excited about demonstrating revolutionary technology, which will ultimately benefit the warfighter, during TacSat-3's 12-month flight," said Thomas Cooley, TacSat-3 program manager with AFRL's Space Vehicles Directorate at Kirtland AFB, N.M.

TacSat-3's payloads include a hyperspectral imager, a communications package, and an avionics experiment that features the first space-based employment of plug-and-play technology.

Acquisition Reform Becomes Law

President Obama on May 22 signed into law the Weapons Systems Acquisition Reform Act of 2009, a law designed to overhaul the manner in which the Pentagon buys its weapons and reverse the trend of skyrocketing costs and lengthy fielding delays.

"As Commander in Chief, I will do whatever it takes to defend the American people, ... but I reject the notion that we have to waste billions of taxpayer dollars to keep this nation secure," Obama said at the Rose Garden signing ceremony, citing Government Accountability Office audits in 2008 that found \$295 billion in cost overruns in 95 major defense projects.

The bill's signing came about two weeks after the Air Force leadership unveiled a five-point plan to improve the service's acquisition arm based on shortcomings identified in recent competitions such as the KC-X tanker and combat search and rescue replacement vehicle (CSAR-X) and subsequent reviews of acquisition processes.

Minot Wing Passes Inspection

The airmen of the 5th Bomb Wing at Minot AFB, N.D., in May successfully passed the wing's first no-notice nuclear surety inspection. The 10-day inspection concluded May 22.

Col. Joel S. Westa, 5th BW commander, praised his unit for its performance. "By earning the highest grade possible after having the most rigorous and intensive inspection ever, with no preparation, we have shown the world the tremendous improvements we have made," he said.

Last summer, the bomb wing had to undergo a retest following an earlier NSI that found some minor discrepancies; the unit then passed the retest. NSI evaluations have gotten tougher since a series of nuclear-related gaffes, one of which involved the 5th BW, led the Air Force to revamp its nuclear enterprise.

Obama Extols Nellis Solar Project

President Obama on May 27 praised the Air Force's 140-acre, 14-megawatt solar photovoltaic system at Nellis AFB, Nev.—the nation's largest—as "a shining example of what's possible when we harness the power of clean, renewable energy to build a new, firmer foundation for economic growth."

Obama said the solar project, which took about six months to complete and created some 200 jobs, is "the kind of foundation we're trying to build all across America" and will save the Air Force "nearly \$1 million a year."

He visited the Nevada site on the 100th day since he had signed the American Recovery and Reinvestment Act.

Irregular Warfare Wing Considered

The Air Force may establish a wing dedicated solely to irregular warfare, Chief of Staff Gen. Norton A. Schwartz said April 24 during a speech in Washington, D.C.

Schwartz said the Air Force is "dedicated to establishing an appropriate institutional architecture" for irregular warfare, "perhaps a wing, at least," backed up by a shift in "culture and career paths"

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Major Cyber Security Moves Announced

The Air Force on May 15 announced that Lackland AFB, Tex., is its preferred location to host 24th Air Force, the new numbered air force that will focus on the service's cyberspace mission. The final decision was pending completion of an environmental impact analysis.

The new NAF, which has operated provisionally at Barksdale AFB, La., will fall under Air Force Space Command, headquartered at Peterson AFB, Colo. The NAF is expected to add about 7,000 personnel positions to AFSPC. Lackland beat out the other five finalist sites: Barksdale, Langley AFB, Va., Offutt AFB, Neb., Peterson, and Scott AFB, Ill.

Two weeks later, on May 29, President Obama, noting that the security of the nation's cyber networks is one of the most serious challenges that the US faces and that the nation is not properly prepared, declared that the nation's digital infrastructure will henceforth be treated as "a strategic national asset."

"Protecting this infrastructure will be a national security priority," he said in a White House address.

To oversee these efforts at the national level, Obama announced the creation of a new cyber security coordinator office within the White House. This coordinator will orchestrate and integrate the government's cyber security-related policy, work to ensure that budgets reflect the policy, and coordinate the government response in the event of a major cyber attack, he said.

Meanwhile, US Strategic Command is mulling the creation of a new sub-command within its organization that would combine the military's cyber defense and cyber attack missions under one roof, yielding important synergies, Air Force Gen. Kevin P. Chilton, STRATCOM commander, said May 7.

Essentially, STRATCOM is looking at combining the functions of its joint task for global network operations and its joint functional component command for network warfare under a single commander, Chilton told reporters in Washington, D.C.

to heighten the service's commitment to nontraditional warfare.

A decision was anticipated in June. The top USAF leadership will also review the "instruments and tools" needed for irregular warfare, Schwartz said. Also being looked at is whether special operations forces should be scaled up to handle more IW roles, he said.

Tanker Split Buy Opposed

Air Force Secretary Michael B. Donley and Chief of Staff Gen. Norton A. Schwartz on May 21 voiced their opposition to buying new aerial refueling aircraft both from Boeing and Northrop Grumman, preferring instead to choose just one supplier's offering in the rejuvenated KC-X tanker recapitalization program that is expected to launch a new competition this year.

Some lawmakers have expressed an openness to a split buy, saying that otherwise the KC-X program may derail as it did in 2008. However, Donley, testifying before the Senate Armed Services Committee May 21, said splitting the buy would require USAF to have "to spend a lot more money up front" to support two production lines at nonoptimal build rates, putting "a huge dent" in the service's procurement accounts for other capabilities.

Schwartz added at the same hearing, "We should invest the limited dollars we have to get the most airplanes as quickly as we can," rather than spending scarce dollars on sustaining "two supply chains, two training activities, and so on."

Black Hawks Eyed in Near Term

With the termination of the combat search and rescue replacement vehicle program and the fate of a future rescue platform in limbo, the Air Force is seeking \$90 million in Fiscal 2010 to buy two new-build UH-60M Black Hawk helicopters to replace HH-60G Pave Hawk rescue helicopters that it has lost in operations in Southwest Asia.

Service spokeswoman Lt. Col. Karen Platt said in May that the Air Force is completing an assessment of the current UH-60M model to determine the level of modification that would be required to convert it to the personnel recovery mission.

When asked whether this approach is a possibility for replacing the Air Force's UH-1N helicopters, Platt said that the Air Force is "assessing all available options" in that regard.

House Approves More C-17s

The House's version of the Fiscal 2009 war supplemental, passed May 14, includes \$2.2 billion to procure eight C-17 Globemaster III airlifters.



DOD photo by Donna Miller

Honor the Fallen: SSgt. Brett Daugherty, a member of the Air Force Honor Guard, salutes at Arlington National Cemetery, Va., after placing a miniature flag in front of a headstone. He was participating in "Flags In," an annual joint services Memorial Day commemoration that dates to 1948. More than 3,000 service members placed 265,000 flags at the cemetery on May 21.

Operation Iraqi Freedom—Iraq

Casualties

By June 18, a total of 4,316 Americans had died in Operation Iraqi Freedom. The total includes 4,303 troops and 13 Department of Defense civilians. Of these deaths, 3,454 were killed in action with the enemy while 862 died in noncombat incidents.

There have been 31,354 troops wounded in action during Operation Iraqi Freedom. This number includes 17,552 who were wounded and returned to duty within 72 hours and 13,802 who were unable to return to duty quickly.

Balad Block 40 F-16 Hits 7,000 Flight Hours

An F-16 Block 40 fighter operating with the 4th Expeditionary Fighter Squadron at Joint Base Balad, Iraq, became the first F-16 of this variant to surpass the 7,000-hour milestone during a recent mission over Iraq, the Air Force announced April 30.

"For the aircraft to have reached this milestone is a testament to the maintenance professionals who work our aircraft every day," said SMSgt. Rob Webster, 4th Aircraft Maintenance Unit senior NCO in charge.

From August 2007 to October 2008, the aircraft logged more than 1,400 combat hours in Southwest Asia. At the time of the milestone, this F-16, deployed from the 388th Fighter Wing at Hill AFB, Utah, had accumulated an additional 350 combat hours on its current overseas stint. In 2008, an F-16C Block 25 aircraft with the Vermont Air National Guard's 158th Fighter Wing became the first Air Force F-16 to amass 7,000 flying hours.

Operation Enduring Freedom—Afghanistan

Casualties

By June 18, a total of 701 Americans had died in Operation Enduring Freedom. The total includes 700 troops and one Department of Defense civilian. Of these deaths, 471 were killed in action with the enemy while 230 died in noncombat incidents.

There have been 3,023 troops wounded in action during OEF. This number includes 1,083 who were wounded and returned to duty within 72 hours and 1,940 who were unable to return to duty quickly.

Coalition Attacks Helmand Stronghold

Afghan Army forces working with US troops and coalition forces launched a major operation against a Taliban and al Qaeda stronghold in the northern reaches of Helmand Province in late May, resulting in a protracted battle in and around the Nad Ali District.

On May 18, ground forces attacked the Taliban-held town of Marja, a major command node and hub of opium processing for the militants, according to a US military source.

Troops moved to take control of the center of the town, targeting the bazaar where the main Taliban activity was located. Multiple ground engagements occurred on the initial day, prompting repeated calls from close air support.

Aircraft including Air Force B-1B Lancers, F-15E Strike Eagles, and MQ-9 Reapers responded by employing several guided munitions and Hellfire missiles and gun strafing runs against enemy fighting positions.

Continued engagements in and around the district lasted until May 22, with additional air assets such as A-10 Warthogs and MQ-1 Predators joining the fight.

On May 22, several compounds and buildings were bombed in Marja, including the site of drug production operations, as well as groups of enemy personnel.

After taking control of the center of the town, forces discovered war rooms stocked with maps, communications gear, night vision goggles, packaged explosives for vehicle borne improvised explosive devices, and US military vehicle parts, in addition to large amounts of black tar opium and derivatives.

Around 34 Taliban fighters were reported killed in the fighting to control the town, with 16 terrorists killed during air strikes as Taliban elements attempted to counterattack, according to coalition reports. Six more surrendered.

The Senate version of the bill, approved May 21, does not include funding for them, so the issue was to be resolved during the conference on the bill in June.

There is Senate support for more C-17s. On May 12, a bipartisan group of 19 Senators called for a total of 15 more C-17s. But the Office of the Secretary of Defense does not want to buy more than the 205 C-17s already on order, saying it has enough of them when factoring in the Air Force's 111 C-5s and the use of commercial freight aircraft to haul cargo worldwide.

Supporting the Pentagon leadership's position is the finding of the Congressionally mandated airlift study, issued to lawmakers in March, that favored upgrading all C-5s to the newest C-5M Super Galaxy configuration over procuring additional C-17s.

Airship Project Takes Off

The Defense Advanced Research Projects Agency announced April 27 that it has selected a Lockheed Martin-led industry team to develop a subscale stratospheric airship to demonstrate the utility of using high-altitude airborne sensors of unprecedented proportions for theaterwide surveillance.

This work will occur under phase 3 of the agency's Integrated Sensor Is Structure program; DARPA is conducting this phase jointly with the Air Force.

The subscale airship is expected to fly in Fiscal 2013. It will carry an X-band radar system with an antenna about half the size of a roadside billboard and a UHF-band system with an antenna roughly equivalent to the size of a soccer field. A notional, full-size operational airship would have sensors dwarfing these, capable of tracking extremely small cruise missiles and unmanned aerial vehicles, as well as dismounted soldiers from hundreds of kilometers away.

Talon Successor Sought

The Air Force issued a solicitation to industry on March 31, seeking information on the best attributes for a future trainer aircraft to replace the T-38 Talon, which celebrated the 50th anniversary of its first flight on April 10 and is still in widespread use.

The service expects to field this notional aircraft as part of a new advanced pilot training family of systems in the 2017 timeframe to help train future F-22, F-35, and bomber pilots.

One of the issues to tackle with the new trainer is how to prepare student pilots for requirements such as sustained high-G operations and air refueling that are best learned with the aid of an instructor pilot on board, considering there are no two-seat versions of the F-22 and F-35, the solicitation states.

Senior Staff Changes

RETIREMENTS: Lt. Gen. Robert J. **Elder Jr.**, Lt. Gen. John F. **Regni**, Lt. Gen. James N. **Soligan**, Maj. Gen. Roy M. **Worden**, Brig. Gen. Neil A. **Rohan**.

NOMINATIONS: To be General: Douglas M. **Fraser**. **To be Lieutenant General:** Gilmory M. **Hostage III**, Maj. Gen. William T. **Lord**, Glenn F. **Spears**. **To be Major General:** Douglas J. **Robb**. **To be Brigadier General:** Steven J. **Arquette**, Howard B. **Baker**, Robert J. **Beletic**, Scott A. **Bethel**, Charles Q. **Brown Jr.**, Scott D. **Chambers**, Cary C. **Chun**, Richard M. **Clark**, Dwyer L. **Dennis**, Steven J. **DePalmer**, Ian R. **Dickinson**, Mark C. **Dillon**, Scott P. **Goodwin**, Morris E. **Haase**, James E. **Haywood**, Paul T. **Johnson**, Randy A. **Kee**, Jim H. **Keffer**, Jeffrey B. **Kendall**, Michael J. **Kingsley**, Steven L. **Kwast**, Lee K. **Levy II**, Jerry P. **Martinez**, Jimmy E. **McMillian**, Kenneth J. **Moran**, Andrew M. **Mueller**, Eden J. **Murrie**, Terrence J. **O'Shaughnessy**, David E. **Petersen**, Timothy M. **Ray**, John W. **Raymond**, John N. **T. Shanahan**, John D. **Stauffer**, Michael S. **Stough**, Marshall B. **Webb**, Robert E. **Wheeler**, Martin **Whelan**, Kenneth S. **Wilsbach**.

CHANGES: Brig. Gen. William J. **Bender**, from Cmdr., 86th Airlift Wg., USAFE, Ramstein AB, Germany, to Dir., Warfighter Sys. Integration & Deployment, Office of Warfighting Integration & Chief Info. Officer, OSAF, Pentagon ... Brig. Gen. Bryan J. **Benson**, from Vice Cmdr., 618th Tanker Airlift Control Ctr., AMC, Scott AFB, Ill., to Cmdr., 380th Air Expeditionary Wg., ACC, Al Dhafra AB, UAE ... Maj. Gen. Paul F. **Capasso**, from Dir., C⁴, AFRICOM, Stuttgart, Germany, to Dep. Dir., Policy, Planning, & Resources, Warfighting Integration & Chief Info. Officer, OSAF, Pentagon ... Brig. Gen. (sel.) James J. **Carroll**, from Dep. Asst. Surgeon General, Modernization, Office of the Surgeon General, USAF, Falls Church, Va., to Cmdr., AF Medical Spt. Agency, USAF, Bolling AFB, D.C. ... Maj. Gen. Stanley E. **Clarke III**, from Mil. Asst. DCS, Strat. Plans & Prgms., USAF, Pentagon, to Chief, Office of Defense Cooperation, Turkey, EUCOM, Ankara, Turkey ... Lt. Gen. Daniel J. **Darnell**, from DCS, Air, Space, & Info. Ops., P&R, USAF, Pentagon, to Dep. Cmdr., PACOM, Camp H. M. Smith, Hawaii ... Brig. Gen. (sel.) Mark C. **Dillon**, from Cmdr., 60th Air Mobility Wg., AMC, Travis AFB, Calif., to Cmdr., 86th Airlift Wg., USAFE, Ramstein AB, Germany ... Gen. (sel.) Douglas M. **Fraser**, from Dep. Cmdr., PACOM, Camp H. M. Smith, Hawaii, to Cmdr., SOUTHCOM, Miami ... Gen. William M. **Fraser III**, from Vice CS, USAF, Pentagon, to Cmdr., ACC, Langley AFB, Va. ... Brig. Gen. Samuel A. R. **Greaves**, from Cmdr., Mil. Satellite Comm. Sys. Wg., SMC, AFSPC, Los Angeles AFB, Calif., to Vice Cmdr., SMC, AFSPC, Los Angeles AFB, Calif. ... Lt. Gen. (sel.) Charles B. **Green**, from Dep. Surgeon General, USAF, Bolling AFB, D.C., to Surgeon General, USAF, Bolling AFB, D.C. ... Brig. Gen. Ronnie D. **Hawkins Jr.**, from Dep. Dir., Policy, Planning, & Resources, Warfighting Integration & Chief Info. Officer, OSAF, Pentagon, to Vice Dir., DISA, Arlington, Va. ... Brig. Gen. Byron C. **Hepburn**, from Cmdr., AF Medical Spt. Agency, Office of the Surgeon General, USAF, Bolling AFB, D.C., to Dep. Surgeon General, Office of the Surgeon General, USAF, Bolling AFB, D.C. ... Maj. Gen. Mary K. **Hertog**, from Dir., Security Forces, USAF, Pentagon, to Cmdr., 2nd AF, Keesler AFB, Miss. ... Brig. Gen. Joseph L. **Lengyel**, from Cmdr., ANG Readiness Ctr., Andrews AFB, Md., to Mil. Asst. DCS, Strat. Plans & Prgms., USAF, Pentagon ... Brig. Gen. Jeffrey G. **Lofgren**, Vice Cmdr., 1st AF, ACC, Tyndall AFB, Fla., to Dep. Dir., Ops., NORTHCOM, Peterson AFB, Colo. ... Maj. Gen. (sel.) Susan K. **Mashiko**, from Vice Cmdr., SMC, AFSPC, Los Angeles AFB, Calif., to Dir., Space Acq., Office of the Undersecretary of the AF, Pentagon ... Maj. Gen. William N. **McCasland**, from Dir., Space Acq., Office of the Undersecretary of the AF, Pentagon, to Dir., Spec. Prgms., Office of the USD for Acq., Tech., & Log., Pentagon ... Brig. Gen. (sel.) Jimmy E. **McMillian**, from Cmdr., 10th AB Wg., USAF Academy, Colo., to Dir., Security Forces, DCS, Log., & Mission Spt., USAF, Pentagon ... Maj. Gen. Christopher D. **Miller**, from Dir., Plans, Policy, & Strategy, NORAD and NORTHCOM, Peterson AFB, Colo., to Spec. Asst. to the Vice C/S, USAF, Pentagon ... Maj. Gen. (sel.) Michael R. **Moeller**, from Cmdr., 379th Air Expeditionary Wg., ACC, Al Udeid AB, Qatar, to Dir., Strategy, Plans, & Policy, CENTCOM, MacDill AFB, Fla. ... Brig. Gen. (sel.) Andrew M. **Mueller**, from Dep. Dir., Cyberspace, Transformation, & Strategy, Office of Warfighting Integration & Chief Info. Officer, OSAF, Pentagon, to Dep. Cmdr., Combined Air Ops. Ctr. 6, Allied Air Forces Southern Europe, NATO, Eskisehir, Turkey ... Brig. Gen. (sel.) Terrence J. **O'Shaughnessy**, from Cmdr., 613th Air & Space Ops. Ctr., PACAF, Hickam AFB, Hawaii, to Vice Cmdr., 131st AF, PACAF, Hickam AFB, Hawaii ... Maj. Gen. (sel.) Douglas H. **Owens**, from Vice Cmdr., 13th AF, PACAF, Hickam AFB, Hawaii, to Vice Cmdr., PACAF, Hickam AFB, Hawaii ... Brig. Gen. Leonard A. **Patrick**, from Cmdr., 37th Tng. Wg., AETC, Lackland AFB, Tex., to Cmdr., 502nd AB Wg., AETC, Lackland AFB, Tex. ... Brig. Gen. (sel.) David E. **Petersen**, from Cmdr., 80th Flying Tng. Wg., AETC, Sheppard AFB, Tex., to Dep. US Mil. Representative to NATO Mil. Committee, Brussels, Belgium ... Brig. Gen. Harry D. **Polumbo Jr.**, from Cmdr., 380th Air Expeditionary Wg., ACC, Al Dhafra AB, UAE, to Dir., P&P, ACC, Langley AFB, Va. ... Maj. Gen. (sel.) James O. **Poss**, from Dir., Intel., ACC, Langley AFB, Va., to Dir., ISR Capabilities, DCS, ISR, USAF, Pentagon ... Lt. Gen. William L. **Shelton**, from Chief, Warfighting Integration & Chief Info. Officer, OSAF, Pentagon, to Asst. Vice C/S, USAF, Pentagon ... Maj. Gen. Lawrence A. **Stutzriem**, from Dir., C/S of the AF Strat. Studies Group, USAF, Pentagon, to Dir., Plans, Policy, & Strategy, NORAD and NORTHCOM, Peterson AFB, Colo. ... Brig. Gen. Thomas J. **Trask**, from Dir., Plans, Prgms., Rqmts., & Assessments, SOCOM, Hurlburt Field, Fla., to Dep.

Lawmaker Opposes Bomber Delay

Concerned over the Pentagon's plans to delay the development of a next generation bomber aircraft, Sen. John Thune (R-S.D.) on May 14 introduced legislation aimed at restoring work on its development in the Fiscal 2010 defense budget.

The bill (S 1044), which is titled "Preserving Future United States Capability To Project Power Globally Act of 2009," states that it is US policy to pursue the bomber's development next fiscal year and not to delay this effort—as Defense Secretary Robert M. Gates announced in April—pending the outcome of the 2010 Quadrennial Defense Review, Nuclear Posture Review, and negotiations with Russia on additional nuclear force reductions.

Gates said there is the need for more clarity, and thus more study, on what the future bomber needs to be. Conversely, for Thune, in whose state the Air Force operates a wing of B-1B Lancer bombers, there is a sense of urgency in fielding the new bomber platform.

Air Guard Moving Officer Training

The Air National Guard has decided to consolidate its officer training program with the active duty and Air Force Reserve officer training program at Maxwell AFB, Ala., *The Daily Times* of Blount County, Tenn., reported May 20.

For the past 40 years, the Air Guard has conducted its officer training at the ANG's I. G. Brown Training and Education Center on the grounds of McGhee Tyson Arpt., Tenn., near Knoxville.

The last class of prospective Air Guard officers was scheduled to graduate June 26 from the Brown Center, making nearly 15,000 graduates since its opening. For a time, the Air Force Reserve also commissioned its officers through the Brown Center, but in 2007 shifted to Maxwell.

B-1B Gets New Maintenance Plan

The Air Force in April approved a new maintenance construct for the B-1B bomber that is designed to improve the aircraft's availability rates by speeding maintenance turnaround times and reducing inefficiencies. Full implementation is planned by October 2010.

This "high-velocity maintenance" construct, which USAF implemented with the C-130 fleet in 2007, applies practices used by the commercial airline industry. Under it, each B-1B will go to depot for heavy maintenance four times in five years, with two light HVM cycles scheduled in between, and the service says it will boost the amount of man-hours worked during those times through better organization of workers, tools, and parts.

Senior Staff Changes (cont.)

Dir., Theater Plans & Synchronization Element, CENTCOM, MacDill AFB, Fla. ... Maj. Gen. Richard E. **Webber**, from Asst. DCS, Ops., Plans, & Rqmts., USAF, Pentagon, to Cmdr., 24th AF, AFSPC ... Maj. Gen. John A. **Weida**, from DCS, UN Command & US Forces Korea, US Army Garrison Yongsan, South Korea, to Asst. DCS, Ops., Plans, & Rqmts., USAF, Pentagon ... Maj. Gen. (sel.) Lawrence L. **Wells**, from Dir., Warfighter Sys. Integration & Deployment, Office of Warfighting Integration & Chief Info. Officer, OSAF, Pentagon, to DCS, UN Command & US Forces Korea, US Army Garrison Yongsan, South Korea ... Brig. Gen. (sel.) Kenneth S. **Wilsbach**, from Asst. Dir., Ops., Plans, Rqmts., & Prgms., PACAF, Hickam AFB, Hawaii, to Cmdr., 18th Wg., PACAF, Kadena AB, Japan ... Brig. Gen. Stephen W. **Wilson**, from Dep. Cmdr., Canadian NORAD Region, NORAD, Winnipeg, Manitoba, Canada, to Cmdr., 379th Air Expeditionary Wg., ACC, Al Udeid AB, Qatar.

CHIEF MASTER SERGEANT CHANGE: James A. **Roy**, to Chief Master Sergeant of the AF, USAF, Pentagon.

SENIOR EXECUTIVE SERVICE RETIREMENT: Brenda L. **Romine**.

SES CHANGES: Davy M. **Belk**, to Dir., Info. Directorate, AFRL, AFMC, Rome, N.Y. ... Deryl W. **Israel**, to Exec. Dir., Warner Robins ALC, AFMC, Robins AFB, Ga. ... Jay H. **Jordan**, to Dep. Dir., Cost Analysis Improvement Group, Natl. Recon Office, Chantilly, Va. ■

Air Force Counters GPS-in-Trouble Talk

Responding to press reports in May about the impending doom of the Global Positioning System constellation of precision position, navigation, and timing satellites starting next year, Air Force officials said the constellation is in good health, there are options to mitigate a potential coverage gap, and the next iterations of GPS satellites appear to be on solid footing.

The Government Accountability Office warned in April of a potential gap in GPS coverage starting in 2010 if the constellation begins to shrink in size, due to the almost three-year delay in the first launch of a Block IIF satellite and the fact that the Block III program is still in its early stages and could also face developmental challenges and cost spikes.

In fact, even if the Air Force can keep the Block IIF and Block III systems on their current schedules—first Block IIF launch is expected around November, while the first Block III launch is projected in 2014—there is still a 20 percent chance the constellation will fall below the 24 satellites considered necessary to provide the standard of global coverage to which the US is committed, GAO stated.

Addressing this, Gen. C. Robert Kehler, commander of Air Force Space Command, told the Senate Armed Services strategic forces subcommittee May 20 that the fact that the Air Force now has 33 GPS satellites on orbit, including three spares, provides “a little bit of breathing space” if an issue arises with getting new GPS capability on orbit on schedule.

Kehler also said the Air Force believes that it has “worked through the problems” that plagued the GPS Block IIF program and that the Block III program is “progressing very well.”

Further, Air Force officials said GPS satellite operators have options, such as providing less coverage to areas where there is less need, if the number of satellites drops.

In 2008, the 66-aircraft B-1B fleet experienced “unacceptable” availability rates, when only 28 aircraft were available at any given time, according to the service.

PTSD Rises Among Airmen

Lt. Gen. James G. Roudebush, outgoing Air Force surgeon general who is retiring in October, told lawmakers May 15 that the Air Force is “seeing an increasing number of airmen” with post-traumatic stress disorder. However, he told the House Armed Services military personnel subcommittee that the service’s early PTSD identification and treatment has enabled “the vast majority of these airmen” to continue to serve “with benefit of treatment and support.”

As a consequence of the rising PTSD rate, Roudebush said there’s been a “persistent demand” for mental health providers in the deployed environment. Further, he said, the service is “tracking this demand closely,” since it may well increase rather than decrease.

Roudebush noted, too, that the Air Force has “significant challenges” in recruiting and retention of military health professionals, including active duty psychiatrists and psychologists.

Airmen Awarded Bronze Star Medals

MSgt. Kenneth Huhman, a combat controller with Air Force Special Operations Command’s 23rd Special Tactics Squadron at Hurlburt Field, Fla., received two Bronze Star Medals with Valor devices on May 7 for his actions in support of Army Special Forces in Afghanistan’s Kandahar region in 2007. He is currently helping the Air Force attract new recruits.

During missions in September and November of that year, Huhman directed close-in air strikes against enemy in-

Next Up, BUFFs: A B-2 Spirit takes off from Andersen AFB, Guam, as part of a June 2 redeployment back home to Whiteman AFB, Mo. The B-2s at Guam were part of a continuous bomber presence in the Western Pacific, and were replaced with B-52 bombers.



USAF photo by S/A Christopher Bush

Photo courtesy, Orbital, Thom Bauer



Up and Away: A Minotaur I rocket successfully boosts the first Air Force Research Laboratory TacSat-3 satellite on May 19 from the Mid-Atlantic Regional Spaceport at the NASA Wallops Flight Facility at Wallops Island, Va.

surgents during intense, long-duration firefights, repeatedly exposing himself to danger and personally killing many enemy fighters. On one occasion, he was temporarily blinded by the impact of an enemy round near him, but continued to call in strikes.

Receiving Bronze Star Medals for meritorious service in Afghanistan were: Lt. Col. Susan Bassett of Sheppard AFB, Tex., May 5; Lt. Col. Daniel Semsel of Whiteman AFB, Mo., May 6; and SMSgt. Bobby Simmons Jr. of Robins AFB, Ga., April 23.

Recognized for their actions in Iraq were: Maj. Seth Graham of Dyess AFB, Tex., April 17; 1st Lt. Bryan Bouchard of Luke AFB, Ariz., April 24; MSgt. William Craig of Robins, April 13; MSgt. Carlos DoRego of Robins, April 13; MSgt. Scott Rogge of Pope AFB, N.C., May 6; and TSgt. Edward Cannell of Robins, April 13.

Korean War Ace Dies

Retired Col. Harold E. Fischer, 83, a double ace of the Korean War and one of 15 US airmen held prisoner by China, died April 30 in Las Vegas. Fischer flew 105 combat missions in F-80 Shooting Stars during the Korean War, then switched to the F-86 Sabre and returned to combat, ultimately scoring 10 aerial victories.

On April 7, 1953, Fischer's Sabre went down during a dogfight with enemy MiG-15s. He bailed out, was captured, and subsequently held prisoner in China. Along with three other F-86 pilots, he remained there as a political prisoner until June 1955, two years after the Korean War cease-fire.

Among his military awards, Fischer received the Distinguished Service Cross. He also flew helicopters during the Vietnam War and served as an intelligence officer and commander of the Air Force Human Resources Laboratory in Texas. He retired in 1978. ■

News Notes

- The Senate approved Lt. Gen. Daniel J. Darnell on May 21 to be deputy commander of US Pacific Command. He replaces Lt. Gen. Douglas M. Fraser, who has been tapped for a fourth star to head US Southern Command.

- Lt. Gen. Norman R. Seip, who has led 12th Air Force (Air Forces Southern) since July 2006, is retiring in October after a 35-year career in the service.

- Maj. Gen. Charles B. Green was confirmed by the Senate on May 21 to receive a third star and be the next Air Force surgeon general. He succeeds Lt. Gen. James G. Roudebush, who plans to retire officially on Oct. 1.

- CMSgt. W. Allen Usry on May 21

became the command senior enlisted advisor to NORAD and US Northern Command. He is the first-ever Air National Guardsman to be the senior enlisted advisor for a combatant command.

- Ashton B. Carter was sworn in on April 27 as the Pentagon's acquisition executive, replacing John J. Young Jr. Carter, a Harvard physicist, was nominated for the post in February.

- Former astronaut and US Senator John H. Glenn Jr. received the 2008 Thomas D. White National Defense Award April 22 at a ceremony at the US Air Force Academy in Colorado Springs, Colo.

- The Air Force-sponsored Center for

Microplasma Science and Technology was formally established on April 17 during a ceremony on the grounds of St. Peter's College in Jersey City, N.J. It will be the nation's first center devoted to the emerging field of microplasma research.

- MSgt. Darren Bradley, a flight engineer with the 56th Rescue Squadron at RAF Lakenheath, Britain, passed the 5,000 flying hours mark in the HH-60G Pave Hawk during a May 21 mission.

- The F-15 West Coast Demonstration Team at Eglin AFB, Fla., flew its final performance May 1. The unit is formally disbanding as the base transitions from operating F-15s to F-35s per BRAC 2005. ■

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America's Triple Threat

In 1988, just before the Cold War faded out, America's strategic nuclear deterrent boasted some 13,000 warheads, but two subsequent decades of negotiated cuts have reduced the total to roughly 2,000 "operationally deployed" weapons.

Warhead losses of such magnitude inevitably have rippled through the fleet of delivery vehicles built to carry the weapons to targets. Entire categories have vanished. Remaining types are fewer in number and fitted with smaller weapon loads.

To date, no US Administration has ever seriously considered abandoning the "triad" of land-based ICBMs, bombers, and missile-firing submarines. Its continuation, however, is no longer the stone-cold, lead-pipe cinch that it once was.

Secretary of Defense Robert M. Gates said change could emerge from the current Quadrennial Defense Review and new arms talks with

Russia. "If we go down significantly in the number of nuclear weapons that we have deployed, the question is whether the traditional triad makes sense anymore," he said in remarks at Maxwell AFB, Ala.

Since late 1960, when the strategic submarine force went operational, 11 Presidents and 16 Pentagon chiefs have supported the triad concept. The reason is simple: US bombers, ICBMs, and submarines each offer distinct benefits. Moreover, the whole is greater than the sum of its individual parts.

True, as you draw down the total numbers of warheads, the triple-headed system of delivery systems—at some point—becomes untenable. In the most extreme example, a nuclear weapons inventory of two warheads can't be split three ways.

So somewhere between 2,000 weapons and two weapons lies the lower limit of a minimum deterrent triad force. Few have offered any near-term justification for eliminating a leg of the triad for anything other than reasons of economy, however.

The bombers were the original nuclear delivery systems. Although both nuclear cruise missile and bomber numbers have declined in recent years, the Air Force is bolstering its nuclear bomber mission. USAF is reorganizing its B-52 inventory, settled on 76 of the jet aircraft as the correct number, and is standing up a fourth B-52 combat squadron. One B-52 unit will dedicate itself to the nuclear mission at all times.

Bombers offer unique benefits. They are highly visible symbols of intent if they are put on ground or airborne alert, sent overseas, or dispersed to various US bases. They send a clear message that the US is taking a threat or incident seriously. Further, the bombers are highly accurate and they alone can be "recalled" after launch.

Nuclear gravity bombs remain an important part of the US arsenal—the B-2 and B-52 can deliver B61 and B83 strategic bombs.

The B-52 can also launch the nuclear-tipped Air Launched Cruise Missile. The ALCM will become the sole US air-launched strategic missile once USAF completes deactivating the Advanced Cruise Missile.

The ICBM force has seen a similar force drawdown. The US retired its 50 Peacekeeper missiles with 500 warheads some years ago. It has more recently cut the Minuteman III inventory from 500 to 450 systems. At least 150 of the remaining ICBMs have been "downloaded" from three warheads to single weapons.



By (in order) land, air, and sea.

The Air Force has a comprehensive Minuteman modernization plan in place because these missiles offer their own unique benefits. There is undeniable value in a weapon that can destroy a target anywhere in the world in about 35 minutes.

The ICBM inventory also serves to discourage nuclear competition. Roughly 500 missile silos and launch control centers are spread across hundreds of miles of US soil. An enemy seeking a pre-emptive attack on the US nuclear force would likely have to target every silo and launch control site with two weapons to have a reasonable expectation of destroying them. The fact that two nukes would likely be expended attempting to destroy single-warhead Minuteman IIIs also makes such an attack costly and inefficient.

Finally, the Navy's Ohio-class Trident submarines are generally regarded as the most secure leg of the triad because, when submerged, they are extraordinarily difficult to detect. Though there are just two Trident sub bases, at Bangor, Wash., and Kings Bay, Ga., the boats have all the world's oceans in which to roam.

For the foreseeable future, the boomers are secure, but depending solely on submarines for nuclear deterrence is a risky long-term proposition. A revolution in anti-submarine technology, ballistic missile defenses, or a major equipment failure could someday make the undersea deterrent vulnerable.

The boomers have also seen their numbers decline. Because each boat could carry 192 nukes (eight warheads atop each of 24 SLBMs), the 2001 Nuclear Posture Review and subsequent Moscow Treaty led to a reduction from 18 to 14 Trident subs, while the D5 missiles themselves had warheads downloaded.

Ultimately, by preserving each leg of the triad, the US maintains unique capabilities, complicates enemy attack and defensive options, and is protected against a failure in one of the systems. As long as nuclear weapons remain key instruments of national military power, policy-makers would be wise to attempt to preserve the diversity of the triad. ■

More information: <http://www.usip.org/resources/americas-strategic-posture>

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The F-35—the last remaining manned combat aircraft program—moves to the center of US airpower plans.

Fighter of The Future

By John A. Tirpak, Executive Editor

In the once-crowded field of manned combat aircraft, the F-35 Lightning II fighter now has become the only game in town.

Secretary of Defense Robert M. Gates, with his April 6 budget cut recommendations, terminated further

production of the USAF F-22 fighter, began winding down the Navy's F/A-18 carrier-based fighter, and postponed the next generation bomber, which was supposed to enter service in 2018.

That leaves only the F-35 as a full-fledged manned air program. Gates has

heaped on the aircraft the burden of providing most of the capability and credibility of American airpower for decades to come.

Gates, in his budget announcement, praised the F-35 as emblematic of his vision for new weapons, saying that it

The first F-35 test aircraft soars over Florida on an April visit to its future home at Eglin AFB, Fla., where Air Force, Navy, and Marine Corps training will be co-located. All three services are counting on the Lightning II to address their combat aircraft deficits.

USAF photo by SRA Julianne Showalter

program by adding some aircraft to the operational test fleet. However, he didn't change the overall target number. That would remain at 2,443 aircraft across all the services, reached in 2035.

If Gates' plan proves out, the F-35 will be produced in numbers exceeding 100 per year for US requirements, and top 200 a year when foreign sales are included.

This production pace exceeds that posted by any fighter program since the late 1980s. F-35s will equip not only the Air Force, Navy, and Marine Corps, but also the air arms of at least eight US allies who are partnered on the program's development, and many others that will simply buy the fighter.

Gates did not back his budget submission with a future years defense program. DOD explained that, owing to the change of Presidential Administrations, the budget had been hastily reworked.

However, Gen. Norton A. Schwartz, USAF's Chief of Staff, later said the 513 F-35s budgeted over the next five years will yield "maybe 350" for the Air Force itself.

Schwartz noted that sustained, high-rate F-35 production will serve the US Air Force well, both in terms of "managing our aging fleet issues" but also in maintaining and controlling average unit cost of fighter platforms. That way, he said, "we can, in fact, purchase more of them and make the platform more competitive internationally at the same time."

Schwartz and other Air Force leaders have said they see a need for 110 or more F-35s a year to recapitalize the aging USAF fighter inventory at a reasonable rate. Asked if that will be possible, Schwartz pointed out that programs "ebb and flow" and that, as some wind down, "others ramp [up], and that would certainly be my expectation for the F-35."

USAF officials said Schwartz expects the pace of F-35 production to pick up after 2011. Gates' plans call for closing out the F-22 program in 2011, though Congress could still intervene and keep the fighter line going.

Lockheed Martin, the F-35's prime contractor, has tooled up to produce as many as 240 F-35s a year in its Fort Worth, Tex., facilities. Pieces of the aircraft are built among all partner countries, but that rate would be the most that could be put through final assembly and checkout without ex-

would be adaptable to a wide variety of missions, producible in large numbers at "sustainable cost," and not too specialized.

In contrast, Gates lashed out at programs he scornfully referred to as "exquisite." By this, he evidently meant

systems tailored to meet specific military requirements, lacking direct value in today's irregular wars in Afghanistan and Iraq, or costing more (in his view) than they are worth.

He promised to field the F-35 as quickly as possible, accelerating the



F-35s under assembly at Lockheed Martin's Fort Worth, Tex., plant. At planned peak, production will surpass 200 a year for US and allied air arms.

panding the assembly line and adding additional shifts of workers. Going higher than 240 could be done, but at what one company official termed "significant expense."

The Air Force's need for the F-35 is already acute, as the average age of USAF fighters has crept above 17 years for the F-16, and 24 for the F-15. Some are considerably older. Moreover, the 2010 budget request included plans to retire 254 fighters from the Air Force's fighter inventory in the next fiscal year alone; it had been thought this reduction would phase in over five years. As a result, the Air Force

will drop quickly and deeply below the level of 2,250 fighters considered the minimum requirement to fulfill national strategy.

An Urgent Requirement

Schwartz said studies to determine how the F-35s will be distributed among the regional commands, Air National Guard, and Air Force Reserve will "come to fruition ... in the next year or so." The heads of Pacific Air Forces, US Air Forces in Europe, and the Air National Guard have all gone on record saying their commands have the most urgent requirement for the fighter.

Internal Vs. External

The F-35 was designed with an entire air campaign in mind. For "first day of the war" operations when stealth is of supreme importance, the F-35 can carry two 2,000-pound bombs (two 1,000-pound bombs for the F-35B) and two radar guided dogfight missiles internally. Critics of the F-35 have complained that this loadout is far too light for sustained combat. However, in stealth configuration, all F-35 fuel is internal, as are all sensor and targeting systems. On legacy aircraft such as the F-16, fuel, weapons, targeting pods, etc., are carried externally and their weight and drag severely hamper performance. With a full internal load of fuel and weapons, the F-35 is as agile as a "clean" F-16 carrying no weapons. In other words, in stealth mode, the F-35 gives up nothing in range or weaponry, but adds considerable ability to penetrate enemy air defenses.

After enemy defenses have been beaten down, however—Week 2 of an air campaign—the F-35 becomes a weapon-hauling champ, with seven external hardpoints able to carry up to about 18,000 pounds of ordnance (15,000 on the STOVL model), including weapons too large to fit in its internal weapon bays. The F-35 can also be fitted with wingtip missile launch rails, to expand its ability to conduct air superiority missions.

Schwartz and Air Force Secretary Michael B. Donley, testifying before Congress in May, defended the plan to remove the older fighters from the inventory now, saying that the savings can be applied to upgrade those fighters that remain, to buy F-35s, and to improve the F-22 with more than \$1 billion of enhancements in Fiscal 2010 alone, and \$7 billion through 2015. The aim, they said, is to have a smaller but more capable fighter fleet, which will permit savings in manpower that can be applied to other pressing needs.

Marine Corps Gen. James E. Cartwright, vice chairman of the Joint Chiefs of Staff, said at a Pentagon press conference in April that the focus on the F-35 should be perceived as good news for the defense industry, "because the reality is, we're going to need quantity [and] that should be actually an advantage for the industrial base." It should be a welcome change of pace, he said, for contractors to see programs "funded at effective, efficient quantities. ... We build them, we build them efficiently, and we get them out there."

Gates, seated next to Cartwright, added that "if we can get this acquisition process in a better place, I think it will be a significant advantage for the industrial base for defense, in no small part because it will afford greater stability and predictability."

The budget put forth by Gates would increase from \$6.8 billion for 14 F-35s in Fiscal 2009 to \$10.4 billion for 30 fighters in Fiscal 2010. Out-year numbers were not provided.

The Government Accountability Office, in a March report, warned against putting too much emphasis on the F-35, noting that as many as 360 aircraft will be bought before operational testing is concluded. The GAO said that a flaw discovered in testing could be expensive to fix on the production line, and that it would be pricey to retrofit the already constructed aircraft with corrections.

A new production ramp rate accounting for Gates' acceleration has not yet been developed. Under previous plans, however, F-35 production would peak at 231 aircraft per year in 2015, of which 130 would be for the US armed services.

The Air Force will buy 1,763 conventional takeoff and landing F-35As. The Marine Corps will buy the short takeoff and vertical landing (STOVL) F-35B, and the Navy the carrier-compatible

F-35C—together, they will buy 680 airplanes, although the exact shares of each have not yet been decided.

David G. Ahern, the Pentagon's director of portfolio systems acquisition, told the House Armed Services' air-land subcommittee in late May that the Pentagon is aware that putting most of the air combat eggs in the F-35 basket entails some risk. The increase in the number of aircraft available for flight testing and an extension of the flight-test program "lessened the overlap between development and operational testing, which is a good thing."

He also acknowledged cost increases and schedule delays on the F-35, saying costs have risen "50 percent ... from the original baseline."

The increases and schedule overruns can be chalked up to "problems with manufacturing development [for] aircraft and engines. Design changes, parts shortages, out-of-station work, and supplier problems have caused significant manufacturing inefficiencies and increased labor hours that have led to higher costs and have caused the program to adjust manufacturing and delivery schedules four times, so far, in development."

Ahern acknowledged that the F-35 plan is "still very aggressive ... [with] very little room for error." The flight-test program, he said, is only two percent complete.

Lt. Gen. Mark D. Shackelford, the Air Force's military deputy to the chief civilian acquisition official, agreed in the same hearing that concurrency is an issue in the F-35, but pointed out

"The Last Manned Aircraft"

In testimony before the Senate Armed Services Committee in May, Chairman of the Joint Chiefs of Staff Adm. Michael G. Mullen said, "There are those that see the [F-35] as the last manned fighter—or fighter-bomber—or jet, and I'm one that's inclined to believe that."

Mullen said the pace of evolution in unmanned aircraft has accelerated so rapidly just since 2006 that the Pentagon is re-evaluating many of its plans for manned combat aircraft, such as the next generation bomber. Mullen, a naval aviator himself, said, "We're at a real time of transition here, in terms of the future of aviation, and the whole issue of what's going to be manned and ... unmanned, what's going to be stealthy, what isn't, [and] how do we address these threats."

Mullen's remarks were seen as a sign that the F-35 program, which will likely be negotiated in multiyear contracts, may never reach the planned production of 2,443 for the US, but could at some point be superceded by an unmanned aircraft with comparable capabilities.

that this was a choice made at the outset of the program. There was a desire to "bring that weapon system on quickly" and "reach a more economic order quantity" than was achieved on other programs, yet still thoroughly test the aircraft. These are "competing pressures," he said.

Under Control

However, Shackelford added that "to mitigate that type of concurrency ... a great deal of upfront investment was made in design tools ... such that we have ... a greater level of confidence in the design of the aircraft than we would have for legacy systems [going] back to the F-16 or F-15 days." Over the last six months, Shackelford said, "the maturity of the physical aircraft gives us reason to believe that we're going to get beyond the production issues" cited by the GAO and others.

Shackelford also said that the alternative engine for the F-35 can be accommodated in the program if Congress provides additional funds for its development, but that the program would be short of development funds if a second engine had to be carved out of funding for the airframe.

Managers at Lockheed Martin believe most of the turmoil in the program is in the past. Cost growth, they said, has leveled off. They believe the most significant problems have been found and addressed, and noted that one of the main cost drivers on the program—the cost of materials such as titanium—are now under their control. The company reports that the test program is going well and two of the major hobgoblins of aircraft development—weight growth and software—are well in hand.

Daniel J. Crowley, Lockheed Martin's vice president and F-35 program manager, said weight is "not something I think about or talk about much because we're on track to our weight projections."

Several years ago, he said, weight was a critical issue, as it was cutting deeply into the payload that the F-35B could take off with vertically. The program was allowed a year's delay as weight-cutting ideas of all kinds were explored and implemented. As a result of the redesigns that ensued, "we've been tracking now for several years to a three percent weight growth projection," which is half of what Naval Air Systems Command anticipated. The weight savings applied to the F-35B provided some bonus payload for the Air Force and Navy versions, although the F-35B weapons bay had to be modified and as a result can only accommodate weapons up to the size of a 1,000-pound Joint Direct Attack Munition. The Air

Photo by Ted Carlsson



Sporting the flags of the nine allies partnered in its development, F-35 AA-1 awaits another test flight. As more aircraft are delivered, testing will accelerate.

“Maneuverability Is Irrelevant”

For all of the Pentagon's recent claims, the F-35 was always intended to be a complement to the F-22 in the Air Force.

The F-22 would be the high-speed, very stealthy high-end guarantor of air supremacy, while the F-35 was cast as the lower-cost backbone fighter that could hold its own in a dogfight and swing to a variety of missions, but have special strengths in ground attack.

The F-35's air-to-air capabilities were developed to give it an edge against the most maneuverable of foreign fighters, since it will be the primary aircraft for most allied air forces.

The Air Force version of the F-35 will have the ability to sustain a nine G turn—equal to that of the F-15 and the F-16. The Navy and Marine Corps models will have 7.5G turning power, and a Lockheed Martin official said those versions will shine in the “low speed” dogfight.

However, according to Northrop Grumman, which supplies major sensor systems on the F-35, “maneuverability is irrelevant” for the F-35. The AN/AAQ-37 Distributed Aperture System, which projects a 360-degree image of surrounding air and terrain on the F-35 pilot's helmet visor, helps the pilot see and target air and ground threats with high fidelity. It eliminates the need for night vision goggles, which have limited field of view and must be compatible with cockpit lighting. With the DAS, the F-35 pilot can literally look “through” the airframe structure—even beneath the aircraft—and shoot at targets that aren't in front of him. Air-to-air missiles can actually be fired at targets to the rear. According to Northrop Grumman, instead of having to slug it out in a turning battle, “the F-35 simply exits the fight, and lets its missiles do the turning.”

Force and Navy variants can still carry the 2,000-pound JDAM.

“We learned a lot of lessons from legacy programs” and from the F-22, Crowley said, about “structural problems that grew weight,” and these have been avoided. Also, the computer-aided design of the F-35 has allowed for far more precision in building parts—twice the computing capability available during the F-22's design.

As a result, weight is well understood and thoroughly under control, Crowley said. In fact, he has the luxury of about 250 pounds of weight savings that are ready to go if necessary. For now, though, the additional weight reduction isn't needed, and implementing the cuts would add cost, so they're being held in reserve.

Fielding the F-35

The first F-35A flew in late 2006, but the design has changed slightly since that first aircraft, and it was not fully representative of a production model. The first F-35B flew in June 2008 (although by late May 2009 it had not yet flown in vertical mode), and both the updated F-35A and F-35C are to make their maiden flights in 2009.

Sixty operational aircraft will be delivered to Eglin AFB, Fla., between 2010 and 2013, for use by USAF, USMC, and Navy training squadrons. The Marine Corps will achieve initial operational capability with the F-35 in 2012, the Air Force in 2013, and the Navy in 2015. Beddown locations for the Air Force F-35As have not yet been established; USAF Chief of Staff Gen. Norton A. Schwartz said in May it will take “about a year” to decide how the aircraft will be divided among the combat commands, and in what order they will receive them.

The weight purge of a few years ago was so “intensive,” Crowley said, that “there's not thousands of pounds” of weight left to be saved on the F-35. However, even with a three percent annual weight growth, the key performance parameters, or KPPs, won't be affected.

“All of our predictions for performance are based on an end-of-life, worst-case” scenario relative to the F135 engine's power capacity, “so the true performance of the jet, throughout its life, will be much better.”

Crowley also reported that software—problems which hamstrung the F-22 in the last few years of its development—is not an issue on the F-35.

“We're well along in software,” Crowley said. “We're meeting our productivity numbers today, and we're doing the early sensor fusion.”

In flight testing so far, “we haven't had any software-related flight anomalies. They've all been hardware. And we haven't had any ground aborts that

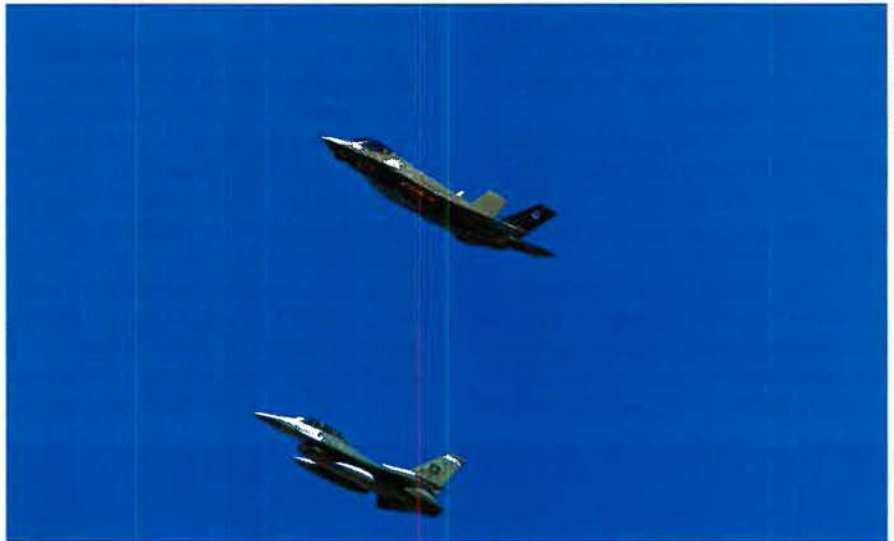


Photo by Ted Carlson

The first F-35 is chased by an F-16. Marine Corps Brig. Gen. David Heinz, the program executive officer, says the test effort will seek to verify predicted performance.

were related to software.” Unlike the F-22, which used “shared processors across multiple subsystems, ... we have different processors for each of the sensors and then they've isolated the software so that you don't get” the in-flight software crashes experienced during F-22 flight tests.

Because the software is done in a number of locations, Lockheed Martin hasn't scarfed up all the writers of code in central Texas or Los Angeles.

“We have spread the work around pretty well, so we haven't found [availability of programmers] to be a bottleneck.”

The Allied Buys

The eight other countries partnered in the development of the F-35 plan to acquire 730 of the aircraft, and these plans have survived numerous reviews and re-evaluations among all the partner parliaments and defense ministries. Current orders are as follows:

Britain: 138
Italy: 131
Australia: 100
Turkey: 100
Netherlands: 85
Canada: 80
Denmark: 48
Norway: 48

In addition, Israel is planning an initial order of at least 25 aircraft. Other countries which have either formally expressed interest or requested formal F-35 briefings include Singapore, Japan, South Korea, Greece, Spain, Finland, and Belgium. All countries that bought F-16s, F/A-18s, or AV-8Bs—the main aircraft that the F-35 replaces—are considered potential customers, and there are more than 40 such nations.

Moreover, to reduce the overlap between development and production, Lockheed Martin is using a flying laboratory—a 737 configured with an F-35 nose and wing leading edges—to try out the sensors and create the sensor fusion that will be a hallmark of the F-35. Sensor integration testing on the flying surrogate is well along, and by the time operational F-35s are moving down the production line, any bugs should be worked out, Crowley said.

With weight and software under control, Crowley said his biggest worry is “maintaining a steady supply of parts with quality, on time.” Process manage-

Lockheed Martin photos



Cockpit displays will complement data projected on the pilot's helmet. Variants will have nearly identical layouts.



The F-35 now is the only new combat aircraft on the books. Initial operational capability is slated for 2012 in Marine Corps squadrons, 2013 for the Air Force.

ment at the Fort Worth plant is not an issue, he said, and the production line will be moving 58 inches a day by the end of the year.

Crowley said much of the credit for the F-35 not veering off schedule and staying within its weight limits is the fact that the various stakeholders in the program have a vested interest in avoiding “requirements creep,” which has plagued most other systems in the last decade.

Pay Per Difference

“Every partner or service has to pay to be different,” Crowley said, and that has tamped down the urge to ask for unique gear or capabilities. Moreover, he said, service acquisition executives and the Joint Executive Steering Board

have adopted an attitude that “if we’re going to add things to the jet, we’re going to take things off,” so they don’t add to the degree of difficulty. An automatic ground collision avoidance system, for example, was moved from early in the program to a later block upgrade, mainly because a separate government software program was behind schedule.

The F-35s will be updated in two-year increments.

“Our parts fit up and mate with [far less] shimming than we’ve ever seen in legacy jets,” Crowley noted. “And we’re running defect rates that are comparable [to] or lower than mature programs today because we designed parts to such close tolerances,” with computer-aided design, “that are much more conforming.”

Former Air Force acquisition executive Sue C. Payton, in an exit memo on

the status of the F-35 program early this year, deemed its health “mixed,” due to cost increases, concurrency, early cost jumps on the F135 engine, and the slowly building pace of flight testing. She expressed concerns about overhead costs on the program, which have ratcheted up in recent years.

However, Payton’s overall assessment was that “I am confident in the program’s risk management plan, and expect that with proper government oversight, the program can achieve the required technical performance.” She urged that as soon as possible, the F-35 become a fixed-price contract rather than the existing cost-plus.

Crowley said that he expects that will happen, and the program will be ready when it does. ■

Playing With Fire

Operational trends over 40 years have shown that US airpower depends completely on tankers.

By Rebecca Grant

“Tankers are the lifeline for our command and for the Air Force.” For Gen. Arthur J. Lichte, who spoke those words, that about sums up the situation with respect to aerial refuelers. And that, in the view of the commander of the Air Mobility Command, tells you why buying a new tanker is USAF’s No. 1 priority.

The Air Force in late 2001 first considered plans to accelerate its planned tanker buy. Since then, the term “KC-X” has become synonymous with scandal, venom, and missed opportunities.

By failing to get started on USAF’s replacement KC-X program, however,

the Defense Department is playing with fire. The most recent conflagration came in 2008. Protests from Boeing were found to have merit, and a tanker award made to a Northrop Grumman-led team that February was overturned.

The tanker controversy “has not been a healthy one” for DOD, the Air Force, or the contractors, said Michael B. Donley, Air Force Secretary.

Late in the Bush Administration, Defense Secretary Robert M. Gates decided the KC-X had become too politically toxic, and put off restarting the competition so the Obama Administration could take over. Little did Gates know he would be staying on as Defense Secretary under Obama.

In February 2009, the next generation KC-X program was revalidated by the Joint Requirements Oversight Council, headed by the Joint Chiefs of Staff vice chairman and charged with blessing requirements for all major acquisition programs.

In April, the KC-X program became something of a rarity—a high-profile Air Force acquisition program supported in the President’s 2010 budget proposal. Plans call for the competition to restart this summer, but there is still no clear methodology for the competition or an announced production rate.

The tanker requirement is documented in war plans. At the top of the official



A KC-135 Stratotanker from the 117th Air Refueling Wing and two F-15s and an F-22 Raptor from the 325th Fighter Wing on a recent mission.

USAF photo by MSGt. Scott Reed

statements is the Mobility Capability Study, an exhaustive analysis matching war plans with force structure. In 2006, the MCS called for the Air Force to maintain 520 to 640 aerial refueling platforms.

By that standard, the tanker fleet is already below the minimum. USAF has just 476 viable tankers—417 KC-135R/Ts and 59 KC-10s. That's 44 aircraft short of the number deemed to be the minimum requirement.

To address the shortfall, Air Mobility Command has divided its tanker replacement plans into three discrete sections.

■ KC-X would be a medium-size tanker replacing 179 aircraft. At the

expected replacement rate, this will take about 15 years—once a program actually begins producing aircraft.

■ KC-Y would begin the next phase, also replacing about 179 aircraft.

■ KC-Z might be a different aircraft, perhaps a replacement for the much larger KC-10 tankers.

Whether the Pentagon should pursue a winner-take-all approach, a split buy, or a dual buy is unsettled. Gates has opposed buying new tankers from two contractors, calling such a move “bad public policy” and a “bad deal for taxpayers.” Many lawmakers support the idea, however.

One could make the argument that the KC-X is more crucial to airpower and

joint operations than any other single platform. Decades of taking tankers for granted have obscured the extent to which the tanker force has reshaped the modern air campaign.

Without tankers, the air campaigns of recent decades would not be possible. The power to deliver fuel in the air, rapidly and reliably, makes possible the swift initiation of an air campaign anywhere on the globe.

In US Central Command's theater alone, the statistics are nothing short of compelling. The average day in 2009 sees some 45 to 50 KC-135 tankers in operation, passing fuel to as many as 250 receivers. And that is just in one region of the world.



In this Vietnam War-era photo taken over North Vietnam, an F-4C Phantom takes on fuel from a KC-135 tanker while two others line up and await their turn at the spigot.

Picture the scene in the cockpit of a combat aircraft on a long mission with its fuel margins dropping. It may be an A-10 whose pilot is supporting coalition troops in contact in Afghanistan, and could stay with the mission, if only there were more gas.

It may be a B-2 out of Guam heading for a tanker rendezvous over the Pacific, or a C-17 transport ferrying trucks to Afghanistan.

In each case, what the aircrew wants to see is the dark gray speck on the horizon growing, slowly, into the comforting shape of a refueling tanker, boom or basket extended.

The fuel figuratively gushing through the boom at thousands of pounds per minute translates into range and persistence. Today's large, highly capable tanker force can be considered a gift of the Cold War, but its time is running short.

The youngest KC-135 aircraft is 44 years old; the eldest is more than 50.

In Lichte's view, "It's unconscionable that we're asking people to fly in combat in 50-year-old airplanes."

The Air Force expects KC-X to go far beyond the capabilities of the KC-135R. The "exact dimensions" are "not the thing that I worry about," Gen. Norton A. Schwartz, Chief of Staff, said in 2005 when he led US Transportation Command.

Lessons from Iraq and Afghanistan have greatly clarified requirements for the next tanker. First comes more fuel, more room for passengers, and more cargo.

No one questions that the No. 1 job for tankers is to refuel receivers.

However, mobility commanders over the past several years have come to depend on tankers for many different roles. With KC-X, they are looking for a platform to give them more capability for these additional missions.

Another lesson has been to build in a capability to deal with increased threats. An AMC study found that, during 2006, US tankers were fired upon 19 times in the CENTCOM region. Advanced defensive systems are a must.

The fleet is sized for global operations and for wartime surge in many types of missions. Tanker fleets must be large enough to meet war plan requirements—the metric of choice here is the number of receiving aircraft per hour that can be refueled. A major operation means putting lots of fighters and bombers over target areas at the same time.

The Essential Core

These are not "heavy force" requirements only. Irregular warfare still relies on air-delivered fires to dispersed, small teams—again potentially creating high peak demand. There is no reason to believe that fewer tankers will be needed in the future.

A robust fleet of tankers therefore forms the essential core of wartime tanker surge operations for the future.

And yet, the tanker crisis of today has been brewing for a decade. Deep concern first emerged in 1999 during Operation Allied Force—the NATO air war over the former Yugoslavia. Air tankers were heavily used, but older KC-135s could sustain only a 78 percent mission capable

rate—they had begun to break in new and unexpected ways.

Since then, the Air Force has been given more vivid warnings, many from the depot at Tinker AFB, Okla.

In 2003, Gen. John P. Jumper, then Chief of Staff, said, "The KC-135s, when you visit them on depot line at Tinker Air Force Base, you can peel the skin layers apart and powder comes out the middle. Corrosion is overtaking these airplanes, and fatigue cracks them in ways that we have never been able to anticipate."

Operating costs for the oldest KC-135Es started to grow at a rate of 10 to 15 percent per year.

An "analysis of alternatives," directed by Congress and carried out by RAND for senior Pentagon managers, was completed in March 2006. That report said, "There is considerable uncertainty about the future technical condition and sustainment cost of the KC-135."

The KC-135s are, in a word, ancient. Although these aircraft have new engines and updated avionics, they are in danger of sudden and impossible-to-predict failure. The KC-135Rs average almost 49 years of age.

The trends are definitely not good. Average time in depot has climbed from 180 days to 240 days. "That's because every time they open the airplanes up, they are finding more problems," Lichte said.

Two known factors give pause. First, the KC-135s eventually will have to be reskinned. As Lichte explained, it was a skin failure that led to the 1988 incident where a commercial airliner over the Hawaiian Islands lost the top of its fuselage, killing a crew member.

The situation with the tanker is analogous.

Second, corroded wires likely were contributing, if not primary, factors in the explosion that took down the TWA flight off Long Island in 1996. This risk could soon affect the safety of the KC-135 fleet.

It is not really possible to anticipate when the KC-135 fleet will be forced to depart the scene for being too dangerous to fly. According to Lichte, the window of danger will begin to open long before USAF can complete a new tanker buy. "I feel very confident that they have the ability to continue to fight tonight, but I start worrying about what happens 10, 20, 30 years down the road. Unfortunately, the answer still comes up that we're going to be using KC-135s."

The DOD plan for the KC-X program has included annual buys that range from



A Boeing artist's conception of a KC-767 refueling a much larger KC-777 in flight.

12 to 15 aircraft. It will take decades to fully replace the KC-135s now flying. If a catastrophic event grounds the KC-135 fleet, there is no real way to compensate.

When the fleet goes down, it will probably happen because of irreversible corrosion of the airframe. To sense the gravity of the tanker imperative, one must look at how air refueling is supporting American military power.

"I don't know any other theater that's more dependent on the tanker force than the Pacific," said Gen. Carrol H. Chandler, commander of Pacific Air Forces. "Today it takes about seven hours on the ground for maintenance for every hour in the air, ... so I would tell you that the new tanker is at the top of our priority list," Chandler said.

More concrete were the events of Sept. 11, 2001. America was under attack and the first response was an instant air campaign. NORAD fighters set up combat air patrols—and CAPs meant tankers.

A KC-135 from Maine was on a scheduled training mission near New York City when it was called to help. The crew set up an orbit over Kennedy Airport to help two F-15s. With the tanker in place, one F-15 would refuel while the other stayed on station or intercepted unknown aircraft over New York. More F-15s arrived shortly and they, too, needed fuel.

Later, a KC-10 from McGuire AFB, N.J., replaced the Bangor crew.

All over America tankers were scrambling. Remote areas in the western United States lacked radar and communications coverage but they did have tankers.

Alaska's air defense command center picked up the track of an inbound Korean

airliner squawking a hijack code. Four fighters scrambled to intercept and track the jet aircraft. Tankers with call signs Arctic 61 and Arctic 64 took off to support the fighters and an AWACS.

Post Sept. 11 Surge

Arctic 61 followed the fighters and airliner on a parallel heading so the fighters could talk to the airliner on VHF via the tanker. But soon the fighters were "getting too far away from our radios for us to maintain communication with them," said Capt. Steven J. Thomas, who, along with MSgt. David G. Rafferty, served then in the Alaskan Air Defense Sector center. Rafferty suggested Arctic 64 hold and act as radio relay with the fighters.

"That worked great and we had a radio relay," Thomas added. "We were quite relieved to have KAL 85 land, learn it

had not been hijacked, and no one was harmed."

Tankers flew 6,175 Noble Eagle sorties during its first year. The need for homeland security in time generated a new tanker mission. In 2002, authorities phased in a graduated alert posture. The minimum posture tasked about 35 fighters and eight refueling tankers to be constantly on alert. Higher alert postures called for considerably more.

The post-Sept. 11, 2001 tanker upsurge in American skies was just the beginning. Many tanker crews were going to the skies over Afghanistan. The opening days of Enduring Freedom illustrated the dependence of American military power on long-range tankers as never before.

Plans for Enduring Freedom called for helicopters, tankers, and transports to operate in Afghan airspace.

- Navy carrier decks held enough F-14s and F/A-18s to guarantee air superiority—if they could stay on station. Enter the tankers. From a handful of theater bases, tankers set up orbits to support Navy fighters and Air Force bombers that opened the campaign.

- Tankers enabled C-17s to fly from Germany to drop relief supplies on Night 1.

- Tankers kept E-3 AWACS aircraft on station.

- Tankers met inbound Navy fighters heading north on six-hour missions.

- Tankers soon were gassing up F-15Es and F-16s on extraordinarily long flights to attack key targets.

After the first few days, the number of preplanned targets diminished. The only way to provide on-call firepower was with frequent, dependable refueling. Air strikes hit Taliban strongpoints as they were identified. In late November, two F-15Es flying out of Kuwait were



A Northrop Grumman artist's illustration of the KC-30 refueling another KC-30 in flight.



A1C Louis Martens (l) and SSgt. Joseph Dodson (r) install safety wires on the engine mounts of a replacement engine for a KC-10.

rerouted near the end of a mission as an AWACS dispatched two tankers to provide poststrike refueling. The Strike Eagles hit their new target and made it back home after a 13-hour mission.

All told, tanker aircraft flew more than 5,000 sorties in Enduring Freedom's peak phase from October 2001 through February 2002. For persistence and endurance, this was a new high water mark.

By March 2003, Army Gen. Tommy Franks, CENTCOM commander, was ready to unleash Operation Iraqi Freedom. Franks had a plan for Iraq that called on airpower to be ready with maximum firepower and flexibility.

Plans called for the air component to conduct five air wars across Iraq all at the same time, but "not a single bomb gets dropped, not a single air-to-air engagement happens, or missile is fired unless tankers make it happen," said Col. Cathy Clothier, as an expeditionary operations group commander.

CENTCOM initially scrambled to find tanker basing locations, but soon the coalition's aerial refueling capacity grew. A total of 149 KC-135s and 33 KC-10s deployed for OIF; Clothier based 30 tankers at a British base on a Mediterranean island.

The pace of operations was high. "At least a third to a half of our aircraft are in the air at any given time, and as the operation tempo increases, so will the number of sorties we fly," said Lt. Col. James Vechery, as commander of an expeditionary refueling squadron.

As air component commander, then-Lt. Gen. T. Michael Moseley soon pushed tanker crews right up to the battle's edge. What the joint force needed was for tankers to come closer, to cut the time fighters spent returning to refueling tracks. "By the third day of the war, we

were operating 60 miles out of Baghdad," said Wing Cmdr. R. A. D. Greene, of RAF 216 Squadron.

US Air Force tankers racked up 6,193 sorties during the main phase of Iraqi Freedom and off-loaded 376,391,000 pounds of fuel.

The mission morphed, and Lichte described how tankers integrated with stability operations. "When the fight's going on and you have troops in contact, and the F-16s and F-15s are down helping protect the Army, if they have a tanker right overhead, [the pilots] just pop up, they hit it, and they go right back.

"If that tanker has the capability of staying on station a very long time, either because it can carry more fuel or because another tanker can come and dump the fuel into it, that gas station stays right over the fight."

An Amplified Mission

The work of today's tanker force amplifies the mission set seen in past air campaigns. Current operations in Iraq and Afghanistan have placed a premium on what fighter and bomber crews call loiter time: Staying in the air as long as possible pays major dividends.

"They are there when you need them," said Lichte. On numerous occasions, firefights went on for several hours. If troops are inserted by helicopter and encounter resistance, fighters and bombers may have to be overhead most of the day to provide direct air strikes and cover extractions. Controllers on the ground benefit from working with the same strike aircrews as long as possible.

Tankers are crucial to keeping the ammunition coming. "Having a tanker up there gives you more loiter time on fighters and bombers," said Lichte. Without tankers, planners would need "quadruple the number of fighters to cover the same time period," Lichte explained.

Today's tankers have also become valuable conduits of information, especially in Central Command's far-flung theaters of operation. Experiences in Afghanistan pointed out the limitations of line-of-sight communications. One solution was the "smart" tanker, which began as a quick-fix installation of Link 16 antennae. Additional enhancements included a package known as Roll-on Beyond Line of Sight Enhancement or ROBE, which debuted in October 2002.

"It's like instant text messaging for war—with pics," Lt. Col. Pamela Freeland, a KC-135 pilot who was deployed to Manas AB, Kyrgyzstan, said of the smart tanker upgrades. This gives pilots "a common operating picture of all of Afghanistan that gives us a better understanding of what's going on in the battlespace we're supporting. Even the boom operators like how easy it is to use the system."

"ROBE ensures I have the total air picture available," said Lt. Gen. Gary L. North of today's capabilities. "To have a synchronized communications capability overhead on our tanker fleet that can reach down into the valleys in Afghanistan is very critical," North added.

The "smart" tanker has become essential for air operations.

Operational trends over the last 40 years have shown that airpower today depends completely on tankers.

Without a reliable air refueling fleet, the Air Force's expeditionary operations would be curtailed. Forward air bases would have to be near battle areas. Humanitarian relief missions would take days longer. The ability to operate in multiple theaters at the same time would wither.

The clock is ticking for the KC-135, but the replacement program remains stalled. Policy-makers would be wise to remember that, were the United States forced to stand down the KC-135R fleet, America would lose its rapid global reach instantly.

"Everything comes to a grinding halt," said Lichte. ■

Rebecca Grant is a senior fellow of the Lexington Institute and president of IRIS Independent Research. She has written extensively on airpower and serves as director, Mitchell Institute, for AFA. Her most recent article for Air Force Magazine was "The Afghan Escalation," which appeared in the June issue.



SPY-1



EQ-36



RMMV



TPS-77

how

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Big Sky Kings

The “Vigilantes” of the Montana Air National Guard now take to the air in F-15C Eagles.

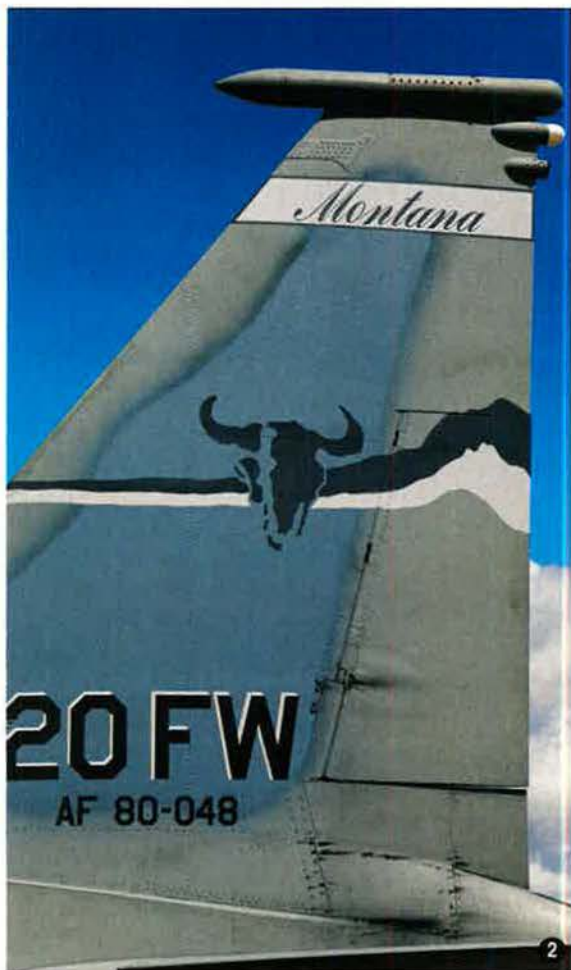
Photography by Ted Carlson





Two F-15Cs of the Montana Air National Guard's 120th Fighter Wing strike out on a practice intercept mission. After flying the F-16 since 1987, the "Vigilantes" (see inset patch) have converted to the F-15C.

The Air National Guard facility at Great Falls, Mont., was quiet for six months after the last F-16 left, but it has been roaring with activity since January, as the 120th Fighter Wing has been converting to the F-15C Eagle. The unit has been in the interceptor business going back to 1955, when it was equipped with F-89 Scorpions. Over the years, the unit converted first to the F-102 and then the F-106, and finally the F-16A. In 2001, new F-16Cs dictated a shift to the multirole-ground attack mission, and the 120th went into the Air and Space Expeditionary Force rotation. Now it's back on strip alert with the F-15C—but the wing is still available for deployment.



1|1 An F-15C awaits its next scramble. 12| The familiar Montana tail flash that once graced F-16s now adorns the F-15. 13| Ready at the hangar at Great Falls Airport, a 186th Fighter Squadron Eagle powers up. 14| Lt. Col. Michael Buck conducts the pre-flight as rain begins to fall.



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11 Eagles receive tender loving care in the cavernous Great Falls ANG hangar. (The F-15 at right, from Mountain Home AFB, Idaho, was on assignment at Great Falls.) The conversion from F-16s was a by-product of the Base Realignment and Closure process. The 120th retained its manned fighter mission, unlike many Guard units that are shifting to an unmanned aircraft or support role, or being

inactivated. *12* TSgt. Jason Bowers of the 186th FS directs an F-15 pilot. *13* Gear up, an F-15C heads out to the range. There are excellent ranges near Great Falls where F-15 pilots can let loose and fly supersonic in Montana's Big Sky. Unfettered ranges are increasingly rare in the lower 48. *14* End of runway checks are a last chance to catch anything amiss. Great Falls' F-15s are considered in

relatively good shape despite their long years of service, and they will receive the "Golden Eagle" upgrade over time. This will include structural and avionics improvements, as well as newer weapons. *15* Capt. Carol Kohtz ascends the crew ladder of her F-15. Its serial number marks it as having been bought in 1980.

111 TSgt. Bret DePratu (l) and MSgt. Brian Haentges stand watch over the Great Falls flight line. They are with the 120th Security Forces Squadron. 121 Crew chief TSgt. Brad Roman-chuk (l) talks to a pilot. (MSgt. Shawn Briggs is in the background.) 131 An Eagle clears the runway. 141 Still graceful after 35 years, an F-15C plies the skies of Montana. It is carrying an AIM-120 AMRAAM and a range instrumentation pod. 151 The Eagle's talons: A transporter bears AIM-9M (top) and AIM-9X (bottom) Sidewinder missiles. The AIM-9X is the most agile and spoof-proof dogfight missile yet fielded. These are inert training rounds, as the blue stripes signify.





11 A half-dozen Eagles line the ramp at Great Falls. Note the "Vigilantes" inscription on the inboard vertical tails. Not as mechanically sophisticated as the F-16s they replace with the Montana Air Guard, the F-15s are larger, with two engines instead of the F-16's one, and with fewer diagnostic systems, making them a different maintenance challenge. However, the Eagles' larger size makes access to

their systems somewhat easier. **12** SrA. Anjelina Klein repairs an oxygen mask in the 120th's life support shop. **13** In its "clean" configuration, the F-15 remains one of the most agile and powerful fighters in the world. **14** Kohtz pops the massive F-15 speed brake. Her Eagle sports an AMRAAM and AIM-9X on the left wing. Boeing is the prime contractor for the Eagle, having merged with McDon-

nell Douglas, the Eagle's designer and builder, in the 1990s. **15** Crew chief SSgt. John Edwards buttons up a panel on a bracingly cold Montana day in February. At top left is the business end of the F-15's 20 mm cannon. Montana ANG Eagles will eventually get the Joint Helmet-Mounted Cueing System, which will allow them to shoot off-boresight at enemies just by looking in the right direction.

111 SSgt. Anastacio Navarro (1) and SSgt. Keith Gottloe work behind the dashboard of an F-15C. The ACES II ejection seat has been removed for service. 121 Crew chief SSgt. Chad Parcel snaps a salute to departing F-15Cs. The wavy two-tone camouflage is the third pattern USAF has applied to the fighter; it's called the "Mod Eagle." 131 Eagles stand ready to intercept suspicious aircraft that may come in over the Canadian border, a scant 100 miles to the north of Great Falls. 141 The 120th's F-15 pilots will often practice dogfights with each other in the local area, but deployments to Red Flag and other exercises are likely before too long. 151 Buck with his F-15 before beginning another mission.





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1 The F-15C's large size is evident in this photo; crews once called the upper rear surface the "tennis court." **2** A brace of F-15s line up for a two-ship launch. **3** The F-15 remains the unbeaten heavyweight champ in real-world air combat, with more than 100 victories and zero losses in dogfights over its 35-year history. **4** Maj. Scott Smith and Lt. Col. Steve DeMilliano carry their gear to their waiting Eagle. More than 900 Guardsmen of the 120th FW keep the F-15s on 24-hour alert. ■

How the Predator Grew Teeth



USAF photo

The little UAV had an inauspicious start. Things have picked up considerably.

By Walter J. Boyne

Left: Predators and Predator crews at Joint Base Balad, Iraq. Below: An MQ-1 Predator carrying two Hellfire missiles.



This is the story of how a lowly reconnaissance drone became one of the most critical weapons in the nation's air arsenal.

It is the story of the Predator unmanned aerial vehicle. More specifically, it is the story about how that UAV turned into an attack aircraft. At birth, Predator showed no signs that it would, in time, figure prominently in thousands of USAF missions over Iraq, Afghanistan, and other hotspots. No one expected it was to wind up watching terrorists; guiding fighters, bombers, and gunships to targets; and sometimes attacking enemies itself in otherwise inaccessible areas.

It was once referred to, affectionately, as "nothing more than a glider with an Austrian racing snowmobile engine." The Predator made its operational debut in 1995. It has since gained new capabilities at a rate that astonishes those accustomed to routine development programs.

The UAV, built by General Atomics Aeronautical Systems Inc., of San Diego, has now seen 14 years of combat. Designations have changed over time, but the initial prototypes were called RQ-1; later armed versions became the MQ-1.

Three groups of people played vital roles in quickly ushering in the Predator's multimission capability, which required adding a laser designator, then onboard Hellfire missiles.

The first group comprised a succession of Air Force Chiefs of Staff, with Gen. John P. Jumper (2001-05) particularly prominent among its members.

Second was a little known but influential Pentagon office having the unassuming designation of deputy chief of staff for intelligence, surveillance, and reconnaissance A2/A2U. The office is headed by James G. Clark. "Snake," as he is called by one and all, is a retired Air Force colonel and fighter pilot. His official title is director of

the Air Force's ISR Innovations and Unmanned Aerial Systems Task Force.

The third group of key advocates belongs to Air Force Materiel Command's "Big Safari" program office, which manages the development of USAF's myriad special purpose aircraft.

Military and Intelligence Community customers have pushed for advances in each of the system components over the years. The first Predator flight was in 1994, as an Advanced Concept Technology Demonstration.

In 1995, prototype Predators demonstrated their capability in NATO operations including Deny Flight and Deliberate Force.

The Army initially led the program, but responsibility was assigned to the Air Force in 1996. Deployed that year to Gjader, Albania, Predators participated in Operation Joint Endeavor. It was there that Gen. Ronald R. Fogleman, USAF Chief of Staff, selected then-Colonel Clark to assess Predator operations.

Clark observed the pilots, seated at consoles in a converted NASCAR transporter trailer, operating the Predators. The UAVs were sending back color television and infrared video surveillance images to the control center. Clark

was suitably impressed, filed a positive report, and he thought he was finished with Predators.

He was done with the Predator, until three years later, that is. On April 2, 1999, he received a call about the Predator from Gen. Michael E. Ryan, who had succeeded Fogleman as USAF Chief of Staff.

A Curious Twist

In his phone call, Ryan told Clark that Jumper, who was commander of US Air Forces in Europe, had informed him of an urgent requirement for the Predator to provide precise geographic locations of the subjects it was observing, so they could be targeted.

In one of the curious twists of modern warfare, Jumper had just been called by Lt. Gen. Michael C. Short, the commander of USAFE's 16th Air Force. Short had learned from a conversation with his son, an A-10 pilot, that although Predator operators could see targets the UAV was reconnoitering, there was no effective way to direct strike aircraft to the targets. What typically resulted was a cumbersome and inefficient conversation as the Predator operators attempted to "talk" the fighter pilots to the targets.

Ryan was already a big supporter of UAVs. In 1995, as commander of NATO's southern air region, he had commanded 16th Air Force and was the NATO air commander for Bosnia. As such, Ryan oversaw the first military operational use of the Predator during Operation Deliberate Force. The Chief was impressed by the fact that UAVs such as the Predator could be used in areas considered too dangerous for manned aircraft without concern for losing a pilot.

In fact, Ryan had once used the RQ-1 as part of a combat search and rescue effort that was searching for a French air crew that had been shot down by Bosnian Serbs.

Ryan sent Clark to the NATO combined air operations center at Vicenza, Italy, to obtain and integrate target mensuration capability for the Predator.

At that time, Predators were flying over Kosovo 24 hours a day, trying to identify hostile forces. The current rules of engagement called for a visual identification of any potential target by a forward air controller before a strike could be made.

A major problem was that the similarity of terrain, housing, and other features made it difficult to convey to an attacking pilot exactly where the target was. Pilots spoke of being told to use a building with an orange roof as a landmark, while they were flying over a figurative sea of orange-roofed buildings.

Clark turned to the Big Safari office at Wright-Patterson AFB, Ohio, led by William Grimes. The Big Safari office was famous for its scientific analysis of weapon systems, combined with a pragmatic approach to acquisition and logistics.

Among its many responsibilities, Big Safari sustains and modifies special mission aircraft, such as the RC-135 Rivet Joint, MC-130E Combat Talon, EC-130H Compass Call, and other sometimes secret programs. At any time, Big Safari's specialized acquisition and contracting process supports as many as 24 projects and logistically sustains up to 50 aircraft.

The Big Safari office recommended that the Predator's sensor camera ball be replaced with a different sensor that would offer both a camera and laser designator. This would allow transmission of target data with pinpoint accuracy from the Predator to NATO's F-16s.

Things moved with what became legendary speed. The laser designator



USAF photo



Gen. John Jumper (standing, center), then ACC commander, is flanked by "Big Safari" members, USAF's specialized acquisition and contracting process team.

was obtained from the Navy only 18 hours after the recommendation was approved. Testing was accelerated, and the first laser-equipped Predator was deployed to Kosovo just 38 days later. Probably by coincidence, the Serbs surrendered one day after the upgraded Predator flew its first combat mission.

Jumper, who was also commander of Allied Air Forces Central Europe, had consistently advocated reducing the "kill chain," the time required to find, fix, track, target, engage, and assess targets.

Close analysis indicated that by making the same aircraft both the "sensor" and the "shooter," an armed Predator could greatly reduce the kill chain time.

When Jumper returned to the United States to lead Air Combat Command, he inquired how things were progressing on the task of installing the laser designators on Predators. He was dismayed to discover that the lasers not only weren't installed, but the existing installations were actually being removed from their host Predators.

Procedural bureaucracy had reared its ugly head, and the laser designators were being pulled from the airframes, Jumper said in an interview, because they were "not part of the program."

Jumper made a quick call to Ryan, who was also unaware of the situation.

After asking for and receiving ACC responsibility for the program, Jumper went to the acquisition community and called for fleetwide installation of the laser designator on the Predator.

Jumper was aware of Predator film which had almost certainly showed Osama bin Laden at an al Qaeda firing range. Because at the time there was no way to attack him immediately, a strike was ordered using Navy Tomahawk land-attack missiles. They took too long to arrive, and so the attack was a failure.

Three Million and Three Months

The ACC commander therefore asked for something else as well—the ability for the Predator to carry and fire Army Hellfire anti-tank missiles. Jumper's goal was to give operators the ability to take immediate advantage when perishable, high-value targets were spotted.

The first response to Jumper's request was predictably routine—the project could be completed in five years, for about \$15 million. Jumper responded, "I'll give you \$3 million and three months, and I'll take responsibility for failures."

It was the kind of charter that Clark, Big Safari, and other special program developers relished. An unorthodox but realistic test program was set in motion.

The Predator's small size and lack of overall structural strength dictated that the RQ-1 could only carry a missile—and rails—that weighed less than 175 pounds. This made the Hellfire missile almost the only choice.

There were particular concerns about firing a helicopter-borne anti-tank weapon from a lightweight UAV. Would firing the missile break up the Predator, either by wrenching a wing from its mounts or knocking off the vertical stabilizer?

Clark witnessed a test which consisted of chaining a Predator to a concrete pad and shooting the missile.

No parts fell off the Predator.

On Feb. 16, 2001, Predator #3034 took to the air and successfully fired a Hellfire in flight. A series of tests showed how effective the Hellfire was against tanks. Clark keeps on his desk the salvaged warhead of the first Predator Hellfire to strike a tank.

Tests continued all through the spring and summer. Firing runs were made at varying altitudes. There were no problems until the altitude for test shots reached 12,000 feet, so a simple but pragmatic decision was



This Predator—#3034—was the first to shoot a Hellfire missile. It now hangs in the National Air and Space Museum in Washington, D.C.

made: Don't fire the Hellfire from the Predator at altitudes above 10,000 feet.

The result was that only 61 days after Jumper's challenge, and with the expenditure of \$2.9 million, the Predator was qualified to use the Hellfire.

The terrorist attack on Sept. 11, 2001 thrust the RQ-1 back into prominence. Predator #3034, in fact, was also among the first three to deploy overseas on Sept. 12, 2001. For its historical significance, it is now exhibited at the Smithsonian Institution's National Air and Space Museum.

At one point, Clark's deputy, Kenneth J. Johns, called his counterpart at the Army's Huntsville missile center to inform him that a Boeing C-17 was inbound. Johns wanted 10 Hellfires loaded on it, no questions asked.

That accomplished, the C-17 shortly took off for the Middle East, loaded with both essential ingredients for a

and there are 10 other sites. In an interview, Clark expressed particular gratitude for the manner in which the Air National Guard has embraced the challenge of operating the Predator.

Speed and Flexibility

As Clark recounts, the Air Force entered the UAV era with relatively little experience developing or operating unmanned aircraft. In the last 14 years, however, USAF has learned a great deal, much of which has been translated into additional Predator capability and which will be used to generate requirements for next generation UAVs.

In one example of a lesson learned, some Predators were armed with the AIM-92 Stinger missile, to defend themselves against Iraqi fighters. Getting the Stinger certified on the Predator took only 91 days.



Pictured are then-Secretary of the Air Force James Roche (r), Snake Clark (center), and Gen. John Jumper (back to camera), three of the major players in the development of the armed Predator.



The Predator's big brother, the MQ-9 Reaper carries four Hellfires and two GBU-12 laser guided bombs.

new twist in warfare: Predators and Hellfire missiles.

Clark and his unit weren't done yet; they next set up Predator's "remote split operation" system in just five days in September 2001.

Satellite relays allow Predator pilots in the US to operate the armed UAV in combat in the Middle East. A conservative estimate indicates that this then-new reachback method saved the Defense Department the time, cost, and effort of moving roughly 1,000 personnel—and all their attendant equipment—from the United States to the theater.

The Global Operations Center for reachback operations is at Creech Air Force Base in Indian Springs, Nev.,

On Dec. 23, 2002—less than three months before Operation Iraqi Freedom began—a Stinger-armed Predator was performing reconnaissance over a no-fly zone when an Iraqi MiG-25 turned in to attack. The Predator fired at the MiG-25, and the TV imagery showed the smoke trails of the two missiles crossing in midair. Unfortunately, the MiG's missile downed the Predator, but the Iraqi Air Force apparently drew the conclusion the US would have wanted them to: that

there was no future in combating Stinger-armed Predators. There were no further attacks against the UAVs.

When asked about the unusual success of the Predator program, its chief proponents, Jumper and Clark, were quick to stress the importance of personal trust among the teams that made drastic changes with speed and flexibility.

Each of the participants in the saga was quick to reel off the names of many other people who also played key roles in solving the problem of arming the Predator with the Hellfire missile, and who thereby helped bring to fruition one of the fastest reactions in high-technology modern warfare—placing Hellfire missiles on the Predator.

The Predator fleet reached 500,000 flight hours on Feb. 18, 2009 and is currently generating 4,400 weekly combat hours.

Its newer, larger, and more heavily armed derivative, the MQ-9 Reaper, has already reached 40,000 flight hours. This unmanned aerial vehicle has truly revolutionized low-intensity conflict, and top defense officials say its importance will only increase in the years to come. ■

Walter J. Boyne, former director of the National Air and Space Museum in Washington, D.C., is a retired Air Force colonel and author. He has written more than 600 articles about aviation topics and 40 books, the most recent of which is Hyper-sonic Thunder. His most recent article for Air Force Magazine, "Carbon Copy Bomber," appeared in the June issue.

Defense Budget at a Glance

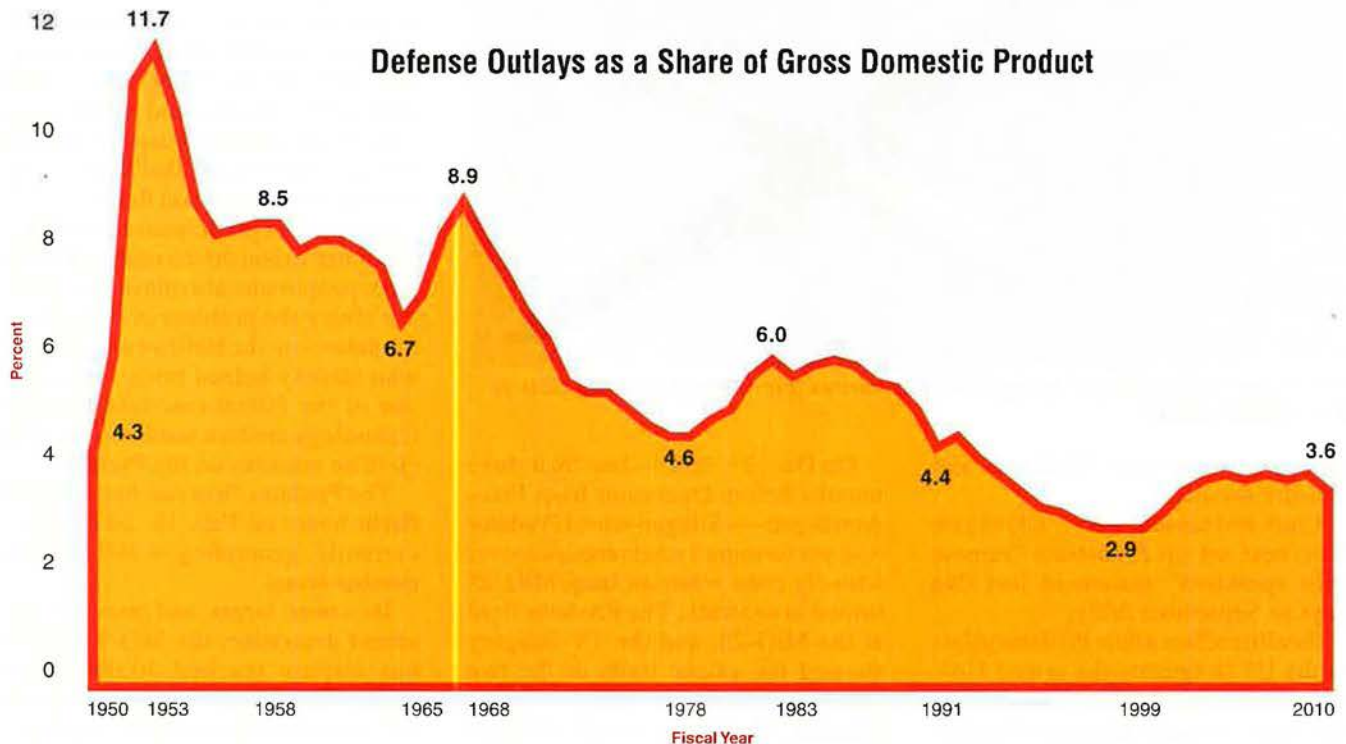
President Obama on May 7 presented a DOD budget request for Fiscal 2010. It seeks \$533.8 billion in budget authority less war costs and \$663.7 billion in BA counting war costs. Funding most often is stated in BA—the value of new obligations DOD can incur. (Some are paid in future

years.) Figures can also be expressed in outlays—actual checks written in a given year. “Current dollars” contain no adjustment for inflation. With “constant dollars,” inflation has been factored out. Charts address only the Defense Department program.

Defense Budget Authority

(\$ billions)

	2008	2009	2010	Planned 2011	2012	2013	2014
No War Costs, Current dollars	\$479.5	\$513.3	\$533.8	\$533.4	\$542.3	\$552.3	\$565.3
No War Costs, Constant FY 2010 dollars	\$488.1	\$522.0	\$533.8	\$524.3	\$521.9	\$520.3	\$521.4
With War Costs, Current dollars	\$666.0	\$654.7	\$663.7	\$596.0	\$605.1	\$615.7	\$629.3
With War Costs, Constant FY 2010 dollars	\$678.0	\$665.8	\$663.7	\$585.9	\$582.3	\$580.1	\$580.4



Defense Outlays

(\$ billions)

	2008	2009	2010	Planned 2011	2012	2013	2014
Current dollars	\$545.4	\$551.1	\$524.8	\$532.1	\$538.5	\$547.6	\$615.6
Constant FY 2010 dollars	\$555.2	\$560.5	\$524.8	\$523.1	\$518.2	\$515.9	\$567.8

Service Shares

(Budget authority in billions of constant FY 2010 dollars)

Dollars	2008	2009	2010	2011	2012	2013	2014
Air Force	\$136.7	\$143.6	\$144.5	\$145.2	\$145.0	\$144.1	\$144.1
Army	130.7	141.6	142.1	138.9	137.4	134.4	138.4
Navy/Marine Corps	141.6	149.9	156.4	153.1	152.2	150.8	151.5
Defense agencies	79.1	87.0	90.8	87.3	87.3	91.0	87.5
Total	488.1	522.0	533.8	524.3	521.9	520.3	521.4
Percentages							
Air Force	28.0%	27.5%	27.1%	27.7%	27.8%	27.7%	27.6%
Army	26.8%	27.1%	26.6%	26.5%	26.3%	25.8%	26.5%
Navy	29.0%	28.7%	29.3%	29.2%	29.2%	29.0%	29.1%
Defense agencies	16.2%	16.7%	17.0%	16.6%	16.7%	17.5%	16.8%

Cutting the Pie: Who Gets What

(Budget authority in billions of constant FY 2010 dollars)

	2008	2009	2010	2011	2012	2013	2014
Military personnel	\$118.6	\$127.0	\$136.0	\$135.4	\$137.6	\$139.4	N/A
O&M	167.2	182.1	185.7	184.6	183.6	186.4	N/A
Procurement	100.8	103.4	107.4	115.8	117.9	118.0	N/A
RDT&E	77.9	80.9	78.6	71.2	68.4	64.7	N/A
Military construction	18.1	22.3	21.0	14.3	11.1	9.6	N/A
Family housing	3.0	3.3	2.0	2.1	1.9	1.7	N/A
Other	2.7	3.3	3.1	1.1	1.3	0.7	N/A
Total	488.2	522.2	533.8	524.3	521.9	520.4	565.3

Manpower

(End strength in thousands)

	1990	2007	2008	Est. 2009	Est. 2010	Change 1990-2008
Total active duty	2,065	1,380	1,402	1,413	1,410	-663
Air Force	535	334	327	333	332	-208
Army	751	522	544	547	547	-207
Navy	582	338	332	331	329	-250
Marine Corps	197	187	199	202	202	2
Selected reserves	1,128	829	838	844	845	-290
Civilians (FTE)	997	659	671	725	745	-326

Operational Training Rates

	1990	2000	2007	2008	Est. 2009	Est. 2010
Air Force						
Flying hours per crew per month, fighter/attack aircraft	19.5	17.2	15.9	14.4	14.0	14.0
Army						
Flying hours per tactical crew per month	14.2	12.7	11.1	11.6	11.6	12.2
Annual tank miles	800.0	669.0	729.0	459.0	550.0	550.0
Navy						
Flying hours per tactical crew per month	23.9	20.9	23.7	18.3	17.8	19.0
Ship steaming days per quarter						
Deployed fleet	54.2	50.5	59.0	45.0	45.0	45.0
Nondeployed fleet	28.1	28.0	27.0	20.0	20.0	20.0

Acronyms

AEHF	Advanced Extremely High Frequency
AFRC	Air Force Reserve Command
AMRAAM	Advanced Medium-Range Air-to-Air Missile
ANG	Air National Guard
ARNG BCT	Army National Guard Brigade Combat Team
AWACS	Airborne Warning and Control System
BUR	Bottom-Up Review
CSAR-X	Combat Search and Rescue Replacement Vehicle
EELV	Evolved Expendable Launch Vehicle
FTE	Full-Time Equivalent
GPS	Global Positioning System
JASSM	Joint Air-to-Surface Standoff Missile
JDAM	Joint Direct Attack Munition
JPATS	Joint Primary Aircraft Training System
JSF	Joint Strike Fighter
MLV	Medium Launch Vehicle
NPOESS	National Polar-orbiting Operational Environmental Satellite System
O&M	operation and maintenance
QDR	Quadrennial Defense Review
RDT&E	research, development, test, and evaluation
SATCOM	Satellite Communications
SBIRS	Space Based Infrared System
STARS	Surveillance Target Attack Radar System
TSAT	Transformational Satellite
UAV	unmanned aerial vehicle

Major USAF Programs RDT&E

(Current million dollars)

Program	2008	2009	2010
A-10	6.5	4.0	9.7
B-1B bomber	180.4	142.6	148.0
B-2 bomber	277.9	364.1	415.4
B-52	51.3	38.5	93.9
Next generation bomber	7.0	0.0	0.0
C-5 transport	174.0	127.1	95.3
C-12	0.0	0.0	0.0
C-17 transport	166.2	235.4	161.9
C-130 transport	233.3	179.3	201.3
C-130J transport	62.1	27.3	30.0
CSAR-X	0.0	232.2	90.0
CV-22 transport	23.4	18.5	19.6
E-3 AWACS	146.3	125.7	176.0
E-8 Joint STARS	337.6	81.0	140.7
E-10 Multisensor C2	37.7	0.0	0.0
F-15E fighter	114.9	198.9	311.2
F-16C/D fighter	76.8	126.8	141.0
F-22A fighter	607.8	605.7	569.3
F-35 fighter (JSF)	1,939.1	1,734.3	1,858.1
Joint Cargo Aircraft	20.3	16.7	9.4
KC-X tanker	29.7	22.9	439.6
T-6 JPATS	0.0	0.0	0.0
AIM-120 AMRAAM	36.4	54.1	50.0
JASSM	11.8	32.9	29.5
JDAM	0.0	0.0	0.0
Small Diameter Bomb	147.6	126.3	153.8
AEHF satellite	612.3	386.4	464.3
Counterspace systems	59.4	76.1	64.2
GPS satellite	556.4	789.5	867.1
MilSatCom	362.7	334.2	257.7
NPOESS	331.0	287.5	396.6
TSAT	776.5	761.3	0.0
SBIRS satellite	583.3	542.4	512.6
Wideband Global SATCOM	21.0	52.1	71.0
EELV booster	6.5	33.6	26.5
MLV booster	0.0	0.0	0.0
Minuteman III ICBM	26.1	70.2	126.1
Global Hawk UAV	274.7	310.7	317.3
Predator UAV	37.6	36.9	19.5
Reaper UAV	55.9	46.4	40.6

Major USAF Programs Procurement

(Current million dollars)

Program	2008	2009	2010
A-10	168.0	143.7	262.5
B-1B bomber	71.3	41.4	128.1
B-2 bomber	102.1	347.9	284
B-52	42.6	41.6	78.8
Next generation bomber	0.0	0.0	0.0
C-5 transport	345.9	574.3	772.7
C-12	98.5	493.5	0.0
C-17 transport	3,826.8	880.5	690.5
C-130 transport	357.6	624.5	565.2
C-130J transport	2,400.6	164.0	479.2
CSAR-X	0.0	0.0	0.0
CV-22 transport	838.1	421.9	451.1
E-3 AWACS	76.8	86.2	79.3
E-8 Joint STARS	94.3	30.6	226.0
E-10 Multisensor C2	0.0	0.0	0.0
F-15E fighter	77.7	36.8	53.1
F-16C/D fighter	383.6	371.8	244.6
F-22A fighter	3,790.0	4,345.5	445.9
F-35 fighter (JSF)	1,412.1	1,660.6	2,349.4
Joint Cargo Aircraft	0.0	0.0	319.1
KC-X tanker	0.0	0.0	0.0
T-6 JPATS	231.4	27.6	15.7
AIM-120 AMRAAM	190.8	203.8	291.8
JASSM	160.0	199.7	52.7
JDAM	124.1	190.8	201.0
Small Diameter Bomb	94.7	132.8	142.1
AEHF satellite	149.9	165.6	1,843.5
Counterspace systems	22.4	29.1	29.8
GPS satellite	248.9	134.9	60.7
MilSatcom	114.0	106.0	111.3
NPOESS	0.0	0.0	3.9
TSAT	0.0	0.0	0.0
SBIRS satellite	399.3	1,793.1	500.9
Wideband Global SATCOM	312.3	21.6	264.1
EELV booster	1,091.8	1,350.3	1,295.3
MLV booster	116.9	5.7	0.0
Minuteman III ICBM	544.4	327.8	257.6
Global Hawk UAV	573.9	710.1	667.8
Predator UAV	299.2	377.7	0.0
Reaper UAV	374.5	444.5	489.5

Selected Force Structure

	Cold War Base 1990	1990 Base Force	1993 BUR Plan	1997 QDR Goal	Most Recent Published Plan 2003	2009
Air Force						
Active fighter wings	24	15	13	12+	12+	—
AFRC/ANG fighter wings	12	11	7	8	7+	—
Combat Wings (all types)	—	—	—	—	—	—
Army						
Active divisions	18	12	10	10	10 ^b	—
Army National Guard/Reserve	10	8 ^a	8	8	8 ^c	—
Active Brigade Combat Teams	—	—	—	—	—	45
ARNG BCTs	—	—	—	—	—	28
Navy						
Active Aircraft Carriers	15	12	11	11	10	10
Reserve Aircraft Carriers	1	1	1	1	1	1
Active Air Wings	13	11	10	10	10	10
Reserve Air Wings	2	2	1	1	1	1
Marine Corps						
Active Marine Expeditionary Forces	3	3	3	3	3	3
Marine Forces Reserve	1	1	1	1	1	1

^a Comprising 34 brigades.

^b Plus two armored cavalry regiments.

^c Plus 16 separate brigades (15 of which are at enhanced readiness levels).

A close-up, high-contrast photograph of a wolf's face, focusing on its eye and snout. The wolf's fur is dark brown and black, and its eye is a striking light blue-grey color. The background is a plain, light-colored wall.

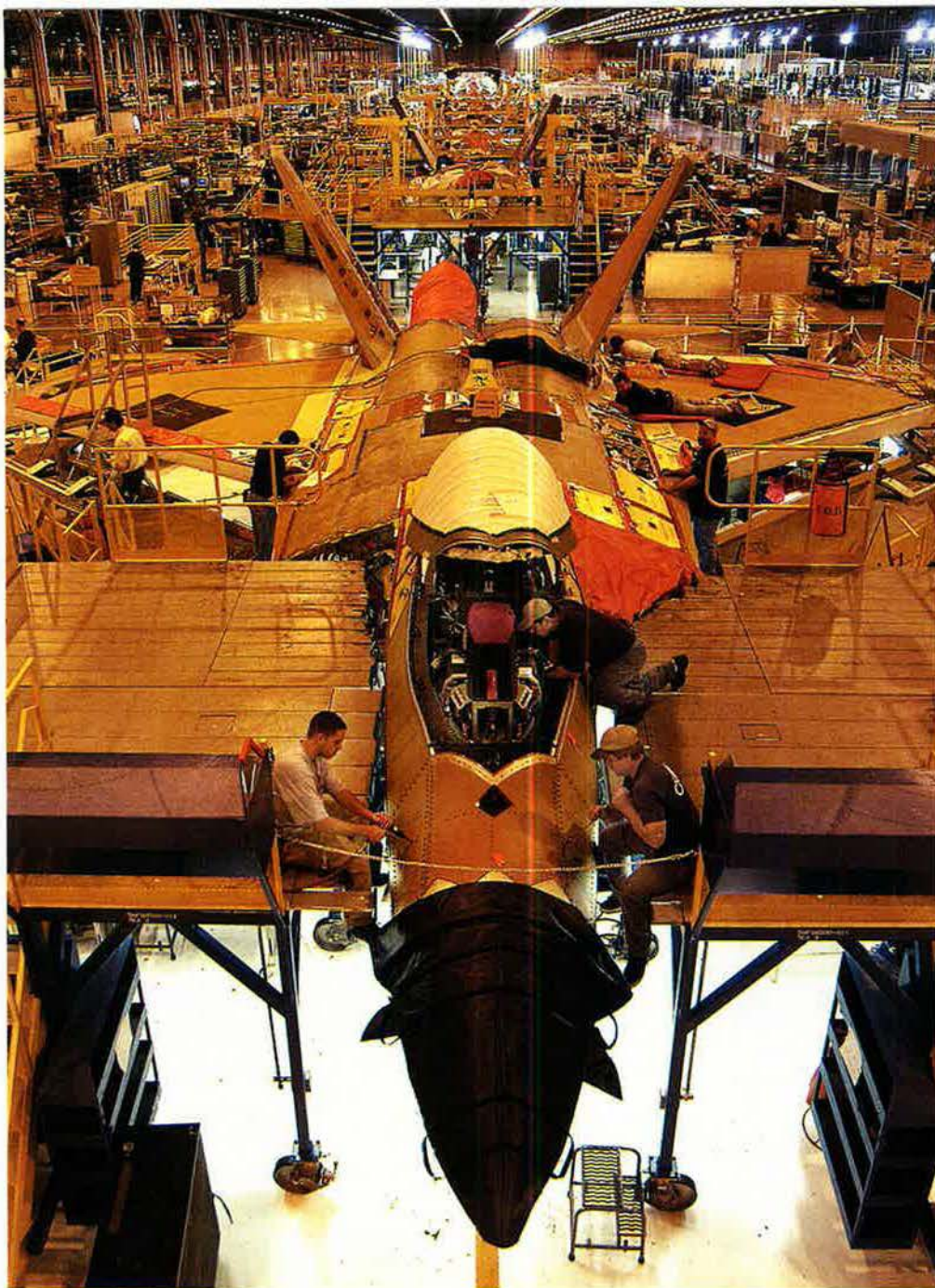
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Things weren't all that great to begin with. And then came "Bloody Monday."

The Sta

"I strongly oppose [Gates'] decision to halt production of the F-22 Raptor," said Sen. Joseph I. Lieberman (I-Conn.), whose state is home to engine-maker Pratt & Whitney. "If we stop the F-22 program now, our industrial base will suffer a major blow before the F-35 ... reaches full-rate production." Pratt & Whitney manufactures the engines for both fighters.

Former Air Force Secretary Michael W. Wynne was even more forceful. "Terminations in the air, space, helicopter, and bomber domain will essentially gut American aerospace engineering," Wynne warned in an April op-ed.

Even the Pentagon, in its industrial capabilities report to Congress released the same week as Gates' announcement, sounded a cautious tone.

"There are currently no plans ... for a sixth generation military-combat aircraft—a follow-on to the F-22A," the report noted. "While Lockheed Martin and Sikorsky futures look bright, ... other primes and subtier suppliers not participating in the F-35 or UH-60M programs may be forced to exit the business, consolidate, or find non-DOD work."

The Pentagon study confirmed that the "military aircraft design and development workload is at a historic low."

Jeremiah Gertler, assistant vice president for defense policy at the Aerospace Industries Association, said that the industry is anxiously awaiting the outcome of this year's Quadrennial Defense Review, which will provide the first detailed look at the new Administration's long-term defense plans.

"It's hard to be very confident that this Administration's going to manage the defense industrial base as a strategic asset," said Barry D. Watts, a senior fellow at the Center for Strategic and Budgetary Assessments who served as the head of the

In the aftermath of big force and budget cuts—and the promise of more to come—Washington has begun to hear major questions about the fate of the defense industrial base under the new Administration.

Will the Department of Defense in future years have access to several viable competitors for weapon systems? Is the Pentagon doing enough to develop technologies that will be critical to advanced weapons of the next decades? Can the United States count on its industry to surge production, as it has in many past emergencies?

The proximate source of concern is Defense Secretary Robert M. Gates' declarations of April 6, dubbed by one lawmaker as "Bloody Monday." Gates

released a stunning budget proposal for next year that slashes through the heart of many of the military's highest-profile programs—from the Air Force's F-22 fighter and next generation bomber to the Navy's cruiser program and the Army's prized Future Combat Systems.

"During World War II, we called ourselves the 'Arsenal of Democracy,'" said a report from the Washington-based Aerospace Industries Association. "If we don't act quickly and prudently, a future Administration could find the arsenal empty and quiet."

Production of Lockheed Martin's F-22 fighter, Gates said, would end with 187 models, some 60 short of what had been USAF's "medium-risk" force. The move has ignited a storm of protest.

Lockheed Martin photo

Left, F-22s on the production line; below, a C-17A lines up to take on fuel. Both aircraft will cease production.

Pentagon's Office of Program Analysis and Evaluation in 2001 and 2002.

Concerns reach across the Air Force's portfolio and beyond. Also on the chop-

posal were the F-35 Lightning II, purchases of which might be speeded up, and Predator and Reaper unmanned aerial vehicles, part of a \$2 billion increase destined for intelligence-surveillance-reconnaissance capabilities.

AIA's Gertler said the sweeping Quadrennial Defense Review could

business. Those operations, he said, aren't likely to be the beneficiary of a sizeable government bailout, yet they play a crucial role in large programs.

Akin, whose district is adjacent to Boeing's defense headquarters, also said efforts to significantly trim back defense spending—and delay new starts

te of the Arsenal

By Megan Scully



DOD photo by MSgt. Rick Storza

ping block are several programs facing developmental or political problems, including the CSAR-X combat search and rescue helicopter for the Air Force, the YAL-1 Airborne Laser, the Transformational Satellite Communications (TSAT) System, and the Navy's VH-71 Presidential helicopter.

USAF was told to cease further production of the advanced C-17 airlifter. The Pentagon doesn't want any more of the Boeing-built cargo aircraft, the Defense Secretary said.

These decisions affect each of the country's major defense firms and countless suppliers sprinkled in nearly every state across the country.

From an aerospace perspective, the only major bright spots in Gates' pro-

usher in even larger changes than seen in the 2010 budget. He emphasized that, at present, the defense industry is healthy and strong, but also hinted at looming problems for small suppliers that do not have a diversified portfolio and rely on one or two programs for the bulk of their profits.

Industrial Base Health

Those smaller firms, in particular, need more predictability and stability for long-term planning, he said.

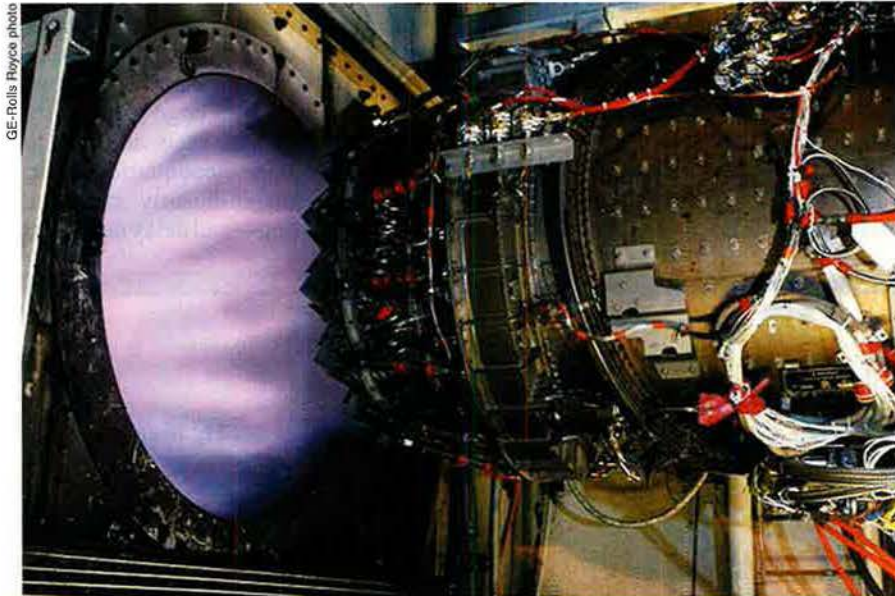
Rep. Todd Akin (R-Mo.), a member of the House Armed Services Committee, expressed growing concern about the health of the defense industrial base. Akin is worried about small machine shops and other suppliers going out of

to programs—will push some smaller players out of key defense business areas.

If you make deep cuts to the military budget, "you get to the point where you don't even know if you can keep one solid supplier going," he said.

AIA, whose members include both the small players and defense giants such as Boeing and Lockheed Martin, warned in a report last summer that planners must "guard against the shortsightedness of curtailing the current modernization drive prematurely."

In the report, titled "US Defense Modernization: Today's Choices for Tomorrow's Readiness," AIA signaled that growth in the Pentagon's operations and personnel accounts could eventually put the squeeze on procurement



GE-Rolls Royce photo

and add to the uncertainty surrounding acquisition programs.

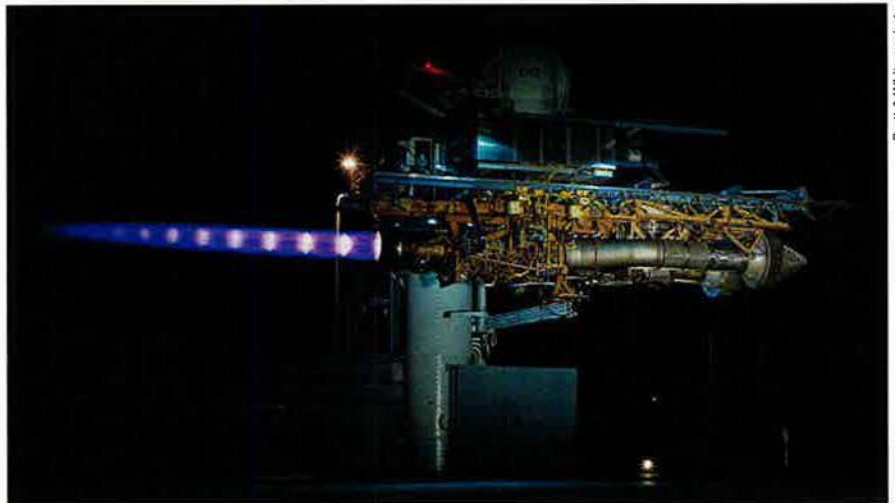
“Continuing this trend beyond current projections will make it even more difficult for defense planners to adequately resource the investment spending upon which our military superiority and technological edge depends,” the report stated. “The next Administration should address this serious, future resource challenge in developing long-range defense plans and in budget guidance to the next Quadrennial Defense Review.”

Programs such as the next generation bomber, which was created out of the last quadrennial review, are crucial to maintaining the industrial base, AIA argued in its report.

There are only a few design teams and facilities capable of creating and building the next bomber and, once lost, those domestic capabilities would be difficult to regain. There is a strategic danger if cuts today eviscerate the nation’s long-term ability to design and manufacture advanced military aircraft. Gen. Norton A. Schwartz, Air Force Chief of Staff, acknowledged as much when commenting on Gates’ decision to send the 2018 bomber back to the drawing board.

Unlike the annual budget, the QDR should take the health of the industrial base into account when deciding on a course of action for a next generation bomber. “Keeping design teams together is a matter that the department needs to consider,” Schwartz said in mid-April.

Industrial base concerns extend beyond bombers. The planned moves will



Pratt & Whitney photo

Top, the GE-Rolls Royce variant of the F-35’s engine during tests. Above, Pratt & Whitney runs tests on its F135 version. Both engines are being designed to be interchangeable for the F-35, which survived Bloody Monday.

idle the F-22 and C-17 lines. General Atomics Aeronautical Systems has a near-monopoly on combat UAVs through the Predator and Reaper, and the massive F-35 program won’t be ready for combat for at least three years.

Realistic Competitions

The Pentagon’s own industrial base report notes that “over the next five to 10 years, most current military aircraft production programs will end, precipitating the need for a new round of consolidation in order to reduce infrastructure costs.” The report also mentioned, however, the need to maintain realistic competitions for combat aircraft production.

But even as the country faces ever-escalating unemployment rates, senior defense officials have made one point abundantly clear: Jobs are not, and will

not be, a consideration in procurement and budget decisions.

The Pentagon has argued repeatedly that acquisition officials must select only the products that provide the best value to the taxpayer. In announcing his cuts, Gates said he is “concerned for the possibility that these decisions will have an impact on individual companies and workers around the country.” But Gates also stressed that his decisions were apolitical and that he did not directly weigh industrial base concerns in crafting his budget proposal.

Gates suggested that increases to programs such as the F-35, which will employ 82,000 people in 2011, could mitigate the job losses and the effect on industry. He also noted, however, that direct F-22 employment would decline

from 24,000 aerospace workers today to 13,000 in 2011, before phasing out completely. Lockheed Martin has said the Raptor program indirectly supports a total of 95,000 workers.

As the Defense Department moves forward its procurement neck down, many industry observers believe the Pentagon should tread carefully. After all, DOD cannot afford to lose the remaining major players if it hopes to have a choice of competitors on future major weapons systems.

Indeed, prime contracts awarded to midsize firms shrunk from 50 percent to 30 percent from 1995 to 2004, while service contracts to those second-tier companies fell from 44 percent in 1995 to 33 percent in 2006, according to a July 2008 Defense Science Board report that examined the defense industrial base. Meanwhile, the five largest prime

contractors dominate the landscape, with discretion over 40 percent of the acquisition budget.

“While competition still occurs between a few firms in each sector, the government buyer can no longer benefit from a highly competitive defense market,” the DSB report stated. “The government now has to play a considerable role in maintaining minimal competition.”

Watts, meanwhile, argues that the effect that high-stakes decisions on weapons systems have on the economy should at least be weighed by the Pentagon. “On the one hand, I sympathize with Secretary Gates that you don’t want to continue pumping money into dubious programs just because of jobs in 45 states,” he said. “But on the other hand, largely ignoring the cumulative effect of successive program decisions on the industrial base—especially if you want to have more than one competitor in major mission areas—appears to be shortsighted in much the same way that subprime mortgages and collateralized debt obligations have proven to be.”

In a study last year titled “The US Defense Industrial Base: Past, Present, and Future,” Watts wrote that the industry is not facing an imminent crisis, but suggested that the government take a more strategic approach to maintaining its industrial base.

“The extent to which the American defense industry will continue to be an enduring source of strategic advantage depends on whether the federal government as a whole, not just DOD, embraces a more consistent, thoughtful, longer-term, and active strategy for influencing the structure and capabilities of the American defense-industrial base,” he wrote.

In his report, Watts recommended that the Pentagon consider making a contract’s potential impact on the industrial base a formal selection criterion.

There have been some efforts on Capitol Hill to make industrial base considerations a part of acquisition decision-making, most recently after the Air Force selected a team led by Northrop Grumman and EADS, the European parent company of Airbus, to build the service’s next fleet of aerial refueling tankers. The contract award was later overturned after the Government Accountability Office upheld a protest filed by Boeing, the losing bidder.

A senior Senate Democrat recently told reporters that his concerns about the defense industry are part of his broader



USAF Photo by Bobbi Zapka

The Airborne Laser soars over Mojave, Calif. The ABL system got chopped from the budget. DOD notes that another round of industrial consolidations may be necessary.

worries about the country’s manufacturing base, which lost three million jobs during the Bush Administration.

“We have hurt our manufacturing base tremendously in this country by ignoring its importance to the economy, as well as to our national security,” said Senate Armed Services Chairman Sen. Carl Levin (D-Mich.), whose home state has been devastated by the failing domestic automotive industry.

Major Struggles

Levin said he remains concerned about the industrial base. But he said that he could not push to make jobs a key issue in procurement decisions as he works with President Obama and others on efforts to reform the Pentagon’s weapons-buying processes to bring down costs.

“If I could find some intellectual way to do it, believe me I would,” Levin said. “I don’t know how you factor it in.”

House Armed Services ranking member Rep. John M. McHugh (R-N.Y.) said in a March interview that the Defense Department needs to come up with an effective way of ensuring the industry’s health in the future. (McHugh has since been nominated to be Secretary of the Army.)

The result, he said, would be a bidding system that protects taxpayers and, at the same time, protects industrial capacity. But McHugh said no one has yet developed a sound policy to do so.

“At the present time, we’re lacking any coherent policy to ensure we have

the sufficient base ... essential to a successful military,” he acknowledged.

Boeing, for instance, is struggling to stay in the tactical aircraft business. It is a major subcontractor on the F-22 program, but that assembly line now appears poised for a shutdown. Boeing lost the F-35 contract to rival Lockheed Martin, which now has the lock on the fifth generation fighter business.

If Boeing were to lose another contract in this arena, the country could end up with just one prime contractor capable of designing and building fighters.

Boeing is marketing a new version of the F-15—the Silent Eagle—internationally, in the hopes of keeping that program’s lines alive. Potential customers include Israel, Japan, Saudi Arabia, Singapore, and South Korea.

Domestically, Boeing has pinned its hopes to the future of the F/A-18E/F Super Hornet fighter for the Navy, seeking a multiyear contract to keep the F/A-18 supplier base in business. Gates’ spending proposal includes money for 31 Super Hornets next year—better than nothing, but not the multiyear commitment Boeing and its suppliers had hoped for.

An active Raptor line could provide valuable strategic insurance in the event that some sort of major delay or problem arises in the F-35 program, but the Silent Eagle or Super Hornet could also ensure that the US has an alternative if new fighters are suddenly needed—with the side benefit of preserving two producers. ■

Megan Scully is the defense reporter for National Journal's CongressDaily in Washington, D.C., and a contributor to National Journal and Government Executive. Her most recent article for Air Force Magazine, "Needed: 200 Aircraft a Year," appeared in the October 2008 issue.



Gunship Worries

They are indispensable. Everyone loves them. There are no plans for new ones.

By Otto Kreisher

America's long-running military struggles in Iraq and Afghanistan have reaffirmed a long-standing truth about airpower in irregular war: When you go into combat, never go without USAF's deadly side-firing gunships somewhere nearby.

Today's AC-130s are upholding a stellar combat tradition extending from the early days of Vietnam in the 1960s through the operations in Grenada, Panama, Kuwait, Somalia, and the Balkans. And US ground commanders of the future, no less than those of today, will surely ask, "Where are the gunships?"

In the future, however, those gunships might not be there. Air Force Special Operations Command's 25 AC-130s are,

on average, almost 30 years old. Searches for a successor have stalled. All of them will have to be retired or rebuilt within 10 years. As a result, these highly effective weapons might be fading out.

Although several studies on a "next generation gunship" were conducted—and a test program for a smaller platform proposed—there is no gunship program now on the books.

"There's really nothing to report on that," noted Lt. Col. Michael Nardo, gunship requirements officer and AC-130 instructor pilot at the 1st Special Operations Wing at Hurlburt Field, Fla. "There's been no decision made to proceed with any other airframe."

The gunship is a relatively new airpower innovation. It first appeared in

the 1960s, in the Vietnam War. AC-47s were World War II-era C-47 transports fitted with an array of heavy armament and targeting gear. They tended to operate at night, and the troops called them "Spooky." Whether they were known as "Spooky" or "Shadow" or "Stinger"—or more popularly, "Puff the Magic Dragon"—Vietnam-era AC-47s, AC-119s, and AC-130As wreaked havoc on enemy supply lines and kept the enemy from overrunning many isolated US military outposts.

Today, they are heavily involved in the greater Middle East. AFSOC's modern-day AC-130s are prized for their ability to loiter over targets until the time comes to unleash a deadly and accurate fusillade. Ground forces love them.



USAF photo

In November 2001, Gen. James L. Jones, then the Marine Corps Commandant (and now President Barack Obama's national security advisor) said he was so impressed with their work over Afghanistan that he wanted to get some for the Corps. "Frankly, I'm kicking myself that I waited so long," Jones said.

More recently, Gen. James T. Conway, today's Commandant, allowed that the marines "have lusted for years" for AC-130s of their own, but could not afford them.

The current force consists of eight AC-130H Spectre aircraft, the first of which entered service in 1969, and 17 AC-130U Spooky gunships, which have an average age of about 20 years. Both versions are armed with a 40 mm rapid-fire gun and a 105 mm cannon. The U models also carry a 25 mm Gatling gun.

What makes the gunship so effective in current-day engagements, however, is its suite of electro-optical and infrared sensors and computerized fire-control systems. These systems allow deadly

At left: An AC-130U Spooky flies a training mission over Hurlburt Field, Fla. Below: Then-CMSAF Rodney McKinley (l) helps MSgt. Preface Hedin (r) and SSgt. James Mobley (rear right) load the 105 mm Howitzer aboard an AC-130H gunship while SrA. Mathew Busman (rear left) works the 40 mm Bofors cannon.

accuracy in the darkness and low-light conditions in which the AC-130s typically operate.

The newer Spookys also are equipped with AN/APQ-180 synthetic aperture strike radar of the kind used by the F-15E fighter. This radar allows long-range target detection and identification. It lets targeting airmen see the impact point of their rounds and adjust fire without requiring a ground observer.

Gunship Lite

The radar also gives the U model the ability to engage targets in poor weather conditions, Nardo said.

Because of their ability to provide high-quality surveillance, to deliver heavy and precise fire, and to remain on station for hours, the gunships, their crews, and support personnel are constantly being deployed from their home at Hurlburt. The details of their deployments are kept secret.

"They definitely are in high demand," said Nardo.

The handful of current gunships are heavily utilized low-density, high-demand assets, however, which is creating growing concern about airframe fatigue and rising maintenance costs.

In 2001, the Pentagon funded a technology demonstration project aimed at



USAF photo by SrA. Andy M. Kin



USAF photo by S/A Julianne Showalter

Maintainers assigned to the 1st Special Operations Aircraft Maintenance Squadron work on an AC-130H's newly installed engine at Hurlburt Field.

producing a new gunship. This project, called AC-X, was to examine the relative merits of making further upgrades to the existing AC-130s or pursuing a new platform. No procurement program emerged from that study.

The desire for an advanced capability remains. AFSOC officials have long desired a new design that could overcome the AC-130's limitations. Today's gunships are slow, fly primarily at night and at sea altitudes, and attack while making a series of left turns around a target. It is preferable to keep them in low-threat environments.

In 2007, Lt. Gen. Michael W. Wooley, then AFSOC commander, said the command was interested in developing a system of manned and unmanned platforms that would provide a "technological leap" to replace the current gunships.

Wooley emphasized the value of stealthy platforms to reduce the threat to the gunships. He discounted use of the new and more powerful C-130Js, which AFSOC was already buying to replace the aged MC-130E/H Combat Talon special operations transports.

The general suggested that the new gunship might in turn be a derivative of the proposed next generation bomber, a heavy, long-range aircraft intended to have the best of the current low observable technology and which was supposed to be fielded by 2018. That concept did not gain much support, and, in any event, the Pentagon in April scrapped that bomber program.

For the near-term, AFSOC had studied the feasibility of a much smaller aircraft

under an initiative called AC-XX or "Gunship Lite." Command officials saw value in a platform that would present a smaller target and could operate with fewer crew members than the 13 currently required on the AC-130.

Keeping Them Visible

An analysis of alternatives conducted last year determined that the best candidate for AC-XX was the C-27J, a twin-engine turboprop that the Air Force and Army were to buy under the Joint Cargo Aircraft program.

Then-Brig. Gen. Bradley A. Heithold, AFSOC's top requirements officer at the

time, previously told reporters the AC-27J would be named Stinger, in honor of the Vietnam-era AC-119s. Heithold said the new AC-27J would be a multimission aircraft capable of covertly transporting special operations fighters into and out of hostile areas, as well as providing airborne fire support.

Heithold added that obtaining a replacement aircraft was becoming urgent for AFSOC because of the wing box fatigue problem and obsolescent avionics in the AC-130s.

Gen. T. Michael Moseley, then Air Force Chief of Staff, told a Congressional hearing during last year's budget deliberations that an AC-27J could be based at Cannon AFB, N.M., where AFSOC is rapidly building up its aviation capabilities. Moseley said basing gunships at Cannon would allow them to use the extensive Melrose Range and the even larger spaces of the White Sands Missile Range and the Army's Ft. Bliss, Tex., artillery ranges.

The AC-XX study "was done to determine if we could utilize, in some way, a light gunship capability," Nardo said, "but we haven't continued with fielding."

In the absence of a funded acquisition program, the Air Force is pursuing a policy that should be familiar to observers of USAF's heavy bomber fleet over the past decade: The plan is for gunship upgrades, enhancements, and structural reinforcements to keep the AC-130s viable.

"The gunships are obviously old, and we're always looking to upgrade and modernize our fleet," said Nardo.



USAF photo

A Vietnam War-era long exposure photograph shows the famous "cone of fire" laid down by an AC-119 gunship near Phan Rang AB, South Vietnam.

Learning from the Air Force's experience with the older transport versions of the Hercules that have experienced wing fatigue problems, the venerable AC-130Hs have already had their center wing box structure reinforced. "So they're doing quite nicely in the current situation," he said.

Because of their heavy usage during more than seven years of war, Nardo said, even the comparatively young U models are beginning to experience the same wing problems. "So we have the first ones going in to get modified," he said, "and we'll finish up the rest of the fleet in the next five years or so."

The Air Force doesn't have any gunships to spare, so to minimize the effect on the already stretched force, the wing box work is conducted during the airplanes' normally scheduled modification and maintenance periods. "We'll do a few a year," Nardo said. "If one becomes critical, we'll move it up a bit, but there is not much of an impact on the overall fleet as far as availability."

The gunships' cabin floor structures also have been enhanced under the "4105 substructure improvement program," so the airframe can continue to take the stress of firing their weapons, he added.

AFSOC officials also have their eye on the same avionics modernization program (AMP) developed for the older C-130 fleet. The gunships were removed from the AMP in 2007 because of a lack of funding, but officials are hopeful they can return the AC-130s to the AMP process beginning in 2010.

Other improvements in their electronics have already paid dividends, Nardo said. U models have been receiving new radios and Link 16 systems to improve their communications and data transfer capabilities, he said.

"We're continually upgrading computers," and the U models are getting a new sensor, called GMS2, Gunship Multispectral Sensor System, to replace outdated systems and to improve their capabilities, he continued.

The Hs are getting the new 241 weather radar systems to replace an old system that had "a high rate of failure" due to its age, Nardo said. That is part of a concerted effort to reduce the command's rising logistics and cost burden and improve availability.

"A lot of our replacement programs are based on aiding our maintenance folks, who generally have to shoulder a large share of the burden of keep-

Boeing photo by Ed Turner



A C-130H modified to carry the Advanced Tactical Laser goes through tests over Albuquerque, N.M.

ing these airplanes flying. We try to get systems that not only increase the readiness rates but reduce the logistics cost and man-hour costs."

The modernization programs are combined into different blocks "so we can get a whole bunch of things done at the same time, so we're not constantly taking airplanes down," the colonel said. "It's a continuous process. As soon as we finish one set of modifications, we start another set."

Directed Energy Weapons

None of the current modification programs directly affect the gunships' weapons.

For years, AFSOC had planned to replace ancient 40 mm and 25 mm guns with two 30 mm cannons, but that endeavor was discontinued after flight tests concluded that the 30 mm cannon was "operationally unsuitable" for gunship use, "due to unsatisfactory gunfire accuracy." There are now no plans to change the gunships' weapons, Nardo said.

While the Air Force will not receive any new-build gunships, it will carry out a second-best solution: infusing the force with as many as a dozen additional old airframes, all of them remodeled C-130s.

Vice Adm. P. Stephen Stanley, the Joint Staff's director of force structure, noted May 7 that USAF plans to convert a few existing MC-130W Combat Spears to gunships. The MC-130 already has an all-weather capability, and wing tanks and in-flight refueling capabilities. "[It] is the quickest way that we can provide this capability," said Stanley.

The future for next generation gunships isn't entirely bleak, however. Outside of AFSOC, there is a program under way that could provide a directed energy weapon for a future laser gunship.

A recent Air Force Scientific Advisory Board study advocated a laser-armed gunship as a means to reduce collateral damage in an urban environment, but the study recommended maintaining a kinetic weapon as well because of the greater explosive power that a cannon can provide. A laser would need at least 100 kilowatts of power and a seven kilometer slant range to be effective, the science board said.

The availability of such a weapon might not be that far off. The Air Force last October awarded Boeing a \$30 million contract to continue developing and testing the Advanced Tactical Laser, following a ground test of the system in August 2008.

On June 13, Boeing successfully fired the weapon in flight for the first time. A modified C-130H carrying the Advanced Tactical Laser took off from Kirtland AFB, N.M., fired its laser, and hit a target on the ground at New Mexico's White Sands Missile Range.

Boeing said in a statement that "ATL's ultra-precision engagement capability will dramatically reduce collateral damage."

More tests to demonstrate the system's military utility are planned, with demonstrations to "support development of systems that will conduct missions on the battlefield and in urban operations." No firm schedule for future tests was announced. ■

Otto Kreisher is a Washington, D.C.-based military affairs reporter and a regular contributor to Air Force Magazine. His most recent article, "Finally, the Osprey," appeared in the February issue.

Eliminate the Air Force

"The Air Force should be eliminated, and its personnel and equipment integrated into the Army, Navy, and Marine Corps. ... The Army, Navy, and Marine Corps are at war, but the Air Force is not. ... Yes, airpower is a critical component of America's arsenal. But the Army, Navy, and Marines already maintain air wings within their expeditionary units. The Air Force is increasingly a redundancy in structure and spending."—**Paul Kane, Marine Corps Reserve public affairs specialist and former research fellow at Harvard's Kennedy School of Government, New York Times op-ed, April 21.**

Eliminate the Academies

"Want to trim the federal budget and improve the military at the same time? Shut down West Point, Annapolis, and the Air Force Academy, and use some of the savings to expand ROTC scholarships."—**Thomas E. Ricks, former Washington Post reporter and author of several books on the armed forces, Washington Post, April 19.**

Russia's Humiliation

"On Russia, we have tended, since the end of the Cold War, to benign neglect, except when we need them for some particular thing. I think we have severely underestimated the humiliation that Russia and Russians felt at the demise of their position in the world."—**Brent Scowcroft, national security advisor to Presidents Ford and George H. W. Bush, Wall Street Journal, May 1.**

Exotic Distraction Theory

"For too long there was a view, or a hope, that Iraq and Afghanistan were exotic distractions that would be wrapped up relatively soon—the regimes toppled, the insurgencies crushed, the troops sent home. Therefore, we should not spend too much, or buy too much equipment not already in our procurement plans, or turn our bureaucracies and processes upside down. As a result, the kinds of capabilities that were most urgently needed by our warfighters in the theater were for the most part fielded ad hoc and on the fly, developed outside the regular bureaucracy and funded in

supplemental appropriations that would go away when the wars did—or sooner."

—**Secretary of Defense Robert M. Gates, Air War College, April 15.**

Threats From Weakness

"Historically, most security challenges have come from state strength, from aggressive, powerful states overstepping the bounds of international norms and international law. We are now in a world where many of the security threats we face will come from state weakness and the inability of states to meet the basic needs of their population. ... State weakness and failure may be an increasing driver of conflict and of situations that require a US military response."—**Michele Flournoy, undersecretary of defense for policy, Center for Strategic and International Studies, April 29.**

Threats From Vets

"DHS/I&A assesses that right-wing extremists will attempt to recruit and radicalize returning veterans in order to exploit their skills and knowledge derived from military training and combat. These skills and knowledge have the potential to boost the capabilities of extremists—including lone wolves or small terrorist cells—to carry out violence. The willingness of a small percentage of military personnel to join extremist groups in the 1990s because they were disgruntled, disillusioned, or suffering from the psychological effects of war is being replicated today."—**Report by Department of Homeland Security Office of Intelligence and Assessment, April 7. DHS Secretary Janet Napolitano initially stood by the report but denounced it on April 24.**

The Withering of Strategy

"The military never gained full control of nuclear weapons, and increasingly in the 1950s lost primacy in nuclear strategy to the new think tanks and to the private sector. At the same time, the services adopted business models of management and to some extent leadership that reflected a growing partnership with American industry. (Significantly, William Westmoreland was the first active duty Army officer to graduate from the Harvard Business School.) The services also em-

braced operations research, systems analysis, and economic theory partly to defend themselves against Robert McNamara and his whiz kids. Nonetheless, the services began to use those disciplines, along with the traditional supports of science and engineering, to manage their institutions, formulate policy, and eventually to wage war. The result was the withering of strategy as a central focus for the armed forces, and this has been manifest in a continual string of military problems."—**Richard H. Kohn, professor of history at the University of North Carolina and former chief of history for the US Air Force, World Affairs, spring issue.**

Heavy Traffic on the High Frontier

"In 1980, only 10 countries were operating satellites in space. Today, nine countries operate spaceports, more than 50 countries own or have partial ownership in satellites, and citizens of 39 nations have traveled in space. In 1980, we were tracking approximately 4,700 objects in space; 280 of those objects were active payloads/spacecraft, while another 2,600 were debris. Today, we are tracking approximately 19,000 objects—1,300 active payloads and 7,500 pieces of debris. ... Based on the last 10 years of launch activity, we conservatively project the number of active satellites to grow from 1,300 to 1,500 over the next 10 years. We also estimate the overall number of tracked objects could increase from 19,000 to as much as 100,000."—**Air Force Lt. Gen. Larry D. James, joint functional commander for space, US Strategic Command, House Science and Technology Committee, April 28.**

Flying With Doolittle

"Early on, everybody thought leaving the flight deck of the carrier was the biggest challenge of the trip. As it turned out, it was the easiest thing, and I had a special advantage because I was sitting next to the best pilot in the world."—**Lt. Col. Richard E. Cole, Jimmy Doolittle's copilot on the 1942 raid on Tokyo, at the 67th reunion of the Doolittle Raiders, April 16-18.**

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A modest airlift into Sudan marks the start of what may prove to be a new regional preoccupation.

Engagement in Africa

By Stewart M. Powell



USAF photo by SSgt. Joseph L. Smallfield Jr.

A USAF C-130 operated by the 81st Rescue Squadron lands on a dry lake bed in Djibouti.

The operation was called Nimble Star. C-17s, in a total of five sorties, moved 136 tons of equipment from Rwanda to Fashir, Sudan. The deliveries supported nearly 3,500 Rwandan peacekeeping troops in that desperate land and were, in the words of a Rwandan Defense Force officer, “essential” to the mission.

The January 2009 airlift, conducted by USAF C-17s from Travis AFB, Calif., marked a major milestone for newly fledged US Air Forces Africa, the air component of US Africa Command.

First, the three-day airlift of oversize vehicles, cranes, water purification systems, trailers, tents, and spare parts

marked the first major operation for the Air Force component, also known as 17th Air Force.

Second, it marked a major effort to begin developing steady relationships on the large and diverse continent where the US has traditionally had limited interaction. “Americans tend to be episodic,” said Maj. Gen. Ronald R. Ladnier, commander of 17th Air Force. “There’s something going on, we roll into town, we help and then we leave, and they don’t see us for another few years. What we’re trying to do is sustain that engagement.”

The US-Rwandan cooperation opened the door to deeper collaboration barely

two months later when the vice commander of 17th Air Force, Brig. Gen. Michael W. Callan, traveled to Kigali to meet with the chief of Rwanda’s Defense Force, Gen. James Kabarebe. The officers mapped a partnership to train and equip Rwanda’s air forces to deal more effectively with medical, logistical, and air traffic management issues in the nation of 10 million.

That meeting set the stage for a follow-up meeting led by the commander of AF-RICOM, Army Gen. William E. Ward.

When the C-17s moved peacekeeping equipment from Rwanda to Sudan, Air Force trainers instructed 35 Rwandan counterparts in load preparation and



USAF photo by Sgt. Kieran Cuddihy

loading, “so that the next time we go down there, they’ll be more prepared to load aircraft and support the next major operation,” Ladnier said. “We’re working like the dickens to not just throw events around but to tie them to a broader, long-term strategy.”

A Big Sustainment Piece

Typical of the wide-ranging engagements was a trip to Nigeria early this year by Lt. Col. David MacKenzie, deputy director of Air Forces Africa’s plans directorate. The veteran C-130 instructor pilot helped his Nigerian counterparts assess the status of that nation’s fleet of eight C-130s. The exercise found that only one of the aircraft was considered airworthy. This is a problem afflicting C-130s in Morocco and Libya, as well.

The US-Nigerian team concluded that consistent maintenance would be required to get Nigeria’s fleet airborne again. “It’s not just about fixing the aircraft,” MacKenzie said. “There is a big sustainment piece in the supply, logistics, and training areas.”

In many cases, national air forces in Africa “have hardware [but] they just haven’t had the same training” as US airmen, Ladnier said, and “have not kept the aircraft up to flying condition.”

Efforts by 17th Air Force, based at Ramstein AB, Germany, and Africa Command, based at Kelley Barracks in

Stuttgart, Germany, represent so-called “active security” efforts. Active security is an evolving US strategy designed to help African nations bolster security, economic development, and political stability to exercise greater control over vast ungoverned spaces that might be used as safe havens or training grounds by al Qaeda and other radical extremists.

“Solutions to problems around the world are seldom one dimensional—

Malian and Senegalese military forces head for a CV-22 of USAF’s 8th Special Operations Squadron during the Flintlock joint training exercise in Mali.

seldom just military,” said Ladnier, who once served a three-year assignment as deputy director of contingency planning and peacekeeping at the State Department. “That is quite honestly what is so exciting about Africa.”



USAF photo by SSgt. Samuel Bender

TSgt. Sean Arnold guides trucks bound for Sudan aboard a USAF C-17 at Kigali Airport in Rwanda.



Maj. Gen. Ronald Ladnier, commander of US Air Forces Africa and 17th Air Force, talks to CPO James Drake in Djibouti.

Air Forces Africa oversees some of the most visible assets that AFRICOM can deploy, even as it has no permanently assigned aircraft of its own and therefore relies upon attached forces. For example, two C-130s and 51 airmen from Dyess AFB, Tex., assigned to serve at Ramstein, have flown 173 sorties to deliver 274 tons of cargo on 98 different missions since Oct. 1. USAF's Africa-wide totals since Oct. 1 have included delivering 1,100 passengers and 630 short tons of cargo on 216 sorties.

In March, 17th Air Force convened a five-day forum at Air University's newly formed Air Force Research Institute, Maxwell AFB, Ala. The forum drew analysts and researchers from around the world to discuss ways to address the security challenges besetting a sprawling continent three times the size of United States, with 54 countries, 900 million people, and dozens of tribes and tongues.

"The one thing I have learned is there is no such thing as an 'Africa expert,'" Ladnier said after the forum. "There are too many cultures, too many challenges, too many different conditions on the continent."

It's been an ambitious operational rollout for the revived 17th Air Force. President Bush's order to create AFRICOM as the nation's sixth geographic military command in 2007 resurrected the numbered air force, which had previously stood down in 1996.

AFRICOM drew together 172 separate Africa-related missions, activities, programs, and exercises from US European Command, US Central Command, and US Pacific Command when

it became operational Oct. 1, 2008. Air Forces Africa was activated the same day. It presently relies on two C-130s attached to its headquarters at Ramstein, and two C-130Hs based in Djibouti.

Some Rough Spots

Yet after nearly a year of focusing exclusively on Africa, Ladnier said the scale of the continent still remains daunting. The 11-hour flight from Frankfurt, Germany, to Johannesburg, South Africa, is about as long as a flight from Frankfurt to Los Angeles.

Most African nations have airfields with runways and infrastructure sufficient to handle C-130s or C-17s. But fuel and fuel-handling equipment frequently is lacking, often forcing 17th Air Force to pre-position materiel and supplies. "Sometimes we just have to bring them in with us," Ladnier said. "That is the biggest challenge to us."

The start-up hasn't always been smooth. The Government Accountability Office, for example, reported that high-level US officials had "raised concerns" that Africa Command might become the hub for all US efforts in Africa—thereby blurring "traditional boundaries between diplomacy, development, and defense."

"To be quite honest, I have never understood that criticism," countered Ladnier. Some \$7.2 billion of the estimated \$9 billion a year in US assistance to Africa comes from State Department-related agencies. "When I look at that money and then look at what the DOD budget is [for Africa]—about \$250 million to \$300 million—I don't think

we're going to militarize anything with that budget."

The GAO estimated that the overall cost to operate AFRICOM in Germany, expand DOD's presence at 11 embassies in Africa, and improve facilities used by US forces in Djibouti could exceed \$4 billion over seven years.

That price tag does not include an expense for establishing a forward headquarters in Africa, and US efforts in this regard have been met with mistrust. Liberia, on Africa's west coast, remains the only nation to publicly express any interest in hosting the overall AFRICOM headquarters. The closest thing to a base the United States has on the continent is a 2,000-strong presence at Camp Lemonier in Djibouti, headquarters of the Combined Joint Task Force-Horn of Africa.

The African Union's Pan-African Parliament vote in 2007 "not to accede" to the US request to "host AFRICOM anywhere in the African continent" has slowed efforts to locate a headquarters on the continent. Not a single African country stepped forward with an offer to host any of the five planned regional integration teams—small, lightly staffed mini-headquarters that were designed to enable AFRICOM to forge closer ties with African nations.

AFRICOM's commander said that, for the time being, this is not a concern. "For many reasons, being on the continent today is not something that's either necessary nor sought after," Ward recently told lawmakers. "It is not the essential part of doing what we need to do to bring value added to our programs on the continent." Africa Command will not decide where to seek a headquarters on the continent until 2012 at the earliest.

For his part, Ladnier said he would prefer to keep his headquarters at Ramstein, adjacent to 3rd Air Force headquarters, which runs USAF's military operations in Europe. "If we get into something else that requires kinetic options, then the 3rd Air Force is ready to assist us with that," he said. "My vote would be to stay here, because I think it makes us more successful."

So far, US Air Force operations in Africa have largely focused on non-controversial missions such as ferrying humanitarian relief supplies and peacekeepers' equipment, conducting training, and working with African nations to improve air traffic control and air safety across a sprawling continent that suffers a disproportionate share of aircraft crashes and fatalities. But



The USAF C-17 Spirit of the Golden Gate takes off for Sudan, carrying some 30 tons of vehicles and equipment destined for Rwandan peacekeeping troops.

demanding—and potentially more controversial endeavors—could lie ahead in places such as Darfur.

US forces have intervened in Africa at least 42 times under various circumstances since 1956, according to the Congressional Research Service.

“Some of the greatest crimes against humanity have occurred in Africa, and periodically we hear calls for intervention,” observed Rep. Rodney P. Frelinghuysen (R-N.J.), a member of the House Appropriations Committee.

“There’s been talk of no-fly zones. ... Are you ready?” Frelinghuysen asked Ward, who replied that enforcing no-fly zones “will require the allocation of forces to conduct [the] military work that would be required.”

On the Air Force side, Ladnier said his headquarters stands ready.

“Whatever may come up, we are prepared to bring all the capabilities that the Air Force can bring to a particular contingency,” Ladnier said. “We will work like heck ... to keep problems from becoming crises. But if we’re asked to respond to catastrophe, then we’re ready to bring what the Air Force brings to any joint fight.”

In June, the 617th Air and Space Operations Center was activated to oversee air operations across Africa. But the greatest day-to-day challenge is still long-term planning. It is difficult to obtain the forces needed, even for the regularly scheduled military-to-military events that help deepen cooperation with African nations—it often takes three or four months to arrange for 17th Air Force to obtain forces for nonemergency

operations such as scheduled military-to-military exercises.

Lily Pad Operations

Ladnier said this is “one area that we’re still wrestling with,” getting equipment and forces in place “in sufficient time to meet the engagement events that we have planned.”

But the command and its capabilities are still expanding. The Air Forces Africa staff is steadily growing—from the 125 who were on hand last October, to 180 airmen by April, toward a final goal of 286 personnel.

The command is building on-the-ground relationships on the continent by offering airlift, training, and aircraft maintenance assistance. Airmen are also offering to improve nations’ air traffic control capabilities to bolster various governments’ political control, economic development, and security.

As Ladnier said, “Better air travel in Africa will do in a similar way [for Africa] what the transcontinental railroad did for the United States.”

Seventeenth Air Force’s contingency and crisis planning and response team had already visited four African nations through April to carry out airfield surveys, with plans to visit seven more nations by Sept. 30. AFRICOM currently has cooperative security location agreements, commonly known as “lily pad” operating agreements, with a dozen

African nations stretching from Algeria on the Mediterranean to Zambia and Botswana in southern Africa.

Military-to-military events, exercises, and conferences are on the increase, as well, with 30 events overseen by Air Forces Africa this year expected to grow to as many as 120 events next year. Countries involved just this year are expected to include Botswana, South Africa, Rwanda, Nigeria, Senegal, Cameroon, Ethiopia, Kenya, Mali, Ghana, Morocco, Nigeria, Algeria, Mozambique, Namibia, Uganda, and Sierra Leone.

The US assistance could pay dividends by enabling countries such as Nigeria to provide airlift to African peacekeeping forces moving within the continent. This could include forces drawn from the seven Nigerian peacekeeping battalions being generated to support United Nations and African Union peacekeeping operations in Liberia, Sudan, and Somalia. A total of seven UN peacekeeping operations are under way across Africa, many drawing forces from some of the 60,000 African troops from 24 nations that have been trained under a US-financed program initially dubbed the African Contingency Operations Training Assistance Program.

Unfortunately, most African nations “have very limited ways to get people to the fight or sustain them when they are there,” MacKenzie said.

Also under way are efforts to partner US-based National Guard units with African nations for military-to-military familiarization and relationship building. Arrangements have led to Wyoming partnering with Tunisia; Utah with Morocco; North Dakota with Ghana; New York with South Africa; California with Nigeria; Vermont with Senegal; and North Carolina with Botswana.

Some US states have even dispatched local government officials and community business leaders to the partner countries in Africa. The goal is familiar—to build on the US military assistance and leverage it into broader ties that bolster commerce and trade.

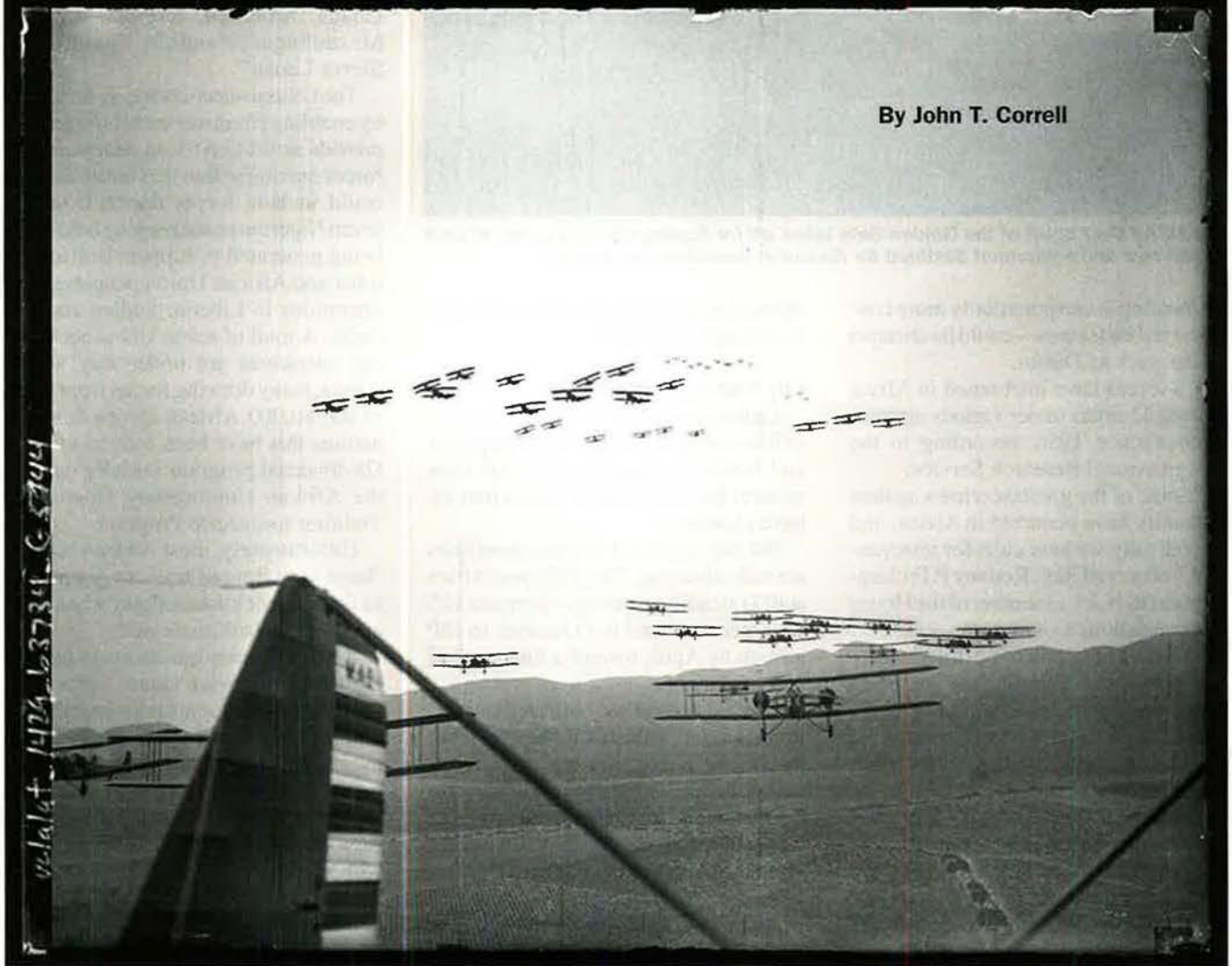
The Air Force has high hopes that it can build beneficial relationships on a continent where US interests have often been underrepresented. “A lot of folks are watching us to see how it works out,” Ladnier said. ■

Stewart M. Powell, White House correspondent for Hearst Newspapers, has covered national and international affairs for 30 years in the United States and overseas. His most recent article for Air Force Magazine, “Swamp of Terror in the Sahara,” appeared in the November 2004 issue.

The nation's air arm in World War II was the Army Air Forces. However, there's more to the story.

But What About the Air Corps?

By John T. Correll



As most airmen know, the United States Air Force began in 1907 as the three-man Aeronautical Division of the Army Signal Corps. It went by various names in the early years, but the dividing lines between most of these eras are clear enough.

For one era, however, there is much confusion about the proper name for the Air Force's predecessor organization. That is World War II.

Even superficial research confirms the nation's air arm during World War II had the name US Army Air Forces. Some go on to claim that the name Army Air Corps was abolished in 1941 when the Army Air Forces came into being.

On the other side, one finds many who insist on calling that wartime air force the Army Air Corps instead of the AAF, or on using the two names interchangeably.

Neither side is entirely correct.

To begin with, the Air Corps did not die in 1941. In fact, the AAC was alive and kicking until 1947. Wartime photos of Henry H. "Hap" Arnold, Commanding General of the AAF, show him to be wearing on the lapels of his uniform the Air Corps insignia—a two-bladed propeller superimposed on wings.

The official song began, "Off we go into the wild blue yonder" and finished up with a rousing, "Nothing'll stop the Army Air Corps!"

However, the wartime Air Corps no longer controlled, as it once did, the affairs of Army airpower.

Every Army officer was commissioned into a specific Army corps or branch. When Arnold graduated from West Point in 1907, he desperately wanted assignment to the



Cavalry but instead was put into the Infantry. There he stayed—although detailed to one flying assignment after another—until 1920. In that year, the Army Reorganization Act made the Air Service a combatant arm of the Army, putting it on a par with the Infantry, Cavalry, Artillery, and other branches.

Airmen were permitted to transfer to the new Air Service. Among those who did so was then-Major Arnold, who moved over from the Infantry in August 1920.

In 1926, Congress passed and President Coolidge signed the Air Corps Act. This legislation changed the name from Air Service to the Air Corps, but it did not alter the status of the branch. However, because the Air Corps was thus established by act of Congress, it could only be abolished by another statute. That did not happen until the National Security Act of 1947.

Still Junior

The Chief of the Air Corps, a two-star general, spoke for the air arm within the War Department. The Air Corps insignia was a modified version of that worn by the Air Service.

As late as 1935, the Air Corps was still no more than the most junior branch of the Army. It was famous and popular with the public, but it trailed the Infantry in clout inside the Army organization itself.

The activation of GHQ (General Headquarters) Air Force in 1935 took all Air Corps tactical units away from individual field commanders and put them under a single organization headed by an airman. GHQ Air Force reported to the Army General Staff, not to the Air Corps itself.

The leadership of the Army air arm was thus divided.

In the late 1930s, then-Major General Arnold was Chief of the Air Corps. Then-Maj. Gen. Frank M. Andrews was commander of GHQ Air Force. The division of power was roughly equal until Andrews went on to other things.

The Army reorganization of 1941 created the new Army Air Forces. GHQ Air Force was renamed Air Force Combat Command and was assigned to the AAF. The AAF controlled both the Air Corps and Air Force Combat Command.

In March 1942, War Department Circular 59 divided the Army into three autonomous Zone of the Interior commands: Army Air Forces, Army Ground Forces, and Services of Supply (later, Army Service Forces). Arnold's title changed to Commanding General, AAF.

The offices of the Chief of the Air Corps and Chief of Air Force Combat Command were abolished and their functions were taken over by the AAF. The Air Corps dropped off the organization chart.

Left, Army Air Corps airplanes practice aerial maneuvers over California circa 1930.



Lt. Gen. Frank Andrews, commander of GHQ Air Force. He reported to the Army General Staff, not the Air Corps itself.

Large combat organizations in the field might have personnel from several different corps. Almost everybody in the AAF was in the Air Corps, although some AAF support personnel were from some other corps. In May 1945, 88 percent of the AAF officers and 82 percent of the enlisted members were in the Air Corps.

When the Air Force became a separate service in 1947, it did not continue the Army corps system. The Air Corps was no more, but the last vestiges of it were slow to fade away.

The Air Force Band adjusted its rendition of "Off We Go" right away, but not until 1951 did the official published version of the song change over to conclude, "Nothing'll stop the US Air Force!"

The wing-and-propeller insignia, which had served through the Air Service, Air Corps, and AAF periods, was worn briefly on the new blue uniform. It was finally eliminated in 1948. ■

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 Invasion That Didn't Happen," appeared in the June issue.

Keeper File

Ben Rich's "Odd-Looking Flying Machine"

Ben R. Rich, head of Lockheed's Skunk Works in the period 1975-91, was the father of the first stealth fighter—the F-117. His drive to build it succeeded in 1981, but USAF denied its existence until 1988. In 1989, it flew in combat. In April 1990, it was shown in public. With delivery of the 59th and last model in July 1990, Rich revealed some unusual aspects of his remarkable development program. He observed that it was "just the beginning" for the F-117, and he was right. Not six months later, on Jan. 17, 1991, F-117s attacked targets in Baghdad, opening the Gulf War. Model No. 59—Affectionately, Christine—flew 33 missions in that war.

Today is a very special day, for, as we turn this last F-117A over to the Air Force, we celebrate the completion of the production phase of a unique aircraft program.

It's not often that one has the opportunity to develop and field an aircraft that represents a true technological breakthrough. And the F-117 is just that—the world's first very low observable fighter aircraft. It certainly is an odd-looking flying machine, all black, flat surfaces, highly swept wing and V-tail, and grids over the inlets. Yet it is a sterling example of what American ingenuity and hard work can create in response to a critical need.

In the 1970s, the Soviet Union had begun developing and deploying new early warning radars, surface-to-air missiles, and fighter aircraft. These new systems posed a major threat to our conventional fighter and bomber forces. At the same time, technology breakthroughs in very low observables were emerging, which offered the potential to counter the menacing threat buildup. And working together, the Defense Department, Air Force, and Lockheed structured the F-117 program to capitalize on these breakthroughs by rapidly developing and fielding an operational stealth fighter. The result is the F-117A stealth fighter, an aircraft with dramatically reduced signatures, which can avoid detection, penetrate heavily defended airspace, and attack critical targets with extreme accuracy.

Prior to the program go-ahead, five dedicated air staff officers reporting to Gen. Al Slay (Gen. Alton D. Slay, commander of Air Force Systems Command) clearly defined a set of top-level requirements for the F-117 weapon system. Then, a system program office with a minimum number of people was established at the Aeronautical Systems Division, under the direction of the late General Dave Englund, then a colonel. Similarly, a small Lockheed team was also established under [the] leadership of Norm Nelson.

The F-117 SPO and Lockheed program office were supported by other organizations and groups, whose efforts were crucial to the program. ...

Working together, this F-117A team established streamlined management methods with clear lines of communication and regularly scheduled meetings, but with a minimum amount of formal reporting. An appropriate amount of oversight was provided, but the team was not overburdened. We created a nonadversarial, problem-solving environment built on trust and commitment. Together, we guided the program through development and production and into operational service while maintaining the highest standards of program security.

As a result, the F-117A was developed and fielded in record time for modern fighter aircraft. Only 31 months after go-ahead, on June 18, 1981, Lockheed test pilot Hal Farley flew the F-117

"Remarks on the F-117"

Ben R. Rich
F-117A Final Delivery Ceremony
Palmdale, Calif.
July 12, 1990

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

for the first time. And with concurrent development and production, initial operational capability was achieved only 28 months later, in October 1983. In other words, the operating unit, the 37th Tactical Fighter Wing, was ready to go to battle only five years after the program go-ahead. That's roughly half the time of conventional aircraft procurement programs. And here we are today, roughly nine years after [the] program start, delivering the last of 59 production aircraft.

But not only was the F-117 done quickly; it was done at low cost. At the same time we applied breakthrough stealth technology, we used proven components from other aircraft to reduce cost and risk—General Electric F404 engines, F-16 flight-control computers, F-18 cockpit displays, and many others. Total Air Force development cost to date is very low compared to other modern-day fighters—less than \$2 billion. And the average unit flyaway cost for the 59 production aircraft is only \$42.6 million including all government furnished equipment—very favorable compared to other fighters.

We built the F-117 at two a season, eight airplanes per year, and achieved a 78 percent learning curve. The total production program, by the way, was fixed price, and we did not lose any money. In addition, the Skunk Works guaranteed range, radar cross section, and bombing accuracy. And thanks to the hard work of many of you, we met all [of] our guarantees. ...

And so today we complete a chapter in the F-117A story with the delivery of the final aircraft, but, in many ways, it is still just the beginning. The 37th is now at full strength and just beginning to be fully utilized as a high-leverage, integral unit within the Tactical Air Command. ■

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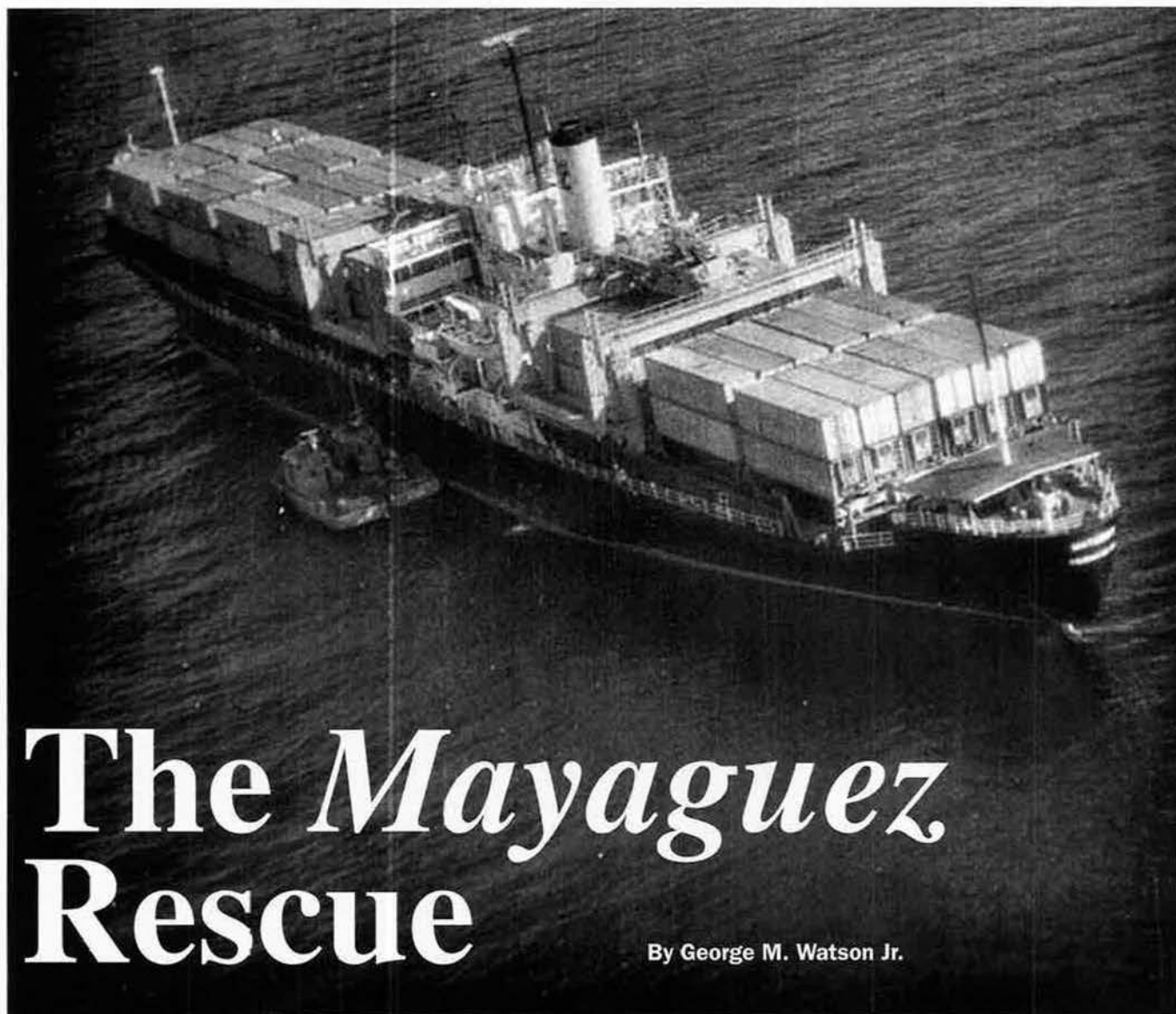
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On Cambodia's Koh Tang in 1975, US forces fought the last battle of the Southeast Asia War.



USAF photo

The *Mayaguez* Rescue

By George M. Watson Jr.

On May 12, 1975, a Cambodian gunboat carrying communist Khmer Rouge soldiers boarded and seized *Mayaguez*, a US container ship sailing from Hong Kong to Thailand and passing along the coast of Cambodia. Coming less than two weeks after the fall of Saigon and the end of the Vietnam War, Washington had no choice but to respond, and it did.

The answer was a rescue mission. The effort, afflicted by rushed planning and poor intelligence, was chaotic. The US didn't know where the communists were holding the *Mayaguez* crew. Airmen and marines sent into battle found an enemy force much larger than anticipated. They faced withering fire from an entrenched enemy. Moreover,

the Air Force helicopter crews were compelled to carry out a mission for which they had no formal training.

The ship and its crew were recovered, but the cost—in lost service lives and damaged equipment—was high.

A Mayday distress signal from the *Mayaguez* radio operator guided a Navy P-3 patrol aircraft to the vessel the morning after it was seized. The ship was riding at anchor about 34 miles from the Cambodian harbor town of Kompong Som, near a spit of land called Tang Island—Koh Tang, in Khmer.

While the US kept up its airborne watch on the ship, President Gerald Ford and his advisors decided to mount a swift rescue operation. The goal was to keep the ship's 39 crewmen from being transferred to the mainland.

Two Khmer Rouge gunboats are seen during seizure of the US container ship *Mayaguez*.

They were haunted by North Korea's 1968 seizure of USS *Pueblo* and its Navy crew members, who were held for 11 months.

The US had no formal relations with the new communist dictatorship in Phnom Penh, but it retained formidable military forces in Thailand and the Philippines. For one thing, the Air Force still had numerous fighters and attack aircraft based in Thailand. This included 24 A-7Ds, 17 AC-130 gunships, and 40 OV-10 forward air control aircraft.

Air Force Lt. Gen. John J. Burns, commander of US Support Activities

Group/7th Air Force, had operational control over Air Force units and some oversight of naval forces and marines.

The carrier USS *Coral Sea* and her escorts were ordered to the scene. The escorts, the destroyers USS *Harold E. Holt* and USS *Henry B. Wilson*, were ready for action. The naval ships had no refuelable helicopters, so the brunt of the rescue operation and of landing assault troops would fall on two Air Force helicopter units. The 21st Special Operations Squadron (SOS), with 10 CH-53Cs, and the 40th Aerospace Rescue and Recovery Squadron (ARRS), with nine HH-53Cs, were called into action.

Neither of these Air Force squadrons was trained to land combat troops under fire, but they possessed useful attributes. The 21st SOS, call sign Knife, relied on stealth in its rescue operations. Its CH-53s carried two side-firing multibarrel guns. The helicopters were able to withstand considerable enemy fire, a fact that would soon prove extremely valuable.

The air refuelable HH-53 "Jolly Greens" of the 40th ARRS could fly long missions, could overcome strong defenses with the help of escort fighters, and had better communications equipment than the CH-53s. The HH-53s also featured explosion-retardant foam in their 450-gallon external

auxiliary fuel tanks, and carried a third multibarrel gun that fired rearward over the open loading ramp.

Rescue Preparations

Because prior agreements prevented stationing ground troops in Thailand, the troops designated to retake *Mayaguez* and rescue the crew were Marine Corps units based in Okinawa and the Philippines. These troops would eventually report to Col. John M. Johnson Jr., the ground forces commander at U Tapao RTAB, Thailand.

Also available were 75 volunteers from the Air Force 656th Security Police Squadron, who were designated to retake the ship if the marines were delayed. The Air Force security police rescue effort was abruptly aborted when one of the Knife helicopters carrying them to U Tapao crashed, killing 18 airmen and the crew of five.

Beginning on May 13, US forces made a concerted effort to prevent *Mayaguez* from getting under way until a rescue contingent would move into position. An A-7 fighter attacked a Khmer Rouge patrol boat. Shortly thereafter, another boat with onboard passengers (identified by the pilot as possibly Caucasian) was spotted leaving the island and making its way toward Cambodia.

Several attempts to turn back the boat, including the use of riot-control agents and shots fired across its bow, failed to stop the vessel. US forces did not attack the boat because of the concern that it held the *Mayaguez* crew, and the boat safely entered Kompong Som harbor.

On the morning of May 14, the Chairman of the Joint Chiefs of Staff sent orders to US Pacific Command (Adm. Noel A. M. Gayler, commander) and USAF's 7th Air Force. They were instructed to prepare to seize *Mayaguez*, occupy Koh Tang, conduct B-52 strikes against the port of Kompong Som and Ream Airfield, and sink all Cambodian small craft in the target areas. Eventually, A-7s from *Coral Sea* were used instead of the big B-52s.

The planners were handicapped because they did not know whether the Khmer Rouge had moved the prisoners to the mainland or left some or all of them on Koh Tang. The rescuers believed that seizing the island would demonstrate American resolve and result in the release of the crew. Some intelligence specialists believed only a few heavy machine guns protected the island, but the Defense Intelligence

Marines scramble from a USAF CH-53 helicopter during the Mayaguez mission.



USAF photo



Agency and PACOM's intelligence section warned that US forces would encounter up to 200 soldiers armed with "recoilless rifles, mortars, and machine guns."

This information failed to reach the marines, who went into battle believing the Koh Tang garrison was defended by roughly 25 irregulars.

Ideally, the island would have been bombed prior to the planned assault, but planners ruled out an air strike for fear of hitting the *Mayaguez* crew. Instead of dispatching C-130 transports to drop 15,000-pound bombs to carve out landing zones, the planners proposed that helicopters touch down on an open beach to deliver the marines.

The first helicopter took off from U Tapao in Thailand on the morning of May 15. Johnson ordered one marine detachment to board and seize *Mayaguez* and another battalion to attack Koh Tang. An airborne battlefield command and control center coordinated the aerial activity through a fighter pilot serving as the on-scene commander. The 432nd and the 347th Fighter Wings, Korat RTAB, Thailand, were to provide air support. Forward air controllers would direct the strikes.

Combat operations commenced on the morning of May 15. Three USAF HH-53s brought the attack force to the destroyer *Holt*, which sailed toward *Mayaguez*. Next, after a flight of A-7s dropped tear gas on *Mayaguez*, *Holt* pulled alongside to release the Marine

Corps boarding party, which found no sign of life on the ship. *Holt* then towed *Mayaguez* out to sea.

Into the Fire

Meanwhile, at about 6:00 a.m., two Air Force helicopters—Knife 21 and Knife 22—approached Koh Tang's western beach and two others—Knife 23 and Knife 31—positioned themselves to land marines on the eastern side of the island. The defenses were heavier than anticipated, and the approaching helicopters were met with heavy gunfire.

The shattered hulks of two helicopters shot down in the rescue mission litter the east beach of Koh Tang.

Knife 21, piloted by Lt. Col. John H. Denham, dropped off its marines and was then hit by enemy fire that caused extensive damage, including loss of its engines. After dropping its external tanks and additional fuel, Knife 21 ditched about 300 yards out to sea. Eventually, another CH-53 arrived and plucked Denham and his copilot from the water.

Knife 22 met a similar barrage, which punctured its fuel tanks. Knife



AC-130 gunships like this one provided fire power from above for the embattled marines stranded on Koh Tang.

The Heroes of *Mayaguez*

For their heroism during the *Mayaguez* operation, Air Force helicopter crewmen and forward air controllers were awarded 92 medals. This included four of the just 10 Air Force Crosses that have been earned since Vietnam.

Air Force Cross recipients were:

- First Lt. Donald R. Backlund, the pilot of Jolly Green 11. Backlund's rescue helicopter pulled out the contingent of marines that had been trapped all day on the east beach after the helicopters that delivered them had been shot up.

- First Lt. Richard C. Brims, the pilot of the CH-53 Knife 51. Brims and his crew extracted 70 marines from Koh Tang, including the last group, which was rescued after dark and under tremendous enemy fire.

- SSgt. Jon D. Harston, a flight mechanic aboard Knife 31, which was shot down into the water. Harston, shot in the leg, was in about four feet of water when he returned for his M16 and helped several marines through the flames to safety. He pulled two injured marines to deeper water where the survivors were rescued by USS *Wilson*.

- Capt. Roland W. Purser, pilot of the rescue helicopter Jolly Green 43. Purser made repeated runs to the heavily defended island over the course of 16 consecutive hours, and during one sortie brought out 54 marines.

22 followed Denham's Knife 21 seaward and eventually made a forced landing on the coast of Thailand, never having inserted its marines.

The same sort of ground fire enveloped Knife 23 as it came over the eastern beach of Koh Tang. Heavy fire knocked out an engine and shattered its tail pylon. All 20 marines aboard made it to the island's tree line, however, as did the three-man helicopter crew. From there, the copilot used his emergency radio to call in air support.

Knife 31, flown by Maj. Howard A. Corson, similarly ran into furious gunfire. This killed his copilot and forced him to ditch the helicopter in about four feet of water. SSgt. Jon D. Harston helped some of the marines trapped inside to get outside, and then helped several wounded marines stay afloat. Not everyone made it, though. Ten marines, two sailors, and one airman died in the wreckage.

The destroyer *Wilson*, steaming toward Koh Tang, spotted the airmen and marines from Knife 31 in the water off the eastern beach of the island and moved to pick them up.

The ferocious enemy fire against the first four helicopters prompted the second part of the first wave to hold off. Word from the marines on shore was that they had carved out a small beachhead. The marines soon encountered enemy opposition from defensive positions in log and earthen bunkers and fighting holes. Each fortification was manned by two to four men.

Jolly Green 41 made several unsuccessful attempts to land and finally—on its fourth try—delivered 22 marines.

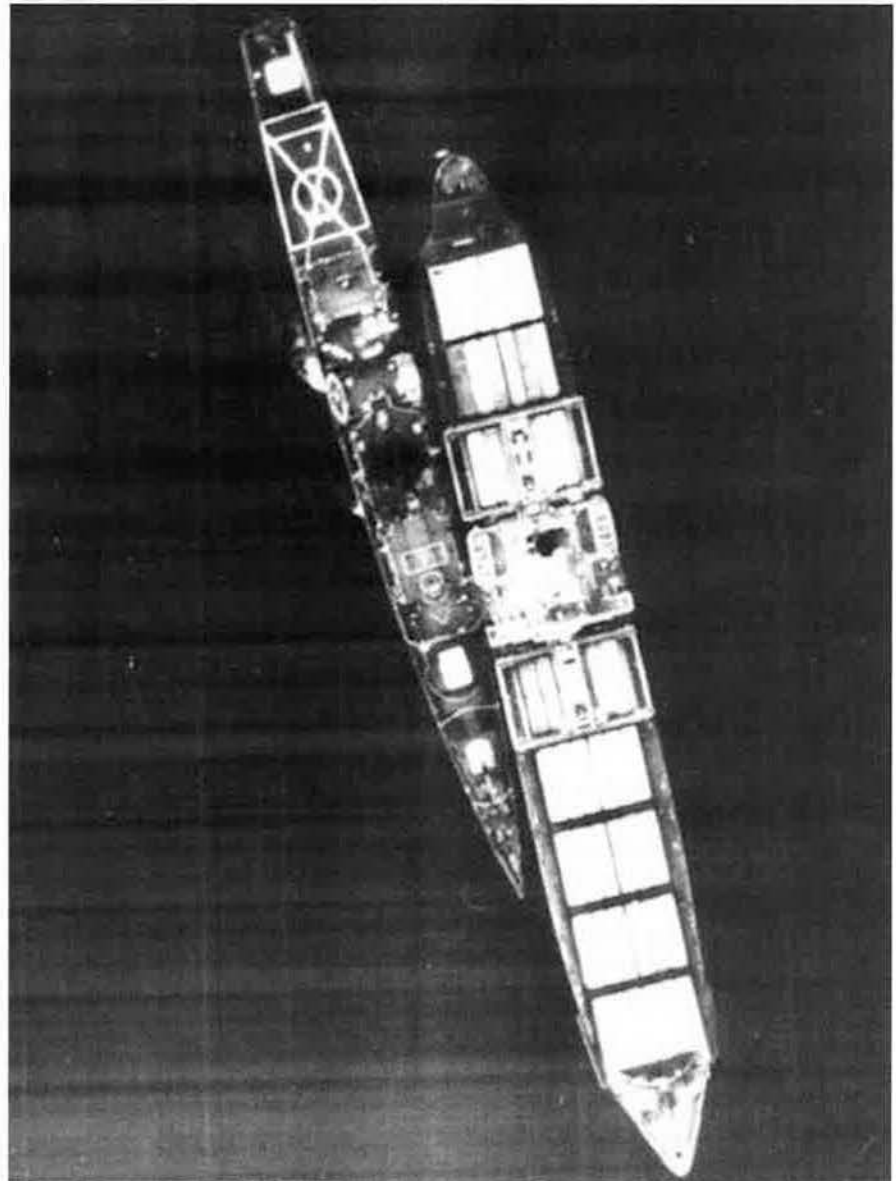
This HH-53 then came down short of U Tapao.

Jolly Green 43 was able to off-load 29 marines who advanced inland to set up a perimeter. Knife 32 was the only one of three helicopters to reach the marine position on the first try. It succeeded in dropping 13 marines, but the damage the CH-53 sustained kept it out of further action after it limped back to U Tapao.

Primary Mission Complete

Of the 180 troops who were to have been off-loaded in the first wave of the assault on Koh Tang, only 131 actually made it to the proper spot. They were placed at three locations, over a three-hour span.

At 9:30 a.m., the pilot of a P-3 patrol aircraft advised *Wilson's* captain that a fishing boat was approaching his war-



USS Holt (I) takes control of Mayaguez. After ascertaining that Mayaguez was deserted, the US destroyer towed the container vessel out to sea.

USAF photo



A rear door gunner mans his post as an Air Force helicopter leaves the Koh Tang area after the mission.

ship. *Wilson* held its fire, suspecting that the boat might contain the crew of *Mayaguez*. It was indeed the *Mayaguez* crew, which was promptly identified and set free. Both primary missions of recovering *Mayaguez* and its crew were now complete, but the bulk of the attack force, already heavily engaged on Koh Tang, had no idea that this was the case.

Air support began to improve when an AC-130 special operations forces gunship, Spectre 61, arrived overhead, identified itself to the embedded marines, and fired several spotting rounds—one of which hit an enemy bunker.

"How was that?" an AC-130 crewman asked, according to the recorded conversation.

"Right on, but it didn't do much," the marine replied.

Then the Spectre fired a 105 mm round, which demolished the bunker.

"Jesus Christ," the marine exclaimed. "What was that? Have I got targets for you!"

The firepower from Spectre 61 and other aircraft enabled two groups of marines to join forces and helped them to survive.

There soon arrived a White House message ordering US forces to "cease all offensive operations" against the Cambodians. That wasn't in the cards, though. After hearing from his helicopter pilots and others that marines were in place and didn't control a single landing

zone, Burns opted to continue in with the reinforcements.

At about noon, a pair of Jolly Greens successfully delivered 53 marines and picked up some wounded on the western beach. Knife 51 and Jolly Green 43 diverted to the western beach, and they too were able to land their reinforcing marines, increasing the US force to about 200. Knife 51 evacuated five of the wounded.

By now, *Coral Sea* was within 70 miles of Koh Tang and used its fighters to strike targets near Kompong Som on the Cambodian mainland, thereby preventing enemy reinforcement of the island.

The Last Batch at Last

Supporting fire from the air and sea began to pick up quickly now. The destroyer *Wilson* began firing on the island. Air Force OV-10 Broncos reached Koh Tang, where they helped to mark targets and aided in the extraction of the Marine Corps force from the eastern beach. A C-130 dropped a 15,000-pound BLU-82 "Daisy Cutter" south of the western perimeter. The bombing probably demoralized the enemy and disrupted a Cambodian attempt to move reinforcements northward to attack the marines.

With the marine contingent now seemingly in a more secure position, the extraction effort commenced at dusk. Two Jolly Greens and one CH-53 were tasked as the initial responders.

Knife 51 was the first to hit the western beach about 20 minutes after sunset. It was able to carry 41 marines out to *Coral Sea*, which was now just 10 miles away.

The crew of Jolly Green 43 landed the craft seven minutes after Knife 51, and carried out some 54 marines.

Amid an exchange of hand grenades, Jolly Green 44's landing was delayed because it couldn't see either the other HH-53 or the beach. After several harrowing passes, it was able to land and extract its marines.

The remaining marines were now protected by fire support from *Wilson*, an AC-130, OV-10s, and the evacuation helicopters with their multibarrel weapons. Jolly Green 44 returned to the island, where SSgt. Bobby Bounds was able to guide the disoriented pilot and copilot to a safe landing. The helicopter departed with some 30 marines.

Knife 51 was to recover the last batch of marines. It took off from *Coral Sea* but had to abort two landing attempts because of pilot vertigo. The pilot then turned on his lights, which caused an eruption of enemy fire. The muzzle flashes were spotted by the AC-130 and helicopter crews—Knife 51 was then able to land and, within 10 minutes, evacuated the last marines. They returned to *Coral Sea*.

The *Mayaguez* encounter was technically a success, as it safely recovered the American container ship and its crew, but it came at a terrible cost. Forty-one US military personnel died in the operation—including three marines who never made it off the island after the battle at Koh Tang and were listed as missing in action.

On the insertion, most of the helicopters that had taken fire managed to stay airborne long enough to avoid a series of airborne disasters. Later, the marines hung on to their tenuous positions on the island long enough for the Air Force rescue teams to recover and pull them out. A mission that nearly ended in complete disaster was bailed out by the responsiveness, readiness, skill, and bravery of US military units. ■

George M. Watson Jr. is a senior historian at the Air Force Historical Studies Office. He has authored numerous scholarly articles and books, including The Secretaries and Chiefs of Staff of the United States Air Force: Biographical Sketches and Portraits. This is his first article for Air Force Magazine.

Flashback

The Image Catchers



When America entered World War I, military aerial photography virtually was unknown, but it emerged as a major weapon. The Army Air Service in 1917 created a Photographic Section, and pilots flew regular photo sorties. A camera was mounted in the fuselage and was operated by a photographer called an air ob-

server. Here an AO reaches for a mission camera before takeoff. Aerial cameras yielded vital intel on German troop movements, fortifications, and logistics. During the Argonne Offensive late in the war, the Photographic Section produced 56,000 prints in four days.

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By Frances McKenney, Assistant Managing Editor

A Return to Minot

When AFA Chairman of the Board Joseph E. Sutter visited Minot AFB, N.D., and the **Gen. David C. Jones Chapter** in April, the local CBS affiliate took note.

"Because we live next to a military base, we know that the impact of Minot Air Force Base is huge, both to our local economy and in the nation's defense," the KXMC-TV report began. The Channel 13 video clip mentioned that Sutter—whose primary military duties were in ICBM operations during his Air Force career—had been stationed at Minot. It also noted the Jones Chapter and AFA's role as an "advocate and supporter for the base."

While at Minot, Sutter met with 91st Missile Wing Commander Col. Christopher B. Ayers. He visited several units, as well as the Airman Leadership School and the David C. Jones Youth Center.

Sutter made a point of meeting the state's 2008 Teacher of the Year, science teacher JoAnn Schapp of Bishop Ryan High School in Minot. Sutter was also guest of honor at the chapter's awards banquet.

State President Jim Simons and the chapter VP, 2nd Lt. Kidron B. Vestal, were among his escorts for the visit.

Doolittle Raiders Honored in S.C.

The South Carolina Air Force Association and the **Columbia Palmetto Chapter** saluted the Doolittle Raiders during the 67th reunion of the World War II airmen who carried out the April 1942 bombing of Tokyo under the leadership of then-Lt. Col. Jimmy Doolittle.

The three-day reunion in Columbia, S.C., on April 16-18, brought together four of the original 80 Doolittle Raiders: Richard E. Cole, Robert L. Hite, Thomas C. Griffin, and David J. Thatcher.

At a "Lunch With the Raiders" event, the four received three-dimensional holograms, featuring Doolittle, from Rodgers K. Greenawalt, the South Carolina state president, and Deborah L. Marshall, chapter president.

"The South Carolina Air Force Association is pleased and proud to again recognize the vital role the raiders played and to honor them for what they did," said Greenawalt.

The chapter mailed similar awards to the five other surviving raiders who were not present at the lunch.



During a visit to Minot AFB, N.D., AFA Board Chairman Joe Sutter (left) takes in information presented by SrA. Justin Miller, dressed in ghillie-suit camouflage. Also in the front row are (l-r) SrA. Sylvester Mitchell and SrA. Joshua Nash. The airmen are assigned to the 91st Security Forces Group Tactical Response Force.

Chapter member P. Wayne Corbett later noted that several of Doolittle's airmen had South Carolina roots, including William G. Farrow of Darlington, who was executed by the Japanese after his aircraft went down in China; Horace E. Crouch of Columbia, who lived in his hometown until his death in December 2005; and Col. Nolan A. Herndon of Edgefield, who died in October 2007.

In 1942, the raiders had practiced mission tactics in Columbia for several weeks before going to Eglin Field, Fla., to complete mission preparation.

More Chapter News

■ ABC affiliate KSTP-TV, covering news in Minneapolis and St. Paul, did a brief news segment on the April awards banquet of the **Gen. E. W. Rawlings Chapter (Minn.)**. Active duty, reserve, ROTC, and Junior ROTC personnel received honors that evening, but the TV coverage took particular note of cadet Christine Spampinato, from the University of St. Thomas, who described what Air Force ROTC has meant to her: "I've been able to travel all over the country and get involved with different things that I wouldn't have had

the opportunity to, and I've met some really amazing people through the program." The news segment noted that the Rawlings Chapter has more than 900 members and is open to civilians.

■ The **Roanoke Chapter (Va.)**, led by James H. McGuire, helped five cadets from Virginia Tech's AFROTC Det. 875 attend the three-day Arnold Air Society national convention in Phoenix in April. The chapter combined forces with the Virginia State AFA to come up with a grant of \$750 to help offset the cost of the trip for cadets Peter Callo, Tavia Cawley, Daniel Collins, Peter Laclede, and Brett Rogers. In addition, AFA's Chairman of the Board Joe Sutter was a featured convention speaker, and AFA co-hosted an al fresco dinner, with entertainment by a live band, during the convention.

■ Forty teachers from Miami-Dade County, Fla., participated in the first annual Aerospace Education Teachers Workshop co-sponsored by the **Miami Chapter** and Dade County. The focus was on rockets: NASA Education Specialist Les Gold—a Gold Coast Chapter member—drove down from Cape Canaveral to present a lecture

on the history of rockets. The teachers assembled rockets made of drinking straws, learned how to launch them, and gathered data. They then learned how to use a math program to interpret the information. The chapter provided the teachers with two meals, workshop materials, door prizes, and other freebies. The Miami Chapter has co-sponsored two workshops in past years with Florida's **Gold Coast Chapter** and **John W. DeMilly Jr. Chapter**.

■ In Warner Robins, Ga., the Museum of Aviation opened a Thunderbirds F-16 aircraft exhibit in May, with help from the **Carl Vinson Memorial Chapter (Ga.)**. The chapter donated nearly \$18,000 for supplies and paint to display the aircraft in the same red-white-and-blue paint scheme that is used by the Air Force aerial demonstration team today. The museum's F-16A flew as the No. 2 and No. 3 aircraft with the Thunderbirds from the early 1980s to 1991 and came from Sheppard AFB, Tex., where it had been a maintenance trainer. Chapter members Jack H. Steed and Dan Callahan joined Thunderbirds Team Leader Lt. Col. Greg Thomas and Warner Robins Air Logistics Center Commander Maj. Gen. Polly A. Peyer, from Robins AFB, Ga., in cutting the ceremonial ribbon to officially open the new display.



The Roanoke Chapter sent cadets (l-r) Peter Laclede, Brett Rogers, Tavia Cawley, Peter Caño, and Daniel Collins to an Arnold Air Society convention. Retired Brig. Gen. Richard Bundy (center) is AAS executive director as well as a Galaxy Chapter (Del.) member.

■ The 14th annual Chuck Yeager Drill Competition in West Virginia brought teams from four high schools to Beckley, W.Va. **Chuck Yeager Chapter** President Ira S. Latimer Jr. and Secretary-Treasurer Herman N. Nately II presented

trophies and medals—all provided by the chapter—to award-winning teams from: Parkersburg South High School in Parkersburg, first place; Cabell Midland High School in Ona, second place; and Woodrow Wilson High School in Beckley, third place. Judges for the drill meet traveled from Langley AFB, Va., to the host Woodrow Wilson High School, with the chapter footing the bill for their expenses.

■ The **Harry S. Truman Chapter (Mo.)** named Jeff Mоргенегг as its 2008-09 Teacher of the Year. A chemistry teacher at Kansas City's Center High School, Mоргенегг—whose mantra is, "All kids can learn chemistry"—was also a standout because of his ability to teach students about robotics. Chapter President Rodney G. Horton presented an AFA Certificate and \$250 to Mоргенегг in a ceremony on April 27 at the high school. Truman Chapter's Communications VP James M. Snyder pointed out that a previous Truman Chapter Teacher of the Year, Susan Rippe of Olathe Northwest High School in Olathe, Kan., became the AFA's 2006 National Teacher of the Year.

■ Joyce W. Feuerstein, president of the **Tarheel Chapter (N.C.)**, and Chapter Veterans Affairs VP Lewis E. Feuerstein drove 90 miles (one way) to Trinity High School in Trinity, N.C., to present an AFA JROTC Medal and Certificate to cadet Jason Suttles. It was the sixth year that the chapter representatives made the trip to Trinity, as well as to other JROTC and AFROTC awards ceremonies in the area. Is it

More photos at <http://www.airforce-magazine.com>, in "AFA National Report"

AFA Conventions	
July 10-11	Florida State Convention, Jacksonville, Fla.
July 17-19	Texoma Region Convention, Dallas
Aug. 1	Pennsylvania State Convention, Carlisle, Pa.
Sept. 12-13	AFA National Convention, Washington, D.C.
Sept. 14-16	AFA Air & Space Conference, Washington, D.C.

Reunions reunions@afa.org

20th Airlift/Military Airlift Sq, Charleston AFB, Dover AFB, Westover AFB. Oct. 8-11 at the Rodeway International Inn in Orlando, FL. **Contact:** Elmer Andrews, 898 SE Seahouse Dr., Port St. Lucie, FL 34983 (772-878-2486) (772-532-9101) (elmerandrews@aol.com).

20th FW Assn (1930s-present). Sept. 24-27 in Herndon, VA. **Contact:** www.20fwa.org (770-429-9955).

55th Strategic Recon Wg. Sept. 15-18 at the Silver Legacy Resort Casino in Reno, NV. **Contact:** Don Gurney (775-882-6392) (xsnoop@sbcglobal.net).

Memphis Municipal Airport, all active duty, reserve, and civilians of the 445th Troop Carrier Wg, 701st Troop Carrier

Sq, 702nd TCS, 919th Troop Carrier Gp, 920th TCG, 2584th AF Reserve Flying Tng Ctr. Oct. 16 at the Tennessee ANG Facility in Memphis, TN. **Contact:** Al Jones (913-381-0982) (kwawjones@everestkc.net).

E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Reunions," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

worth it? Trinity's senior aerospace science instructor, retired Lt. Col. Raymond Carter, later wrote to the chapter, "Your attendance is always very special to us." He added that he had already prepared an application for an AFA JROTC Medal to be presented next year.

■ **Red Tail Memorial Chapter (Fla.)** President Michael H. Emig and chapter member James Albritton attended the University of Florida's AFROTC Det. 150 awards program in Gainesville in April to present an AFA ROTC award to cadet Christopher Thorn. Col. Hubert D. Griffin, the detachment's professor of aerospace science, is a chapter member.

■ Twenty-two Virginia AFJROTC programs participated in the fourth annual state drill championship sponsored by the Virginia AFA and the state's chapters. The **Tidewater Chapter** and **Richmond Chapter** organized and set up the meet, with funding from the **Langley Chapter**, **Donald W. Steele Sr. Memorial Chapter**, and the **Gen. Charles A. Gabriel Chapter**. Virginia State President Jeffrey L. Platte attended the meet and was impressed by the level of skill and enthusiasm of the cadets. He presented awards to the winning cadets, including the first-place team from Western Branch High School in Chesapeake. ■



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DISTRICT OF COLUMBIA: Kip Hansen, 251 18th St., Suite 1100, Arlington, VA 22202-3545 (703) 416-8000.

MARYLAND: Robert Roit, P.O. Box 263, Poolesville, MD 20837-0263 (301) 349-2262.

VIRGINIA: Jeff Platte, 109 Colonels Way, Williamsburg, VA 23185-5130 (757) 827-4729.

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3601 N. Aviation Blvd., Ste. 3300, Manhattan Beach, CA 90266-3753 (310) 643-9303

State Contact

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Region President

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622 West Palm Valley Dr., Oviedo, FL 32765-9215 (321) 383-2906

State Contact

FLORIDA: John T. Brock, 622 West Palm Valley Dr., Oviedo, FL 32765-9215 (321) 383-2906.

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Region President

Ronald E. Thompson

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State Contact

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KENTUCKY: Jonathan G. Rosa, 1101 Grade Ln., Louisville, KY 40219-2678 (502) 413-4773.

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State Contact

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State Contact

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State Contact

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7737 Lakeridge Ln., Montgomery, AL 36117-7423 (334) 271-2849

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State Contact

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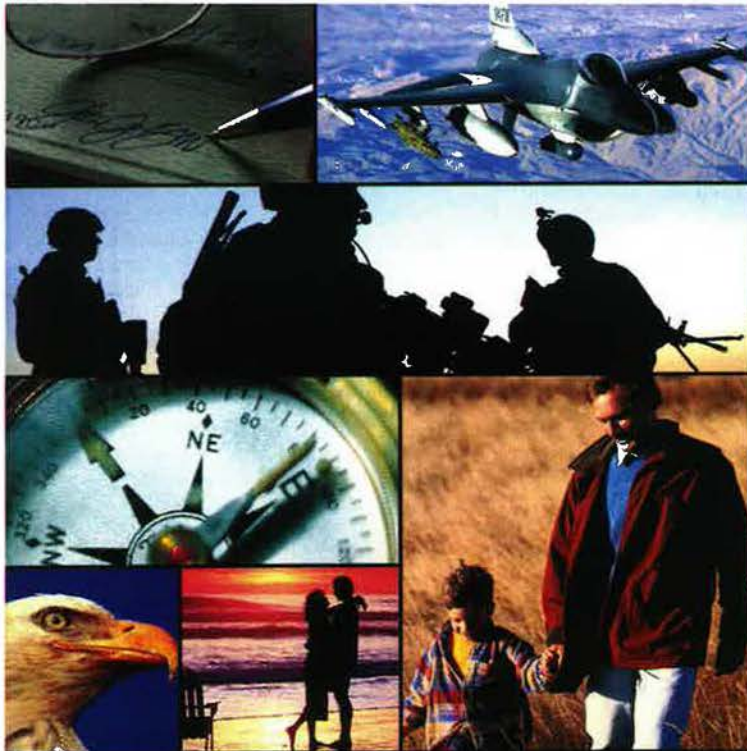
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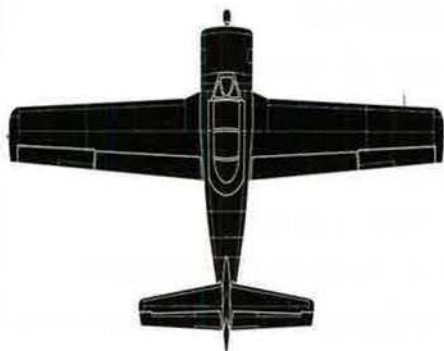
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T-28 Trojan



Many trainer aircraft have been turned into warplanes. Few if any, however, have performed as well in that role, and in so many places, as the Air Force's T-28 Trojan. Its combat career began in the early 1960s in Vietnam. The good performance of the T-28 intrigued foreign governments, which used it for training, close air support, reconnaissance, and airborne patrol. Versions of the T-28 served with more than 20 air forces. They eventually saw combat on four continents.

The T-28A was designed to replace the obsolete World War II-era T-6 Texan trainer. The early version was powered by a troublesome 800-horsepower Wright R-1300 engine. Nonetheless, the Trojan performed well enough to convince the Navy to buy the T-28B and T-28C with a larger Wright R-1820. USAF used the Trojan as a trainer through 1956, at which point it was replaced by the Beech T-34 and

Cessna T-37. The Air National Guard retained it for a few years. Then, in the early 1960s, the aircraft was revamped and given a completely new purpose.

The first T-28s to serve in Vietnam were part of Operation Farm Gate's 4400th Combat Crew Training Squadron. Rugged and reliable, it was well-liked by its air and ground crews. The original mission to train South Vietnamese pilots soon grew to include combat strikes. Then, in 1962, USAF began to modify some 300 T-28s as fighter-bombers for counterinsurgency warfare in Vietnam. These aircraft, redesignated as T-28D Nomads, provided years of stellar service. The aircraft was withdrawn from combat in Vietnam in 1964, but it continued to operate with the 60th Special Operations Squadron on missions over Laos and Cambodia.

—Walter J. Boyne

This aircraft: USAF T-28C—#140579—as it looked in the early 1960s when assigned to the 4400th CCTS in South Vietnam. It wore South Vietnamese markings because it flew in secret US Farm Gate missions.



In Brief

Designed, built by North American ★ converted by Fairchild ★ first flight Sept. 24, 1949 ★ crew of two ★ number built (all services) 2,232 ★ single Wright R-1830 radial engine ★ **Specific to T-28D:** max speed 352 mph ★ cruise speed 230 mph ★ max range 1,335 miles (loaded) ★ armament two 50 cal machine guns, miniguns ★ bomb load up to 3,000 lbs of bombs, rockets ★ weight (max) 8,118 lb ★ span 40 ft 7 in ★ length 32 ft 10 in ★ height 12 ft 8 in.

Famous Fliers

Air Force Cross: Bernard Lukasik. **Notable:** Robert Simpson, died Aug. 28, 1962 in first shootdown of US attack aircraft in Vietnam War. **Others:** Harry Aderholt, Forbert Gleason, James Harding, William Hobbins, Benjamin King, William Palank, John Piotrowski, Richard Secord, Brien Ward.

Interesting Facts

Saw combat in Asia, Africa, North America, South America ★ designed to transition pilots from prop to jet aircraft, the first to do so ★ given call sign Zorro by 606th ACS in Thailand ★ sold to French Air Force, which modified the n and used them in Algerian War ★ used by 23 air forces ★ nicknamed Nomad, Fennec ("desert fox"), and Normair ★ known as Tora-Toras in the Philippines ★ supplied by CIA in 1960s to Moïse Tshombé's regime in Congo.



T-28s armed with machine guns, bombs, and rocket launchers.

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