June 2010/$4

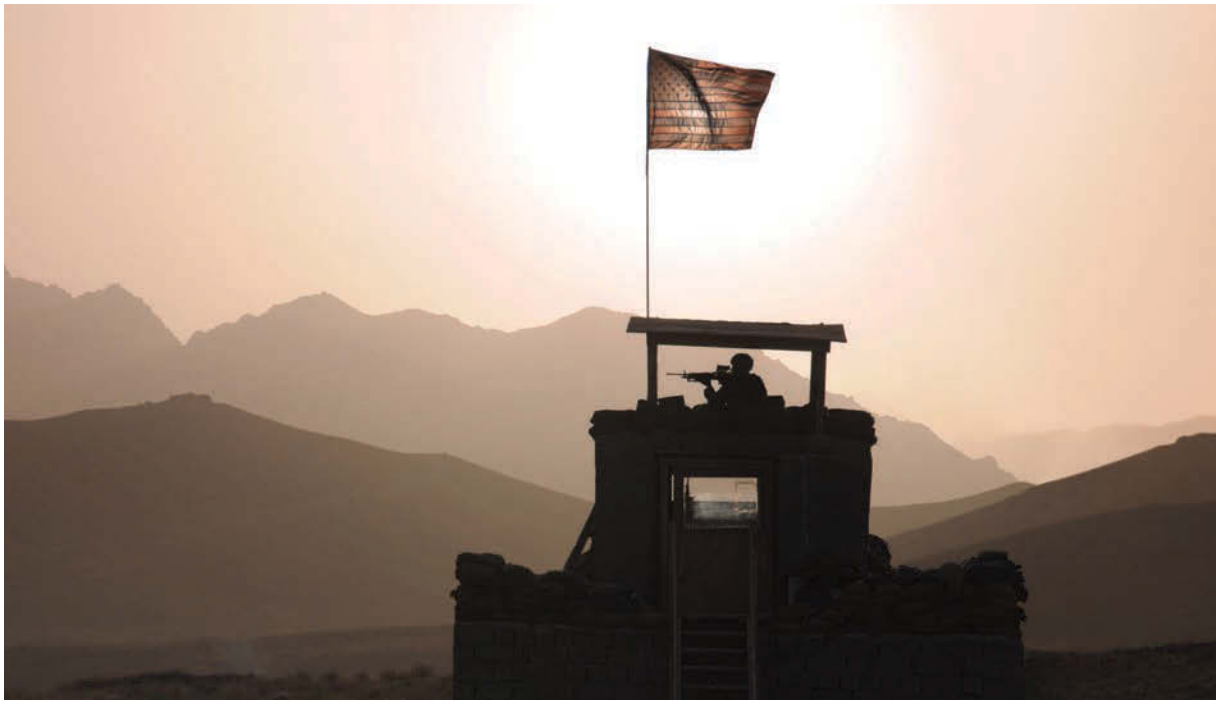
AIR FORCE MAGAZINE

JOURNAL OF THE AIR FORCE ASSOCIATION

Total Force Tankers

ISR Revolution
Strike Command Steps Up
Fiorello's Foggiani

NORTHROP GRUMMAN



Eyes in the sky for boots on the ground.

www.northropgrumman.com/jointstars

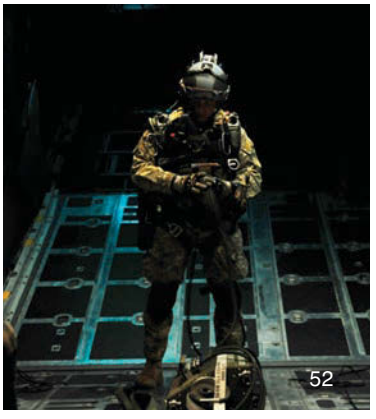
Joint STARS

The U.S. Air Force's E-8C Joint Surveillance Target Attack Radar System (Joint STARS) gives our warfighters the edge they need. The wide area surveillance (50,000 square km) and communication interfaces give our troops access to imagery and information on the battlefield, chat capability, and other support when and where it is needed. The Dismount Moving Target Indicator (DMTI) capability can track non-vehicular, slow moving entities — even individuals. Joint STARS aircraft are eyes in the sky protecting our boots on the ground.

June 2010, Vol. 93, No. 6

AIR FORCE MAGAZINE

JOURNAL OF THE AIR FORCE ASSOCIATION



About the cover: A KC-135 refuels an F-16. See "Wildcats Meet the Ugly Babies," p. 44. Photo by Ted Carlson.

www.airforce-magazine.com

AIR FORCE Magazine (ISSN 0730-6784) June 2010 (Vol. 93, No. 6) 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.

BOEING KC-X

NewGen Tanker

COMBAT

AMERICAN MADE

LOWEST TOTAL COST

COMBAT READY

SUPERIOR COMBAT MANEUVERABILITY FOR GREATER

UnitedStatesTanker.com


READY FOR A NEW GENERATION.
SURVIVABILITY.
BOEING

Editorial

By Robert S. Dudney, Editor in Chief

Warfare v. Lawfare

WASHINGTON, D.C., MAY 19, 2010

IN DECEMBER 1999, the chief prosecutor of a UN war crimes tribunal revealed she was sifting evidence that NATO's pilots and commanders—many of them American—may have broken international law by bombing Serbia. The claim was a shocker. Amid sharp US criticism, the prosecutor backed down.

That, however, was before the International Criminal Court came into force in mid-2002. Such legal ideas are no longer so rare or easily dismissed. Indeed, military and political leaders could soon face a dramatically denser tangle of legal dangers.

In June, ICC member states meeting in Kampala, Uganda, will decide whether to add a "crime of aggression" to offenses it will investigate. Member nations would be obliged to arrest officials accused of the crime for trial in The Hague. It could happen to US leaders and service members, despite the fact Washington has refused to join the court.

The UN-sponsored Rome Statute of 1998 authorized creation of an independent and permanent court to end impunity for perpetrators of genocide, crimes against humanity, war crimes, and the vague crime of "aggression." Signatories could not explain the latter term, though, and left it undefined and unprosecutable.

Now, members are weighing a draft definition. It holds that a crime of aggression occurs when someone directs use of force in a way that is a "manifest violation" of the UN charter. The charter prohibits nondefensive use of force and provides for Security Council authorization.

US officials say that, by the ICC's draft definition, NATO leaders probably would have been judged criminal for the 1999 war to stave off Serbian attacks in Kosovo. The Iraq War, which also lacked Security Council approval, would be unlawful, too.

Worse, there exists no impartial body to decide which side is an aggressor. Precisely who initiates and directs a war is murky, so literally hundreds of officials would potentially be subject to indictment, arrest, and prosecution, say legal experts. It is a standing invitation to abuse. In fact, concern about politicized prosecution is why the US, China, Russia, India, and Israel for years have refused to join the ICC. Refusal, however, wouldn't matter to this court. Military action by nonmembers could still be characterized as "aggression," if it happened on the soil of one of the ICC's 111 member states.

Airpower has long provoked sharp debate about legalities. Some argue bombing is inherently inhumane and uncivilized because many victims are civilians. This allegation has cropped up in every war and will again.

Who will stand in judgment of US troops and leaders?

The Clinton Administration helped negotiate the Rome Statute but couldn't persuade others to address US military concerns about politicized prosecutions. Though President Clinton signed the Rome Statute, he slammed its "significant flaws" and never sought Senate ratification, which was implausible in the extreme.

President George W. Bush took a more hostile stance. His Administration objected to a lack of external checks on the powers of the court and dilution of Security Council authority. Bush not only suspended Clinton's signature but also negotiated agreements with some 100 countries to prevent surrender of US personnel to the ICC. This worked, and little changed until recently.

President Obama took office ready to re-engage to some extent with the ICC. Secretary of State Hillary Clinton last summer declared, "This is a great regret that we are not a signatory." The Administration began participating as observer and pledged to assist some of its investigations.

However, even ICC-friendly Obama officials have argued against the aggression prosecutions. They recognize that the US is unique in the world for its peacekeeping and humanitarian operations, having forces deployed in scores of nations.

The developing US position seems to be that the court should obtain a Security Council finding of aggression before acting.

Whatever the outcome of the aggression issue, US problems with the court are sure to continue.

Last September, ICC chief prosecutor Luis Moreno-Ocampo reported he was collecting information about possible war crimes committed by NATO forces in Afghanistan. Drawing scrutiny, he said, were "massive attacks, collateral damage exceeding what is considered proper."

He has said that inadvertent killing of civilians in a military strike could in some cases be deemed a war crime. Moreno-Ocampo specifically mentioned unmanned aerial vehicle strikes against terrorist leaders in Afghanistan and Pakistan.

Such actions have begun to affect Western military norms. The *Wall Street Journal,* in a Nov. 26 critique, has Moreno-Ocampo recounting a conversation with a NATO legal advisor; the advisor said troops are trained to realize they could be arrested and brought to the ICC on war crimes charges with the help of evidence provided by NATO itself. This is hardly a recipe for trust and confidence.

Maj. Gen. Charles J. Dunlap Jr., a former USAF deputy judge advocate general, has warned about "lawfare," defined as "the use of law as a weapon of war" by foes who exploit "real, perceived, or even orchestrated incidents of law of war violations" to undermine superior military power.

Obama has pledged to consult closely with military leaders about the court. It is hard to believe the White House will get positive feedback without major changes in ICC governance. Without military support, there is virtually no chance that the required 67 Senators will vote to ratify the Rome Statute.

At bottom, the major question is not whether international law will be observed, but who will stand in judgment of US troops and leaders.

Clearly, that should be the United States itself. No nation has done more to promote human rights, democracy, and the rule of law. It certainly doesn't need a world court of unaccountable jurists to tell it how to stay within international law or deal with those few Americans who might violate those laws. ■

The Training System of the future is here:
Introducing the T-100 Integrated Training System

The T-100 Integrated Training System is the most modern, advanced and comprehensive 4th & 5th generation flying training system in the world. Building upon the proven technology, systems and international success of the Alenia Aermacchi M-346, the T-100 incorporates state of the art U.S. technology to provide the U.S. Air Force with the capability it needs today to meet the training requirements of tomorrow.

www.aleniana.com

FINMECCANICA Right there with you.

AleniaNorthAmerica
A Finmeccanica Company

Letters

letters@afa.org

At Razor's Edge

I've been a member of the Air Force Association since 1968, and I have never been more concerned about our ability to retain future air superiority *["A Force at Razor's Edge," April, p. 24].* No doubt that investments in Global Hawk, Predators, and Reapers provide important intelligence and air-to-ground joint force enhancements. I wonder, however, if our wargame scenarios ever address the possibility that all of our UAVs get shot out of the sky. Air superiority needs to be priority one, despite budget constraints. Without it, everything else is at stake.

Col. David R. Haulman, USAF (Ret.)
Vicksburg, Miss.

Enlisted Heroes

Great article and a thanks for telling more of the story by Col. Leo Thorsness and the brave men who survived the cruel and torturous years of captivity by the communist Vietnamese *["Commissioned in Hanoi," April, p. 56].* We did have a primer mission over Hanoi and Haiphong and three other North Vietnamese target areas by B-52s operating out of U Tapao, Thailand, some six months earlier. These missions proved the B-52s could hit North Vietnam targets and return home safely. That was Linebacker I, directed by President Nixon, which was the predecessor to Linebacker II, the operation spoken of in "Commissioned in Hanoi." I hope that we see more of the stories by such heroes as Colonel Thorsness in *Air Force* Magazine. Thank you.

Lt. Col. Sid Howard, USAF (Ret.)
Midwest City, Okla.

MiG Alley

With reference to the excellent article entitled "MiG Alley" by John T. Correll *[April, p. 61],* your readers might be interested to know that 27 RAF pilots were also to see combat with the Sabre in Korea. These were officers who were on exchange assignments in the States at the time, particularly with such units as the 4th and 51st FIWs. Two of them were KIA, whilst another was MIA. Although none were to achieve ace status, they did account for six MiGs destroyed.

Dennis W. Pritchard
Caernarfon, UK

USAF's Worrying Future

Your March issue was, as usual, informative and insightful—but also very disturbing.

First, members learn from the editorial that the QDR projects reductions in Air Force fighter wing equivalents *["Wars of the QDR," p. 2].* Then, the "Washington Watch" column informs us that, according to the Chief of Staff, our future Air Force aims to be "sufficient" *[p. 8].* In less than a decade, the Air Force is moving from a position of overwhelming dominance (never a fair fight) to "calibrated ambition"—guessing how much power is probably sufficient to win. This will be done with a multirole fighter yet to be produced that is falling further behind schedule as we speak. And what will this fighter compete against? Well, turn a few more pages.

The "Issue Brief" reveals the Russian PAK FA stealth fighter, an F-22 equivalent *[p. 22].* Notably, it will likely

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

AIR FORCE JOURNAL OF THE AIR FORCE ASSOCIATION MAGAZINE
www.airforce-magazine.com

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 Editor
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

BPA Circulation audited by Business Publication Audit

The Beechcraft AT-6B / The KING AIR 350ER ISR.

Specialized airpower. Anytime. Anyplace.

In a world where unpredictability is commonplace and flexibility is critical, Beechcraft delivers robust, purpose-built solutions. The Beechcraft AT-6B provides an affordable, capable and sustainable NetCentric ISR and light precision-attack solution. The Beechcraft King Air 350ER ISR offers networked electro-optical/infrared remote and SAR capabilities and more endurance to the most successful turbine-powered aircraft in history. Together, these aircraft fulfill the specialized airpower needs of the world's first responders.

Learn more. **+1.800.949.6640** or **HawkerBeechcraft.com**

Beechcraft

Air Force Association
1501 Lee Highway • Arlington, VA 22209-1198

Telephone: (703) 247-5800
Toll-free: (800) 727-3337

Press 1 *if you know your party's extension.*
Press 2 *for Membership.*
Press 3 *for Insurance and other Member Benefit programs.*
Or *stay on the line for an operator to direct your call.*

Fax: (703) 247-5853

Internet: http://www.afa.org/

E-Mail Addresses

Field Services.....**fldsvcs@afa.org**
Government Relations..... **grl@afa.org**
Industry Relations ..... **irl@afa.org**
Events ..... **events@afa.org**
Membership..... **membership@afa.org**
Insurance/Member Benefits....**service@afa.org**
Policy & Communications (news media)..... .....**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: jdoe@afa.org)

AFA's Mission

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

To advocate aerospace power and a strong national defense.

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

outperform the F-35 in many areas. Even more frightening to learn is the PAK FA and its Chinese equivalent will likely be produced and exported in great quantities, while the F-22 will never number more than 187.

But the US Air Force will always have its pool of superior trained airmen and maintainers. Not so fast. The first main article is titled "Guard and Reserve in a Time of Trouble" *[p. 24].* Will we be losing our bench?

Regardless of the type of fight the nation will face in the future, from peer-to-peer confrontations to counter-insurgencies, some aspects to victory will not change. We will have to clear a way to the heart of the enemy, we will need to destroy their centers of gravity, and we will have to sustain forces on the battlefield. Technical superiority best projected by the US Air Force leverages national strengths while minimizing casualties to accomplish these tasks. The other alternative is to sacrifice the blood of thousands of our soldiers and marines in unnecessary land battles that even the odds for the enemy.

Every indication from the March issue is that the nation is approaching a period where the air superiority and dominance we have come to take for granted may not be there for the next fight. For the first time since World War II, the United States may enter a conflict and find it does not have and cannot guarantee complete mastery of the skies.

The Army uses "hooah" as rallying cry. The Air Force tried "airpower," but it didn't catch on. How about a rousing "sufficiency" to motivate the troops?

Maj. Gen. Roger P. Lempke
USAF (Ret.)
Lincoln, Neb.

Mismatches

Gen. John Michael Loh's article was right on target *["The Simulation-Reality Mismatch," March, p. 30].* There was an interesting earlier example of such a mismatch. During the early months of 1967, System Analysis in the Office of the Secretary of Defense analyzed the projected effectiveness of tactical air in Europe against Warsaw Pact forces. The overall conclusion was that while suffering very high attrition, tactical air would kill very few ground forces. The Air Force challenged the analysis, and it was agreed to conduct a joint OSD/Air Force analysis to agree on inputs so there would be no disagreement on the output. Agreement was very difficult.

The Air Force team was headed by the assistant for analysis from Air Force Plans. At one point, OSD requested that he be replaced. Maj. Gen. Richard H. Ellis, Air Force director of plans, recommended to Harold Brown, Secretary of the Air Force, that he reject the OSD request.

In the midst of this joint effort, war broke out between Israel and her Arab neighbors. Secretary Brown directed that the OSD analysis be applied to that conflict to determine real-world validity. The results overwhelmingly disproved the OSD analysis. Brown sent a memo describing the application of the analysis and the results to the Secretary of Defense and to Gen. Earle G. Wheeler, Chairman of the Joint Chiefs of Staff, who sent it to all the services and joint commands. The joint study effort was disbanded.

Lt. Gen. Howard M. Fish,
USAF (Ret.)
Shreveport, La.

Smart Bombs

The story "Emergence of Smart Bombs" by John Correll was excellent, and I read it with much interest *[March, p. 60].* Actually the idea of using a laser for target marking and weapons delivery was first proposed by the late David Salonimer of the Army Missile Command, Huntsville. He sponsored two small R & D feasibility investigation contracts in 1964. One was awarded to North American, Autonetics division (the company noted in the article for their later work in this field on Paveway guidance), and one to RCA Aerospace Systems, Burlington, Mass.

At RCA, principal investigator Michael Cantella was the first to demonstrate feasibility, first in the laboratory and later in an airborne implementation. The demonstrations involved use of a gated image system (image orthicon TV camera) for a receiver with a ruby laser target marker. The use of an IR laser that came as a successful later development was not possible in this pioneer work since TV camera tubes have poor sensitivity outside of the visible spectrum. The RCA/Cantella airborne system was flown in a Piper Apache aircraft in early 1965 and demonstrated for a few days at each of several Army research centers and at Wright Field to Air Force personnel. I know this to be accurate information, having been involved directly with both Mr. Salonimer and Mr. Cantella in this technology achievement.

Fortunately, as frequently the case in technology breakthroughs, creative follow-on workers grasp, adapt, and carry new concepts to great distances, as was the case with Col. Joseph Davis Jr. and those who came later.

(Mr. Cantella has remained active to this day in IR military technology—a renowned consultant for many years at MIT Lincoln Laboratories.)

Paul Seeley
Wellesley, Mass.

The article by Mr. Correll on smart bombs in the March issue certainly covered most aspects of this history. However, since laser guided bombs (LGB) received the bulk of this summary, I would like to entertain a few comments about the electro-optical (TV) systems that were first deployed to Ubon Air Base, Thailand. In 1969/70 I was a field representative for Rockwell International/USAF for the (TV) Homing Bomb System (Hobos) and was assigned to Ubon.

The original Paveway Project at Eglin AFB, Fla., in the late 1960s had three divisions. Paveway I was the LGBs, Paveway II was (TV) electro-optical (Homing Bomb System-Hobos), and Paveway III was infrared guidance (which was never deployed).

As previously addressed [in the article], the LGBs deployed to Ubon Air Base in May 1968. In January 1969, the Hobos arrived and made an immediate impact by destroying an enemy storage munitions area, which in this case was housed in a mountain. With only a small cave entrance area for the target, the Hobos flew into the opening and exploded the tunnels of munitions. The mountain burned for two days. Previously, other sorties with various bombs could not damage this target. This demonstration utilized the low flight angle and the three-to-one L/D that was an inherent capability of the Hobos design in this mission. Other major targets that were later destroyed were a five-span bridge brought down by four systems (three on the same abutment) and major mountain roads closed, with systems being launched 12 miles away from the target. Thus, high-value targets that required precise impact angles with standoff capability became the major tasking for Hobos in the Vietnam War.

While LGBs were the majority of weapons launched in Vietnam, approximately 500 Hobos, out of approximately 4,000 built, were launched, and according to USAF records resulted in a CEP of 7.1 feet. In later years, the GBU-15 would even improve on the CEP and was approaching an all-weather capability.

Pete Petersen
Winder, Ga.

I just finished reading your interesting "Emergence of Smart Bombs" article in the March edition of the *Air Force* Magazine. It brought back many memories, and I thought your readers might be interested in a short addendum to the article, with a Navy slant. In January of 1972, I deployed on USS *Hancock* in VA-212 flying A-4F Skyhawks. There were three A-4 squadrons on board, with VA-55 and VA-164 joining the VA-212 Rampant Raiders. Each of the squadrons had a designated area of expertise with respect to the new "smart weapons" of the time. VA-55 had the required sensors and concentrated on Shrike missions and SA-2 suppression; VA-212 had a small TV mounted in the instrument panel and was the Walleye squadron; and VA-164 brought along a couple of TA-4s and handheld laser designators similar to the "Zots" described in your article. I vividly remember being glad that I was not flying or in the backseat of a VA-164 TA-4F over a target in North Vietnam in a 30 degree angle of bank at 250 knots trying to designate a target. While crude by today's standards, I'm not sure many folks know that tactical "smart weapons" actually got their start in Vietnam.

Cmdr. Greg Marshall,
USN (Ret.)
Penn Valley, Calif.

Washington Watch

By John A. Tirpak, Executive Editor

QDR mission impossible; No-die zone; IW isn't cheap ....

The QDR's Budget Obsession

Strategies outlined in the Pentagon's 2010 Quadrennial Defense Review were drawn to match budget decisions, and not the other way around, according to a panel of experts.

"Was the QDR a budget-constrained exercise? My tentative assessment is, yes," said Stephen J. Hadley, co-chair of the 20-member independent commission to assess the QDR.

Hadley, national security advisor to President George W. Bush, and co-chair William J. Perry, former Secretary of Defense, testified in April to the House Armed Services Committee.

They were asked to provide a preliminary report on their panel's activities. Congress directed creation of the panel last year, when members questioned why defense programs were being cut back or eliminated while the strategy underlying them was still being crafted.

Hadley said that the managers of any QDR must walk a fine line between planning to cope with each and every potential threat and laying out a realistic defense posture. Without some consideration of anticipated spending levels, the QDR would have become a useless "pipe dream, unsupported by real financial resources," he said.

On the other hand, he and others implied, the QDR process loses relevance if its managers allow budget considerations to dominate and dictate what should be strategic decisions.

This was the view expressed by Rep. Duncan Hunter Jr. (R-Calif.), who voiced his opinion that the QDR should not attempt to reconcile itself with likely funding levels. Rather, the Pentagon should lay out security needs and let Congress worry about how to pay for them.

"We don't need DOD telling us what we ought to spend," Hunter said. "They're there to give us their projection for what we ought to spend, but ... when it comes to ... how much we should spend, ... that's what we're here for."

Perry said that the force structure outlined in the QDR—equipment both in hand today and being developed or built—is "quite capable of dealing with any future military threats which I can envision right now, ... in the next 10 years." However, Perry said, he couldn't guarantee whether the force structure will hold for 20 years.

Perry and Hadley said that their group—12 chosen by the Secretary of Defense and eight by Congress—have divided up the QDR evaluation into five subgroups, which will look at:

- The nature of 21st century conflict.
- "Whole of government" capabilities.
- Force structure and personnel.
- Acquisition and contracting.
- The QDR process and beyond.

The panel's final report is due to be delivered to Congress on July 15.

Is It Impotent and Obsolete?

In the view of the Hadley-Perry wise man panel, the entire QDR process itself may be fatally hampered by its poor timing and incompatible purposes.

Former Pentagon chief Perry noted that, today, Congress is asking for "a much more ambitious study than we did in the Bottom-Up Review" of 1993, which was the first iteration of what has become known as the QDR. Such reviews have been released in 1993, 1997, 2001, 2006, and 2010.

Perry said, "You want a full-blown strategy, looking ahead 20 years, informed by, but not constrained by, budget planning. ... The QDR is a very useful document, but it does not do that. In fact, it's probably not possible."

While the QDR did an adequate job of examining near-term threats and "rightly" placing priority on winning today's wars, it ignored or failed to provide necessary detail on a host of vexing defense problems, Perry said.

There were no options presented to "control ... spiraling health care costs," which are devouring an ever-larger share of defense budgets, Perry said. Moreover, "we need options for how to decrease the cost and the time involved in acquisition programs," and how to involve other parts of government in the business of nation-building.

"The QDR clearly spells out the need for doing that, but it does not spell out the details," Perry said.

"We are wearing out and, in some cases, destroying our equipment at a very fast rate, and that is building up a due bill, which is going to affect future budgets in a very important way," Perry warned, and the QDR doesn't map out how to recover from the "wear and tear" of ongoing operations in Iraq and Afghanistan.

Those issues probably need their own separate study, and possibly a bipartisan commission—modeled along the lines of the base closure process—to tackle them, Perry asserted.

"Acquisition reform and health care and retirement costs are recurring themes of QDRs," Hadley said, and a special commission might "actually make some progress solving these things" so that in four years' time, critics are not "saying the same things ... we said in this QDR."

HASC ranking Republican Howard P. McKeon (Calif.) said that perhaps the QDR is "a step too far, given a new Administration [and] a new budgeting, and maybe we need to step back a little bit" and divide the task into smaller, more digestible chunks.

Airpower, McChrystal Style

In the months since Army Gen. Stanley A. McChrystal imposed new restrictions on air-to-ground attacks in Afghanistan, the Air Force has been applying more airpower, not less.

That was the word from a top in-theater USAF commander, Brig. Gen. Steven L. Kwast. Kwast, the head of USAF's 455th Air Expeditionary Wing at Bagram Airfield, told reporters, "Not only are we doing more [since McChrystal's tactical directive], but what we are doing is more profoundly bringing us to victory here, because it is more focused on protecting the people."

The avoidance of civilian casualties has risen to the top of the Afghanistan debate in Washington, D.C.

In the wake of a series of civilian Afghan deaths from air attacks, McChrystal in July 2009 ordered field commanders to limit the use of close air support, "air-to-ground munitions, and indirect fires" when the target was in a residential area. He argued that civilian casualties, "in the long run, make mission success more difficult and turn the Afghan people against us."

Kwast said that, since the order, the number of sorties has actually increased. However, the purpose of the sorties has

shifted from dropping ordnance and toward the collection of intelligence-surveillance-reconnaissance (ISR) data.

"Airpower can be applied in so many ways," Kwast said. "We can be there to shut down the enemy's communications so they can't fight. We can be ... the eye in the sky so we can see the enemy, ... understand what they're doing, and we can wait and have tactical patience ... until the enemy is in a place where there are no civilians."

The idea that airpower has been muzzled is "one of those misconceptions in the American media," Kwast asserted.

"The more this fight is a counterinsurgency, the more powerful airpower is, the more useful it is," he said. "We fly more now than we ever have, because we need to be there for the ground force commander [and] the troops on the ground. And we are there to support them directly."

Kwast acknowledged that "we have dropped fewer bombs since the tactical directive, because the ground commanders are becoming more and more focused on protecting the people instead of chasing the enemy."

USAF photo by TSgt. Efren Lopez

The Reaper is one eye in the sky over Afghanistan.

He continued, "You have to still chase the enemy, ... but the emphasis has been placed on ... the governance and the development and the security of the Afghan people. And so that focus has had the effect of fewer bombs dropped."

Asked if the change in focus has meant that USAF aircraft now do more "show of force" missions—flying low and loudly over enemy forces to scare them away—Kwast said yes, in some places. However, "every village needs a different solution," and while a show of force might be welcomed in one valley, it might be counterproductive elsewhere.

The MC-12 Project Liberty aircraft—a small, manned ISR platform that combines the full-motion video capabilities of a remotely piloted aircraft with human eyes on targets and communications capacity—has been "a godsend" in Afghanistan, Kwast said.

"It brings something we have not had before, in the way it lashes so many capabilities together. ... It's saving lives, every time it flies. ... I cannot tell you how happy the ground force commanders are to have that capability here."

Irregular Airpower—the Requirement

Giving the Air Force long-term and comprehensive irregular warfare capabilities will require a complement of 12,000 airmen, some 800 to 900 newly acquired aircraft, and up to $62 billion over 20 years, according to a RAND report issued in April.

The service should also anticipate that it will probably be in Iraq and Afghanistan long after the other services leave—potentially 10 years or more—as it builds up those countries' air forces.

In a monograph, "Courses of Action for Enhancing US Air Force 'Irregular Warfare' Capabilities," RAND authors put forward four steps USAF could take to give IW the emphasis it needs. The report is the first public estimate of the dollar cost of making the Air Force more IW-oriented.

"Course of Action Zero," so named because it involves fundamentals such as climate and leadership, calls for setting up high-level USAF organizations to integrate IW as a prime mission, give personnel promotion credit for building IW skills and experience, and create thinking and strategy centers to develop IW operational concepts. This most basic action will require 180 people and a $7 million investment, with annual costs of $30 million.

Course of Action One (the second recommendation) places priority on success in Iraq and Afghanistan, where rugged terrain and poor roads highlight the value of airlift and combat airpower. USAF will have to help build both the Iraqi and Afghan air forces, requiring it to own, share, and provide both light close air support and intelligence, surveillance, and reconnaissance aircraft, and stay "perhaps for five to 10 years." It will need to train more joint terminal attack controllers, generally strengthen the training pipeline for advisors, and set up air academies for both countries.

This second thrust would require 3,600 personnel and 200 aircraft "including additional intelligence-gathering MC-12s, the conceptual OA-X light attack platform, and a family of light cargo aircraft." The initial bill would be $1.9 billion, with annual operating costs of $423 million.

In Course of Action Two, the authors aim at setting up global IW capabilities, mainly building worldwide partnerships with other countries to fight terrorism and insurgencies. The Air Force would create IW advisory wings, embed USAF IW specialists on combatant commander staffs, create regional air academies, build its own human intelligence capabilities, and provide more "transferable" aircraft to COCOMs. The bill would be 3,000 personnel, startup costs of $2.3 billion for people and 255 aircraft, and recurring costs of $374 million annually.

Course of Action Three looks out long term, and focuses on building USAF's nonpartner capabilities to prosecute IW on its own. The authors called for USAF to develop stealthy, long-range gunships and a stealthy special operations forces "mobility platform" to get SOF troops in and out of denied airspace covertly. The idea would be to enable USAF to handle "surge IW operations" in the widest range of scenarios.

For the big IW missions, RAND anticipates a need for 93 manned ISR aircraft and 300 COIN-type aircraft, with a bill of 4,400 people and an initial investment of $4.7 billion, with recurring costs of $600 million annually for the 393 organic aircraft.

For the stealthy, high-tech capabilities, RAND pegged the cost at 1,320 people and $20.5 billion to develop, buy, and operate 48 highly specialized aircraft.

"Most of the resources would be needed beyond 2020," the authors noted of their fourth course.

The authors said that Defense Secretary Robert M. Gates has given clear direction in ordering the services to adapt to "the long war."

However, "the specifics present numerous challenges, not the least of which is the need to begin to change the USAF culture from one focused on the challenges of major combat operations (challenges that are not going away) to one equally accomplished in irregular warfare." They note that fighting terrorism and insurgencies and supporting the "internal defense" of partners "could not be done without the Air Force." ■

Air Force World

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

CV-22 Crash Kills Two Airmen

Maj. Randell D. Voas, 43, of Lakeville, Minn., and SMSgt. James B. Lackey, 45, of Green Clove Springs, Fla., perished in the April 9 crash of an Air Force Special Operations Command CV-22 Osprey tiltrotor aircraft during a mission in southern Afghanistan.

Both were members of the 8th Special Operations Squadron at Hurlburt Field, Fla., which had deployed to Afghanistan in March. Voas was a CV-22 evaluator pilot and a former MH-53 Pave Low helicopter pilot. Lackey was a CV-22 evaluator flight engineer and 14-year veteran MH-53 flight engineer.

The CV-22 went down about seven miles west of Qalat City in Zabul province. The crash's cause was still under investigation in late April. Cpl. Michael D. Jankiewicz, 23, an Army Ranger assigned to Ft. Benning, Ga., also died in the mishap as did an unidentified civilian employee. Others aboard were injured.

Dyess Gets First C-130J

Air Force Chief of Staff Gen. Norton A. Schwartz on April 16 flew *Pride of Abilene,* the first new C-130J Super Hercules transport assigned to the 317th Airlift Group at Dyess AFB, Tex., to the air mobility base.

By 2013, Dyess will receive a total of 28 C-130Js, and the 317th AG will constitute the largest Super Hercules force in the world, according to Dyess officials. The C-130Js are replacing the base's C-130H aircraft.

At the arrival ceremony, Schwartz said, "Our people who permit us to use these machines to best effect are our No. 1 asset." The group's airmen have been continuously deployed for more than 2,200 days, in support of operations worldwide.

Volcano Disrupts Military Air Traffic

Ash spewing from Iceland's Eyjafjallajokull volcano in mid-April disrupted civilian and military air traffic over northern Europe, impacting flight operations for a time at RAF Lakenheath and RAF Mildenhall in Britain and at Ramstein and Spangdahlem air bases in Germany.

Because of the danger that the volcanic ash poses to aircraft engines—when absorbed, it can cause an engine to flame out—flights were temporarily suspended at places such as Mildenhall. Aircraft, aircrews, and maintenance personnel were shifted to locations farther south such as Rota, Spain, so that they could continue to operate.

Other military flights normally traversing the northern European air routes were diverted south, and aeromedical flights normally taking wounded personnel from Afghanistan to Ramstein were rerouted to JB Balad, Iraq.

First AESA Radar for ANG F-15C

Officials on April 12 celebrated in Jacksonville, Fla., the rollout of the first Raytheon-built APG-63(V)3 active electronically scanned array radar system destined for an Air National Guard F-15C fighter.

The Florida Air Guard's 125th Fighter Wing at Jacksonville is the first unit to receive the new radar, which Air Force and industry officials say "will greatly improve" F-15 pilots' situational awareness, beyond-visual-range targeting, weapon accuracy, and ability to find and track small targets at low altitude.

The AESA is considered 50 times more reliable than the mechanically scanned antenna it replaces. The Air Force intends to install AESA radars on the 176 F-15C/Ds that it plans to maintain until at least 2025. Air Force F-15E Strike Eagles are getting AESA radars under a separate initiative.

F-15E Aircrew Honored

Capt. Aaron Dove and Capt. Mike Polidor, F-15E Strike Eagle weapon systems officer and pilot, respectively, on April 9 received Distinguished Flying Crosses for their actions in Afghanistan on Oct. 2, 2009.

On that day, they responded to an urgent call for close air support at Combat Observation Post Keating, where about 250 Taliban fighters had surrounded and pinned down some 80 coalition troops, destroying most of the post. Polidor and Dove were on station for about seven hours, as Dove coordinated the CAS strikes.

They were not the first strike aircraft on scene, but they took tactical airborne control, "something [F-15E crews] don't often train for, but they executed it per-

Photo by Jim Haseltine

fectly," commented Capt. Gordon Olde, another WSO engaged in Keating action.

More Details on F-35 Given

The Air Force's "best estimate" is that it will have its first squadron of F-35A strike fighters combat-ready in the first quarter of 2016, Maj. Gen. Johnny A. Weida, assistant deputy chief of staff for operations, plans, and requirements, told Senate lawmakers April 13 during an oversight hearing.

He said this operational unit would have between 12 and 24 F-35s equipped with Block 3 software and would be able to penetrate defended airspace, go after enemy fighters, and attack enemy air defenses. However, it is ultimately Air Combat Command's call when these aircraft will be cleared to conduct real-world operations, he noted.

The Marine Corps expects to have its first operational unit of 10 F-35Bs ready in December 2012, but won't deploy them until 2014. The Navy's first combat-ready squadron of 10 F-35Cs is slated for summer 2016, said officials from those services at the hearing.

WGS Breaches Cost Limits

Costs of the Air Force's Wideband Global SATCOM program have increased by 27.2 percent, thereby breaching Congressional cost-reporting thresholds and necessitating a review and certification that the project warrants

05.13.2010

Two F-22 fighters of the 49th Fighter Wing maneuver through the airspace of an empty military operating area near Holloman Air Force Base in southern New Mexico. Holloman lies in the Tularosa Basin, a vast expanse of painted desert bounded by the Sacramento Mountains and San Andres Mountains. These Raptors wear markings of not only the 49th Operations Group but also the 44th Fighter Group, an Air Force Reserve Command outfit formed to support the active duty units at Holloman.

continuation, the Department of Defense announced April 1.

Pentagon officials attributed the discrepancy to "a significant downturn" in the commercial satellite market that wiped out some commercial components meant to keep the price down and the fact there was a three-year production break between the first group of satellites already on orbit and the next bunch of three on order.

The Air Force has lauded the Boeing-built WGS satellites and is procuring at least two more of them. The Air Force in early March took control of the third WGS spacecraft from Boeing after its December 2009 launch. The program certification is due by June 1.

Possible MC-12W Bases Revealed

Air Force officials on April 23 released the list of six candidate basing locations for the MC-12W Liberty Project Aircraft. The prospective beddown locations are Altus AFB, Okla.; Beale AFB, Calif.; Key Field, Miss.; JB Langley, Va.; Robins AFB, Ga.; and Whiteman AFB, Mo.

The Air Force is building a fleet of 37 MC-12s. These twin turboprop intelligence-surveillance-reconnaissance aircraft have been operating in Iraq since June 2009 and in Afghanistan since last December, but there are no Stateside bases for them, other than at Key Field, which has been a temporary site for MC-12 mission qualification training.

The Air Force's next step is to analyze the environmental impact of basing the aircraft at each proposed location. Once that is complete, the service expects to announce the list of preferred locations in the late summer, followed by the final basing determination around the spring of 2011.

New Bomber OK in New START

The New Strategic Arms Reduction Treaty with Russia will not affect the design of the Air Force's next generation long-range strike platform since the treaty is expected to expire before the new aircraft would enter the inventory, Maj. Gen. Johnny A. Weida, the assistant deputy chief of staff for operations, plans, and requirements, said April 13.

"The treaty is only a 10-year treaty with a five-year extension," Weida told Senate lawmakers during an oversight hearing. "And so," he continued, "the new bomber will be outside that treaty, so [it] will probably be covered by a different set of circumstances."

Air Force officials have said they don't expect the bomber to join the inventory until at least the mid-2020s. Upon its entry into force, New START, signed on April 8, would limit the US and Russia each to 1,550 deployed strategic nuclear warheads and 700 deployed launchers (i.e., bombers, ICBMs, submarine-launched ballistic missiles).

Manas Lease Extended

The interim Kyrgyzstan government agreed to extend for one year the US lease of the Transit Center at Manas, a key logistical hub for US and allied operations in Afghanistan, according to press reports in mid-April. The lease was set to expire this summer.

This news came in the aftermath of the political turmoil and violence that engulfed the Central Asian nation earlier that month, leading to the overthrow of President Kurmanbek Bakiyev.

This instability had temporarily affected Manas operations. While Manas-based tankers were able to continue aerial refueling operations, the transit of US troops was halted for several days. But by April 12, the US Embassy in Kyrgyzstan's capital city Bishkek announced that Manas had "resumed normal operations," including troop transits.

B-2 Radar Development Done

Northrop Grumman announced April 13 that its industry team has completed the system development and demonstration phase of the program to modernize the AN/APQ-181 radar on the Air Force's fleet of 20 B-2A stealth bombers.

The SDD phase included installing the new Raytheon-supplied radar gear, which includes active electronically scanned array antennas and new radar avionics, on the B-2 test aircraft and first group of operational B-2s, as well

***Fireworks:** Two B-1Bs assigned to the 28th Bomb Squadron at Dyess AFB, Tex., release chaff and flares over the mountains of New Mexico during a training mission.*

USAF photo by MSgt. Kevin J. Gruenwald

as delivering the spare parts for them. The program is now in its full-rate production phase.

Air Force acquisition officials told House lawmakers March 24 that the new radar equipment is expected to be fully operational on all 20 B-2s in Fiscal 2013.

Hypersonic Glide Vehicle Launched

An Air Force-industry team on April 22 launched the Defense Advanced Research Projects Agency's Hypersonic Technology Vehicle-2 aboard a Minotaur IV Lite suborbital rocket from Vandenberg AFB, Calif.

DARPA is testing the Lockheed Martin-built HTV-2 under the Falcon program to demonstrate hypersonic technologies applicable to future prompt global strike systems. The HTV-2 was to glide in the upper atmosphere over the Pacific Ocean at about 13,000 mph for approximately 30 minutes and crash-land near the Kwajalein Atoll.

DARPA said April 23 its preliminary review of technical data indicated that the Minotaur successfully released the test vehicle.

Approximately nine minutes into the mission, however, telemetry assets lost the signal from the HTV-2—indicating a flight anomaly. This mission was the first launch of the Minotaur IV.

C-17 Basing List Released

Air Force officials on April 23 released the list of three Air National Guard locations under consideration to host some of the remaining C-17 Globemaster III transport aircraft that will enter the inventory over the next several years to bring the C-17 fleet size to 223.

They are Eastern West Virginia Airport in Martinsburg, W.Va.; Memphis Arpt., Tenn.; and Stewart ANGB, N.Y. Each is currently home to C-5A Galaxy transports. After environmental studies are done, plans call for announcing the preferred locations in November, with final basing decisions made in June 2011.

New Force Management Initiatives Announced

The Air Force leadership on March 25 instituted a new wave of force-management measures—some voluntary, some not—to thin the ranks of active duty officer and enlisted members by several thousand between now and the end of Fiscal 2011.

The goal is to meet USAF's authorized and funded end strength threshold of 332,800 airmen in Fiscal 2012. As of Feb. 28, there were 335,500 active duty airmen.

The Air Force projects that it will be about 4,800 airmen over the Fiscal 2010 end strength ceiling of 331,800 airmen come October. If nothing more were done, it would not meet the Fiscal 2012 level, Brig. Gen. Sharon K. G. Dunbar, director of force management policy on the Air Staff, told reporters on the eve of the announcement.

Exacerbating the situation is a sluggish economy that has contributed to USAF's retention rates being at a 15-year high despite an incredibly robust operations tempo, she said. An initial wave of mostly voluntary force-management initiatives taken in November 2009 has not resulted in the hoped-for drawdown.

"It is imperative for us to take action now," said Dunbar.

These steps are projected to affect two percent of the service's officers (1,373) and 1.6 percent of the enlisted corps (4,376) through Fiscal 2011. Additionally, they will reduce officer accessions by 737 and enlisted accessions by 2,681 over that period, said Dunbar.

These measure also aim to correct overages in certain career areas and shortages in currently stressed fields and emerging sectors by reshaping the force within that ceiling, she said.

The voluntary separation measures allow personnel to leave the service immediately, while the nonvoluntary ones will commence this summer with departures targeted for no later than April 2011, according to service officials.

Dunlap said most of the officer reductions would come in Fiscal 2011.

The emphasis of the new measures is on minimizing the impact on airmen currently serving and to help those who are separating with their transition, she said.

Air Force Chief of Staff Gen. Norton A. Schwartz said in March USAF would like to retire 17 C-5As in Fiscal 2011. Under the plan, one ANG base and one Air Force Reserve Command site would shed their C-5As for C-17s. The 445th Airlift Wing at Wright-Patterson AFB, Ohio, has already been identified as the AFRC unit to get C-17s.

Combat Spear Deliveries Complete

Air Force Special Operations Command on March 30 took delivery of the 12th and final C-130H2 aircraft that technicians at Warner Robins Air Logistics Center on the grounds of Robins AFB, Ga., converted to the new MC-130W Combat Spear configuration for use as covert infiltration and helicopter refueling platforms.

The ALC delivered the first MC-130W in June 2006, completing the entire modification initiative under budget and ahead of schedule, according to Air Force and industry officials.

The MC-130Ws are meant to replace combat losses of AFSOC MC-130 Combat Talon special-mission aircraft. Some of the MC-130Ws have been fitted with weapons to give them a gunship-like attack capability to quickly bolster AFSOC's in-high-demand AC-130 Gunship fleet.

B61 Schedule Deemed Crucial

Maintaining the schedule of the Pentagon's life extension program for the B61 nuclear bomb is just as important for the B-2A stealth bomber and future strategic deterrence as it is for giving the F-35 strike fighter a nuclear capability for tactical roles, Air Force Gen. Kevin P. Chilton, US Strategic Command commander, said April 14.

The Pentagon's current timetable calls for churning out the first modified B61s in 2017. "A lot of folks are linking 2017

Index to Advertisers

Wyatt Says Mobility Study Off on Tactical Airlift Needs

Lt. Gen. Harry M. Wyatt III, Air National Guard director, said April 14 the Pentagon's new Mobility Capabilities and Requirements Study 2016 has already been essentially overtaken by events when it comes to tactical airlift.

"There's probably a greater need for tactical airlift than the MCRS has identified," he told House defense appropriators during an oversight hearing.

The reason, said Wyatt, is that the MCRS did not consider the Air Force's newly acquired mission for direct support of Army troops when it concluded that the Air Force only needs about 335 of its total 401 C-130 transports.

Further, he noted, there is still a requirement for 78 C-27J transports, but plans on the books to purchase only 38, with the gap to be filled by C-130s.

However, the Air Force leadership, using MCRS findings as an underlying driver, has proposed restructuring the C-130 fleet as part of the service's Fiscal 2011 budget proposal, with the goal of reducing its size.

This originally included the permanent shift of ANG and Air Force Reserve Command C-130Hs to the active duty formal training unit at Little Rock AFB, Ark.

When this proposed transfer came to light in late March, it unleashed a fury of bipartisan Congressional resistance, with complaints that the Air Force leadership had not properly consulted with the Air Guard and Reserve management.

The Air Force, ANG, and AFRC leadership then reached a compromise deal announced May 11 as part of the service's proposed force structure realignments for Fiscal 2011.

Under it, the service would temporarily transfer a total of 18 C-130Hs from ANG and AFRC units across the nation to Little Rock to establish an Air Reserve Component association for C-130 training there by 2012.

As new C-130Js continue to enter the fleet and legacy C-130 training requirements ebb, those C-130Hs would return to their home states.

"I'm glad this partnership will better assist the Air Force in training qualified Total Force C-130 crews," said Wyatt.

to F-35," Chilton told the House Armed Services Committee. He continued, "We need the B61 in first production in 2017 regardless of the F-35 because the B61 also is a weapon that is used by the B-2, by our strategic deterrent."

Chilton also said the B61 LEP is important for the nation because it represents the first opportunity "for adding increased security and safety and reliability" to the nuclear stockpile. The Obama Administration's 2010 Nuclear Posture Review calls for "a full-scope" B61 LEP to enable F-35 integration and increased confidence in the bomb.

First HC-130J Rolled Out

Lockheed Martin on April 19 rolled out the Air Force's first HC-130J combat rescue tanker during a ceremony at the company's assembly facility in Marietta, Ga. Congress has authorized the Air Force to procure 11 HC-130Js so far to start replacing Air Combat Command's aging HC-130s that began flying in the 1960s.

Dropping In: ***An HH-60 Pave Hawk delivers pararescuemen to the desert floor near Davis-Monthan AFB, Ariz., during Angel Thunder, a two-week combat search and rescue and medical evacuation exercise. The exercise provides an opportunity for 1,200 service members to practice personnel recovery.***

USAF photo by SSgt. Joshua DeMotts

The War on Terrorism

Operation Enduring Freedom—Afghanistan

Casualties

By May 13, a total of 1,056 Americans had died in Operation Enduring Freedom. The total includes 1,054 troops and two Department of Defense civilians. Of these deaths, 772 were killed in action with the enemy while 284 died in noncombat incidents.

There have been 5,831 troops wounded in action during OEF. This number includes 2,590 who were wounded and returned to duty within 72 hours and 3,241 who were unable to return to duty quickly.

MC-12 Begins Operations at Kandahar

The first intelligence-surveillance-reconnaissance MC-12W Liberty Project aircraft to operate from Kandahar Airfield, Afghanistan, as part of the new 361st Expeditionary Reconnaissance Squadron flew a combat sortie April 1 after arriving at the base three days earlier.

The twin turboprop MC-12 provides live streaming video imagery and signals intelligence to ground troops—capabilities that Lt. Col. Darren Halford, 361st ERS commander, described as "unparalleled"—to give ground forces vital information on the enemy.

"The MC-12 will protect US and coalition lives and will be a vital tool helping Afghanistan defeat the insurgency," he said.

The squadron, part of Kandahar's 451st Air Expeditionary Wing, is the second MC-12 expeditionary unit in Afghanistan, joining the 4th ERS at Bagram Airfield that began operations in December 2009.

Overall, the Air Force intends to operate a total of 24 MC-12s in Afghanistan by the end of 2010. It already operates six MC-12s under the 362nd ERS at JB Balad, Iraq.

Operation Iraqi Freedom—Iraq

Casualties

By May 13, a total of 4,401 Americans had died in Operation Iraqi Freedom. The total includes 4,388 troops and 13 Department of Defense civilians. Of these deaths, 3,484 were killed in action with the enemy while 917 died in noncombat incidents.

There have been 31,810 troops wounded in action during Operation Iraqi Freedom. This number includes 17,865 who were wounded and returned to duty within 72 hours and 13,945 who were unable to return to duty quickly.

Balad Becomes Temporary Medical Hub

Air Forces Central in mid-April temporarily named JB Balad, Iraq, the new hub for aeromedical evacuations of wounded troops from Afghanistan after ash spewing from Iceland's Eyjafjallajokull volcano disrupted the normal air routes to Ramstein AB, Germany.

The 332nd Expeditionary Medical Group at the Air Force Theater Hospital at Balad received its first four medical evacuation patients on April 17.

Normally, medically ill and wounded US military personnel requiring urgent care are routed through Ramstein to Landstuhl Regional Medical Center.

Air Force officials said the rerouting to Balad would not result in any degradation of care.

"The HC-130J will enable us to meet the expanding operational tasks that we face today," said Maj. Gen. Thomas K. Andersen, ACC's director of requirements, at the ceremony. He added, "We are grateful to those [employees] of Lockheed Martin assembled here that have given us a world-class aircraft."

The HC-130J is a modified version of the Marine Corps KC-130J tanker model. The new rescue tanker fleet is expected to commence operations in mid-2012. The Air Force is also buying new MC-130J special-mission transports for Air Force Special Operations Command.

Ogden Finishes F-16 Upgrade

Air Force and Lockheed Martin officials on March 26 completed the installation of new avionics gear on the 306th and final F-16 Block 40/42 fighter aircraft to be upgraded at Ogden Air Logistics Center, Utah, under the Common Configuration Implementation Program.

With this, the depot finished its portion of the CCIP work, having modernized 560 F-16s since 2001, including 254 F-16 Block 50/52s, said Troy Mogck, a Lockheed Martin systems engineer for CCIP. Overall, the Air Force is upgrading 651 F-16 Block 40/42s and Block 50/52s under CCIP, the largest F-16 modernization initiative to date.

The new avionics increase aircraft lethality and harmonize the configuration of the two blocks to one standard. Work in Korea to upgrade Pacific Air Forces F-16s is expected to conclude in June, thereby completing all CCIP installations, said Mogck.

JET Taskings Will Go On

The increase in Army and Marine Corps end strength "won't substantially reduce" the number of airmen performing joint expeditionary taskings right away, an Air Force spokesman said.

The growth of land forces, he said, is focused on combat units, while most JET assignments—comprising work not traditionally done by airmen—fall into such areas as training, combat support, or combat service support. The number of JETs will decrease as US forces withdraw from Iraq, but since support units will facilitate the drawdown, JETs "will lag behind the withdrawal of combat units," he said.

Air Force Chief of Staff Gen. Norton A. Schwartz told Congress in February he hoped that the use of JETs wouldn't become a "habit," since USAF has its own critical needs that these airmen could fill. So far in Fiscal 2010, JET requirements have remained steady. Any reductions in Iraq have been offset by increases in Afghanistan.

Global Hawk Traverses Canada

The Air Force on April 8 conducted the first operational mission of an RQ-4 Global Hawk remotely piloted aircraft through Canadian airspace, paving the way for a new northern route that will enable the more rapid ferrying of RQ-4s in and out of Beale AFB, Calif., and forward operating locations worldwide.

Previously Global Hawks have flown over Canada only during training sorties. Pilots and sensor operators from the 12th Reconnaissance Squadron at Beale controlled the RQ-4 during this flight.

This northern route follows the curvature of the Earth, thereby significantly reducing the amount of time it takes to get from the US West Coast to East Coast and beyond. Capt. Kyle Blaikie of the 12th RS said the worldwide ferrying process has now been streamlined "into a single 26-hour flight."

New F-22 Reserve Unit Activated

Air Force Reserve Command's 44th Fighter Group was activated April 9 during a ceremony at Holloman AFB, N.M. This group is Holloman's first Reserve unit and AFRC's second sharing in the operations of the F-22 fighter, following the 477th FG at JB Elmendorf, Alaska.

The 44th FG, which includes the 301st Fighter Squadron and the 44th

Senior Staff Changes

RETIREMENTS: Maj. Gen. Charles J. **Dunlap Jr.,** Maj. Gen. Erwin F. **Lessel III,** Brig. Gen. **Dana A. Simmons.**

NOMINATIONS: To be Lieutenant General: Eric E. **Fiel. To be Major General:** Mark A. **Barrett,** Michael R. **Boera,** Edward L. **Bolton Jr.,** Joseph D. **Brown IV,** Norman J. **Brozenick Jr.,** Sharon K. G. **Dunbar,** David S. **Fadok,** Jonathan D. **George,** Walter D. **Givhan,** Mark W. **Graper,** James W. **Hyatt,** John E. **Hyten,** Richard C. **Johnston,** James J. **Jones,** Bruce A. **Litchfield,** Charles W. **Lyon,** Wendy M. **Masiello,** Kenneth D. **Merchant,** Harry D. **Polumbo Jr.,** John D. **Posner,** Lori J. **Robinson,** Mark O. **Schissler,** Margaret H. **Woodward.**

CHANGES: Maj. Gen. C. Donald **Alston,** from Asst. C/S, Strat. Deterrence & Nuclear Integration, USAF, Pentagon, to Cmdr., 20th AF, AFGSC, F. E. Warren AFB, Wyo. ... Lt. Gen. (sel.) Eric E. **Fiel,** from C/S, Center for Command Spt., SOCOM, MacDill AFB, Fla., to Vice Cmdr., SOCOM, Pentagon ... Maj. Gen. (sel.) Jonathan D. **George,** from Dir., Strat. Capabilities Policy, Natl. Security Council, Exec. Office of the President, Washington, D.C., to Asst. C/S, Strat. Deterrence & Nuclear Integration, USAF, Pentagon ... Brig. Gen. James K. **McLaughlin,** from Vice Cmdr., USAF Warfare Ctr., ACC, Nellis AFB, Nev., to Dir., Combat & Info. Ops., STRATCOM, Offutt AFB, Neb. ... Brig. Gen. (sel.) David D. **Thompson,** from Dir., Space Forces., Air Forces Central, ACC, Al Udeid, Qatar, to Vice Cmdr., USAF Warfare Ctr., ACC, Nellis AFB, Nev.

SENIOR EXECUTIVE SERVICE CHANGES: Scott M. **Anderson,** to Dep. Dir., Log., CENTCOM, MacDill AFB, Fla. ... David **Beecroft,** to Dir., Global Combat Spt., DCS, Log., Instl., & Mission Spt., USAF, Pentagon ... Erin C. **Conaton,** to Undersecretary of the Air Force, OSAF, Pentagon ... Charles D. **Ebersole,** to Dir., Engineering, JSF Prgm. Office, AFMC, Arlington, Va. ... Gordon M. **Ettenson,** to Dir., Irregular Warfare, DCS, Ops., P&R, USAF, Pentagon ... Russell J. **Frasz,** to Dep. Dir., Operational Planning, Policy, & Strategy, USAF, Pentagon ... Richard A. **Genaille Jr.,** to Dep. Dir., Defense Security Cooperation Agency, Office of the USD, Policy, Pentagon ... Jorge F. **Gonzalez,** to Dir., Engineering & Tech. Mgmt., Warner Robins ALC, AFMC, Robins AFB, Ga. ... Kerry E. **Kelley,** to Dir., C4 Sys., STRATCOM, Offutt AFB, Neb. ... Lawrence S. **Kingsley,** to Dep. Dir., Log., AMC, Scott AFB, Ill. ... Gilbert J. **Montoya,** to Dir., 448th Supply Chain Mgmt. Wg., AF Global Log. Spt. Ctr., AFMC, Tinker AFB, Okla. ... Judith B. **Oliva,** to Dir., Budget Mgmt. & Execution, Office of the Dep. Asst. SECAF, Budget, Pentagon ... Lynda T. **O'Sullivan,** to Dep. General Counsel, Office of the AF General Counsel, Pentagon ... Richard D. **Pino,** to Dep. Dir., Comm. & Networks Programs, Office of the Dep. Asst. SECDEF (C3, Space & Spectrum), Arlington, Va. ... Scott **Reynolds,** to Dep. Asst. SECAF, Log., Office of the Asst. SECAF, Instl., Environment, & Log., USAF, Pentagon ... David K. **Robertson,** to Dir., Engineering & Tech. Mgmt., Oklahoma City ALC, AFMC, Tinker AFB, Okla. ... Debra K. **Tune,** to Principal Dep. Asst. SECAF, Instl., Environment, & Log., Office of the Asst. SECAF, Instl., Environment, & Log., Pentagon ... Steven D. **Wert,** to PEO, C2, ISR, ESC, AFMC, Hanscom AFB, Mass. ... Terry A. **Yonkers,** to Asst. SECAF, Instl., Environment, & Log., Pentagon. ■

Aircraft Maintenance Squadron, will work with Holloman's active duty 49th Fighter Wing, which is standing up two F-22 active duty squadrons. However, the ultimate number of F-22s based at Holloman will depend on USAF's beddown decisions on the F-35 strike fighter.

The 44th FG traces its lineage to the 44th Bomb Group that flew B-24s during World War II. The 301st FS formerly operated F-16s at Luke AFB, Ariz.

USAF, Army Agree on C-27J

The Air Force and Army have reached an agreement on employment and disposition of the new C-27J Joint Cargo Aircraft, Gen. Norton A. Schwartz, USAF Chief of Staff, told House lawmakers in mid-March.

The two services "are completely in agreement with the way forward" for delivery of materiel and personnel to the last tactical mile, he said, adding that Air Force aircrews are "prepared and trained to do direct support whenever the Army requires it."

The Air Force is expected to release by June the list of candidate Air National Guard beddown locations for the last 14 C-27Js procured under the current 38-aircraft program of record. Schwartz said three locations would each get four airplanes; the remaining two aircraft would be used for training.

ANG Wing To Fix A-10 Engines

Members of the Connecticut Air National Guard's 103rd Airlift Wing at Bradley Airport in East Granby on March 6 broke ground at the site where the unit's new centralized intermediate repair facility will be erected under an $8.3 million construction project.

This work will add 17,000 square feet of work space—giving the wing roughly 30,000 square feet of room overall—to repair and overhaul TF34 engines used on the A-10 Thunderbolt II ground-attack aircraft.

The CIRF will employ about 80 technicians who will be responsible for the T34s on 78 Air Guard A-10s and additional engines for A-10s in active duty units. The CIRF will be the last remaining part of the wing's A-10 legacy. Under BRAC 2005, the unit relinquished its A-10s and took on C-21 VIP transport operations.

Laser Demo Eyed for B-1B

The Air Force, together with Defense Advanced Research Projects Agency, is working to demonstrate a high-energy laser weapon system for aircraft self-protection, Steven H. Walker, deputy assistant secretary of the Air Force for science, technology and engineering, told House lawmakers March 23.

Lockheed Martin photo

Lucky Seven: ***The seventh F-35 flight test aircraft takes off on its first flight from NAS Fort Worth JRB, Tex. The aircraft, known as AF-2, is configured to test multiple weapons loads and will be used to test the F-35's ability to carry both internal and external weapons.***

USAF photo

The Shuttle's Mini Me: ***The X-37B Orbital Test vehicle was launched for the first time on April 22 from Cape Canaveral AFS, Fla., aboard an Atlas V expendable booster. The autonomous and reusable vehicle, which resembles the space shuttle, can carry new technologies into orbit in its internal payload bay and then bring them back to Earth after assessment.***

Under the Electric Laser on a Large Aircraft, or ELLA, initiative, the service aims to integrate a laser system module into the forward bomb bay of the B-1B bomber "to demonstrate the aircraft self-defense capabilities of a high-energy electric laser in a practical platform," he said.

ELLA will be based on DARPA's High-Energy Liquid Laser Area Defense System laser device. Upon completion of HELLADS development, the Air Force will couple the device to a beam control system for a series of ground demonstrations followed by integration on the aircraft, said Walker.

Housing Project Completed

Officials at Edwards AFB, Calif., held a ribbon-cutting ceremony on March 26 to celebrate the completion of a five-year, $100 million construction project that brought 291 new energy-saving homes to the desert base.

"The houses we deliver today will, for decades and decades, support the families who deliver excellence for our nation," said Col. Jerry Gandy, commander of Edwards' 95th Air Base Wing, at the ceremony.

The ribbon cutting came about one week after Gen. Norton A. Schwartz, Air Force Chief of Staff, told House lawmakers that the service has roughly 13,000 inadequate single family homes out of a total of 53,000 houses. USAF expects to reduce the inadequate inventory to zero by 2016, he said.

World War II Airman Identified

The Department of Defense announced April 22 that the remains of TSgt. Walter A. McClellan, a 19-year-old B-17 gunner missing in action since his bomber was lost over Germany in April 1945, had been identified and returned to his family. On the next day, he was buried with full military honors at Barrancas National Cemetery at Pensacola NAS, Fla.

McClellan's B-17 was struck by enemy fighters during an April 17, 1945 mission to bomb a rail depot in Dresden. After the war, US search teams could no longer search the Soviet-controlled area, so the US deemed the B-17 crew remains nonrecoverable.

Reports from German citizens in 1956 and 2007 led to the 2008 exhumation of a grave in Burkhardswalde, where a recovery team found human remains and artifacts determined to be those of McClellan. Church records revealed he had parachuted over Biensdorf, but German SS forces captured and killed him near Burkhardswalde.

Obituaries

■ Herman S. Wolk, author and historian of airpower and the Air Force, died May 6 at the age of 78. Wolk researched and wrote more than a dozen books on the history of the Air Force and numerous articles for *Air Force* Magazine, often working from personal interviews with the principals of his stories. He was recognized as an authority on the founding of the Air Force as a separate and independent service and the events leading up to its creation in 1947.

From 1959 to 1966, Wolk served as headquarters historian for Strategic Air Command, and then served in the Office of Air Force History from 1966 until his retirement in 2005. In his final position there, he was senior historian.

Wolk's crtically acclaimed last book, *Cataclysm: Hap Arnold and the Defeat of Japan,* was published just weeks before his death. John T. Correll, former editor-in-chief at *Air Force* Magazine, said, "Herm inspired, coached, motivated, assisted and supported a whole generation of historians."

■ Retired Maj. Gen. Fred J. Ascani, who flew the F-86E to a new world airspeed record in 1951, died March 28 at age 92. He suffered from lung

USAF photo by SSgt. Christopher Boitz

North! To Alaska: ***A B-52 takes off while a C-130 waits on the flight line at Eielson AFB, Alaska, during a Red Flag-Alaska exercise in April. Red Flag Alaska is a multiservice combat operations exercise held up to four times a year.***

cancer, reported the *Washington Post*. Ascani graduated from the US Military Academy in 1941 and flying training in 1942. He flew 52 combat missions as commander of the 816th Bomb Squadron during World War II. Thereafter, he served in flight-test assignments, first at Wright-Patterson AFB, Ohio, and then at Edwards AFB, Calif. He flew some 50 different research aircraft, including the X-1 and XF-92. In 1951, he became vice commander of the Air Force Flight Test Center at Edwards. He then served in various senior command and staff assignments. He retired from the Air Force in 1973.

■ Retired Lt. Col. David G. Simons, a physician and researcher who reached nearly 102,000 feet during 1957 balloon flight on Project Manhigh II to study the effects of high-altitude flight on human physiology, died April 5 at age 87. His work helped pave the way for manned spaceflight. Simons sat in a small capsule attached to a balloon for more than 32 hours during the record 101,516 feet flight on Aug. 19-20, 1957, for which he was featured on the cover of *Life* magazine. Simons received his medical degree in 1946. Shortly after entering the Air Force in 1947, he served as project officer for animal studies on V-2 rocket flights. He retired from the Air Force in June 1965. He was inducted into the New Mexico International Space Hall of Fame in 1987. ■

News Notes

■ The Air Force announced March 24 its two Air Force Week celebrations in 2010: New York City from Aug. 25 to 29 and Cocoa Beach, Fla., from Oct. 27 to 31. The Thunderbirds aerial demonstration squadron will perform during these festivities.

■ The 19th Fighter Squadron at JB Elmendorf, Alaska, was announced April 2 as Raytheon Trophy winner for 2009 as USAF's best air-to-air fighter squadron. The F-15 unit will be decommissioned later this year under the Air Force's fighter drawdown.

■ Air Force Reserve Command on March 30 announced the standup of the 414th Fighter Group at Seymour Johnson AFB, N.C., to work with the active duty 4th Fighter Wing in operating the wing's F-15E fighters.

■ Cadet Col. Ryan W. Castonia, an Air Force ROTC cadet wing commander at the Massachusetts Institute of Technology, on April 5 received the 2009 Air Force Cadet of the Year Award. He graduates in June and intends to become a combat rescue officer.

■ The National Museum of the US Air Force in Dayton, Ohio, held the 68th Doolittle Tokyo Raiders Reunion April 16-18. Four of the eight remaining Raiders participated in the events, which included a fly-in of 17 replica B-25s.

■ Robert L. Giles, a B-17 navigator who saved a crewmate's life as their shot-up B-17 was going down over Germany in April 1944, received the Air Medal for his actions—at long last—on April 6. Administrative errors were to blame for the 66-year oversight.

■ Raytheon announced March 31 that it had delivered "an operationally significant quantity" of ADM-160B Miniature Air Launched Decoys to the Air Force, an important milestone as this weapon system nears its in-service date.

■ Members of the California Air National Guard's 129th Rescue Wing at Moffett Field in early April helped rescue an injured man aboard a sailboat 1,400 miles out to sea from the southern California coast.

■ The Air Force on March 26 activated the 422nd Joint Tactics Squadron under the Air Force Expeditionary Center at JB McGuire, N.J, to serve as a central repository for expeditionary combat support lessons learned and tactics, techniques, and procedures.

■ The Air Force on March 31 began to implement a phased plan to open access on the Air Force network to Internet-based social-networking sites, based on revised policy. Five Pacific Air Forces bases were granted access on a test basis during the initial stage. ■

UNLIKE ANYTHING. READY FOR EVERYTHING.

Bell Helicopter
A Textron Company

The CV-22 revolutionizes the art of insertion and extraction. It supplies an unmatched combination of speed, range, altitude and payload in a vertical lift aircraft. Giving you the flexibility to deliver forces anywhere. Even the middle of nowhere.

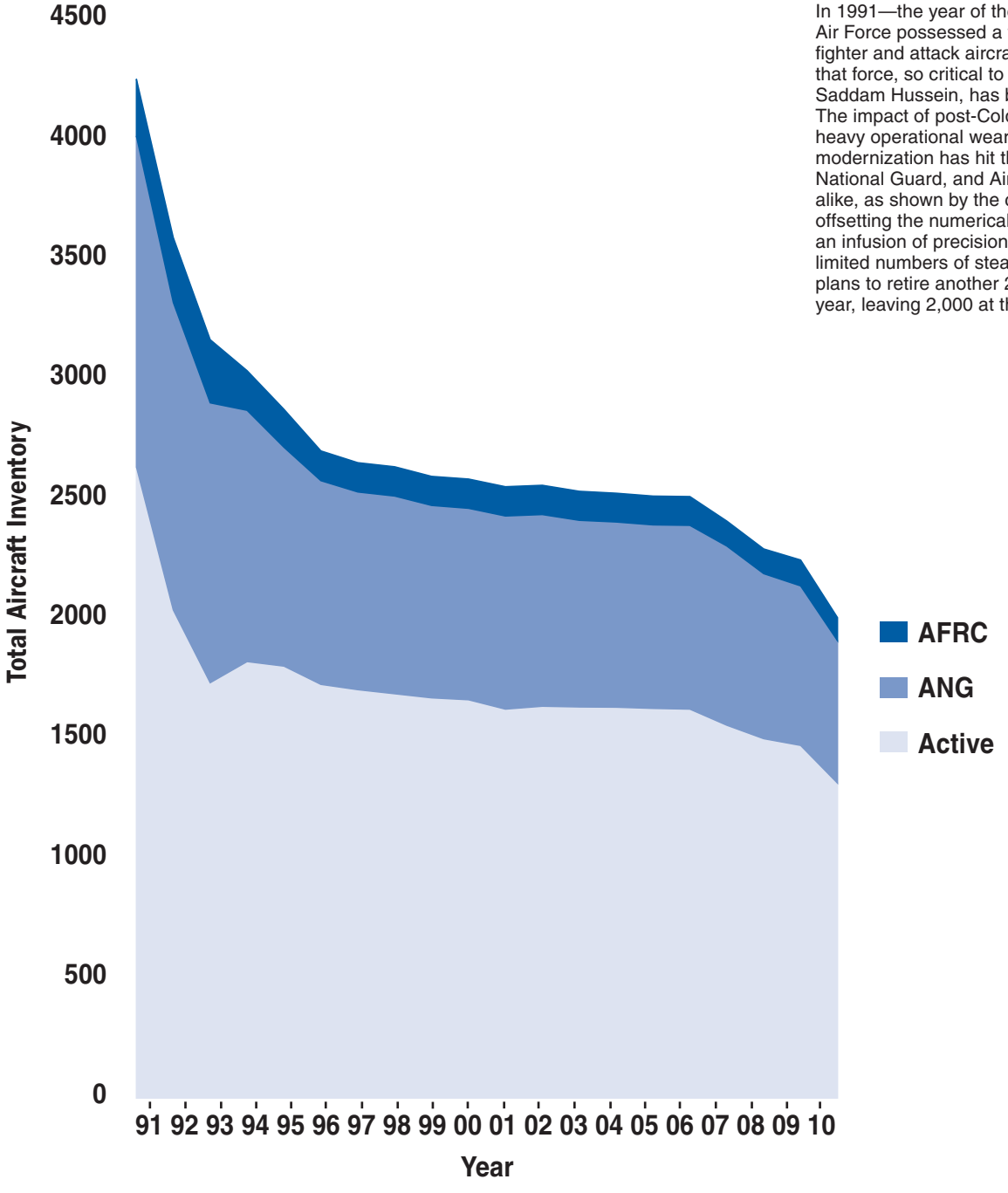
BOEING

chartpage@afa.org

Fighter Fade-out

The force takes heavy losses

In 1991—the year of the Gulf War—the Air Force possessed a force of 4,242 fighter and attack aircraft. Over 20 years, that force, so critical to the defeat of Saddam Hussein, has been cut in half. The impact of post-Cold War retirements, heavy operational wear and tear, and slack modernization has hit the active force, Air National Guard, and Air Force Reserve alike, as shown by the chart. Partially offsetting the numerical decline has been an infusion of precision weapons and limited numbers of stealth aircraft. USAF plans to retire another 250 fighters this year, leaving 2,000 at the end of 2010.



Source: Data for years 1991 to 2009 from the "USAF Almanac" for years 1992 to 2010, published by *Air Force* Magazine, Arlington, Va. Data for year 2010 derived from Air Force sources.

THE RIGHT TOOL FOR THE JOB

The U.S. Air Force already boasts one of the most impressive aircraft fleets on Earth. Adding the C-27J takes this to a new level. The C-27J was designed from the ground up for quick, efficient and flexible transport of personnel, equipment and supplies into remote austere environments. It provides today's aircrews with the capabilities they need to satisfy time-sensitive, mission-critical requirements and safely get the job done. It is the perfect complement to the U.S. Air Force's current fleet and will continue to help the U.S. Air Force effectively support our warfighters abroad and emergency response forces at home.

WWW.C-27J.COM **C-27J JCA TEAM**

L3

AleniaNorthAmerica
A Finmeccanica Company

L-3 | Alenia North America | GMAS | Honeywell | Rolls-Royce

Issue Brief

By Adam J. Hebert, Executive Editor

The Rise and Semi-Fall of MIRV

In its Nuclear Posture Review, DOD unveiled its decision to convert all Minuteman IIIs into single-warhead ICBMs. Today, USAF has 450 of them. Many have one warhead, but some are "MIRVed," meaning their nosecones have **m**ultiple **i**ndependently **t**argetable **r**e-entry **v**ehicles. These have up to three warheads.

Not for long, though, as plans call for USAF to "de-MIRV" them all. "This step," claimed the NPR, "will enhance the stability of the nuclear balance by reducing the incentives for either side to strike first."

How will "downloading" US silo-based missiles substantially reduce the nuclear threat? In weighing the answer, it is useful to review some history.

Writing in 1953 about the two nuclear superpowers, J. Robert Oppenheimer, former scientific director for the Manhattan Project (turned harsh nuclear critic), observed, "We may be likened to two scorpions in a bottle, each capable of killing the other, but only at risk of his own life."

In the 1950s and 1960s, though, weapons were inaccurate. Because one had to commit several weapons to be sure to cover a single target, the attacker would run out of weapons before he wiped out the enemy's nukes. The foe's second strike was assured, so neither side wanted to go first.

MIRVing upset that stability. The US flight-tested a MIRVed system in 1968 and began deploying the triple-warhead Minuteman III in 1970. The USSR soon followed, catching and up with and then far surpassing the US by the early 1980s. On both sides, accuracies sharpened, too.

MIRVs: Too much of a good thing.

As MIRVed ICBMs proliferated, Oppenheimer's scorpions-in-a-bottle metaphor moved closer to reality, for two reasons:

■ Capability. Stacking multiple warheads on each missile dramatically increased each ICBM's firepower and its usefulness in mounting a disarming counterforce strike. An attacker could fire off a portion of his own ICBM force while still keeping some in reserve.

■ Incentive. Missiles with many warheads instantly became lucrative targets. A single enemy silo might now hold three, six, or more warheads. Even if an attacker had to expend two warheads per silo, the offense would still enjoy the benefits of a favorable exchange ratio.

It was this push-pull combination that made the late Cold War nuclear balance precarious. In a crisis, either side—though still very fearful—might be tempted to go first in hopes of gaining a war-winning advantage.

One of the great ironies of the times was the central role played by arms control in promoting this upward spiral of nuclear danger. While the superpowers probably would have gone MIRV at some point, that day was hastened by SALT talks in the late 1960s. The push was to limit launchers—bombers and missiles—not warheads. The logical response was to make the fullest use of each launcher by piling on warheads.

Arms negotiator Paul C. Warnke memorably, and mistakenly, compared the superpowers to "apes on a treadmill," with both "jogging in tandem on a treadmill to nowhere." There was only one ape, though. Former Defense Secretary Harold Brown had it right when he said, "When we build, they build; when we stop building, they build."

According to Natural Resources Defense Council estimates, the US and Soviet Union in 1975 each had roughly 2,200 warheads atop their ICBMs.

Over the next five years, the US total didn't change, but Moscow more than doubled its MIRV force, winding up with 5,630 warheads fitted to its 1,400 or so land-based missiles. A huge number of these—more than 3,000 warheads—were found on the monster, 10-warhead SS-18 missiles. The Soviets had 308 of them.

In Western strategic circles, it was thought that the SS-18 force was powerful enough to destroy 65 to 80 percent of US ICBM silos, using two nuclear warheads against each, with more than 1,000 SS-18 warheads left over for further counterforce strikes.

Over time, as the arsenals grew, officials began to see the drawbacks of MIRVing, while it became clear single-warhead ICBMs were actually stabilizing. Such weapons reversed the push-pull dynamic set in motion by MIRVing.

"The principal cause of instability with current weapons systems is the disproportion between warheads and launchers," wrote Henry A. Kissinger in 1983. "There is no effective or intellectually adequate solution to this problem except to seek to eliminate multiple warheads."

Still, backing away from MIRV has been difficult. Washington took the first step in the 1980s, limiting deployment of its premier 10-warhead Peacekeeper to only 50 weapons. After the collapse of the Soviet Union in the early 1990s, the US moved to retire that big ICBM. The last was withdrawn in 2005.

Moscow has also reduced its reliance on MIRVed missiles. Some reports claim it retains in service only about 60 out of the 308 SS-18 missiles, and plans to go down to about 40.

According to the White House, USAF's Minuteman III force has 550 warheads. Administration plans would cap the fleet at 420 deployed ICBMs, all with a single warhead.

In Russia, however, the situation is different. It has 331 functioning ICBMs, with about 1,100 warheads, an excess of 750 warheads. That is to say nothing about the US and Russian strategic submarine fleets, which are also equipped with high-performance MIRVed missiles.

It makes sense to end MIRVing and go to a single-warhead Minuteman force. Clearly, though, the golden age of single-warhead peace won't arrive unless Russia follows suit. ■

More information: http://www.time.com/time/printout/0,8816,923356,00.html

CONSTANT VIGILANCE REQUIRES EXTRAORDINARY VISION

When a routine air patrol becomes an uncommon challenge, the extraordinary vision of FLIR Systems' EO/IR systems proves invaluable. Our advanced sensors deliver greater clarity, range and mission flexibility for civilian-supported search-and-rescue, homeland security, and disaster relief operations. FLIR. Giving your Civil Air Patrol team the critical vision for mission success. ***www.FLIR.com/GS.***

FLIR® Extraordinary Vision

Photo by Sagar Pathak

Strike Command Steps Up

The legendary SAC is the benchmark for the Air Force's new nuclear deterrent force.

By Adam J. Hebert, Executive Editor

For nearly 50 years, Strategic Air Command maintained an unsparing, no-nonsense operational culture. After the Air Force disestablished the legendary SAC at the end of the Cold War, however, USAF's nuclear element slowly drifted away from that exacting standard.

It was a mistake, as everyone now will readily, almost compulsively, concede. That certainly goes for Lt. Gen. Frank G. Klotz, the officer chosen to head USAF's new Global Strike Command.

"If there is one unchanging, immutable truth" about the nuclear arsenal, said Klotz, "it is that it demands constant and undivided attention."

That didn't carry on in the post-SAC years, and, as a result, the service committed a number of serious arms-related blunders. "The focus on existing standards had atrophied over the years," said Brig. Gen. Everett H. Thomas, commander of the Air Force Nuclear Weapons Center at Kirtland AFB, N.M.

Beginning in 1992, the nuclear mission was divided between Air Combat Command and Air Force Space Command. In many ways, it became secondary in competitions for attention, resources, and prestige.

Now, the SAC outlook is coming back—because that's the way things need to be when dealing with the most powerful weapons on Earth. The creation of Global Strike Command, with a singular focus on the nuclear enterprise, is designed to underline that. "It became clear" that nuclear and conventional missions were "out of balance," Klotz said. Strike Command is to put them back into balance.

Photo by Ted Carlson

Left, a B-2 stealth bomber on a training mission. Above, a B-52 on a Red Flag sortie over Nevada. Both bomber types are ready to perform nuclear or conventional missions.

Col. Ferdinand B. Stoss III, commander of the 91st Missile Wing at Minot AFB, N.D., noted that the loss of focus was a change in culture that "took time, and it will take time to build it back." Part of the problem, he explained, was that over time the space side of the 13S career field that space and missile officers share became more prestigious than the missile side. When missileers finished their initial tours, most of the best and brightest were switching to space operations for their follow-on tours.

Best and Brightest

Priorities have already changed. Stoss reports that space ops will still inherit the majority of graduating missileers because that field requires greater numbers of midcareer officers. But the "best and brightest" missileers are now progressing into both career tracks—and there are more volunteers for career follow-on nuclear assignments than there are spaces available.

Veteran airmen in the nuclear fields—missiles, bombers, munitions, and maintenance—all said they see the new focus most clearly in the new intensity of the exercises and inspections. They are training and being judged more frequently, and more harshly, than at any point in most of their careers.

In some cases, the training must be intensified just to keep pace with the real world. Stoss noted that because of overlapping modernization and upgrade schedules, the operating tempo for Minuteman III operators and maintenance personnel is at an all-time high. While on alert, "you never know when something's going to come up," said 2nd Lt. John Farnell, a deputy

USAF photo

Missile maintenance technicians work on a Minuteman III ICBM in its launch silo during a nuclear surety inspection at Malmstrom AFB, Mont.

Photo by Sagar Pathak

SSgt. Dustin Martin (l), SrA. Monicha Pugh (on ladder), and A1C Cody McConnell perform maintenance on a B-2 bomb bay simulator at Whiteman AFB, Mo.

crew commander in the 740th Missile Squadron. "It's feast or famine."

This affects training as well.

"In the mid-to-late [1990s], many alerts were the same," said Lt. Col. Todd Schollars, who oversees missile procedure training. Alerts have become "incredibly complex," he said, because several missiles could be undergoing maintenance at the same time. Officials have had to increase the intensity of the training "just to replicate the field."

In other cases, the training has been intensified to meet the most stressing scenarios. Capt. Tom Meagher, a B-52 aircraft commander with the 69th Bomb Squadron, noted that the focus for one week at the end of March was on strategic attack and dealing with fighter intercepts.

From 2007 through 2009, Minot was on the front lines of the Air Force's nuclear struggles. The commander of the 5th Bomb Wing was among those fired in 2007 after nuclear cruise missiles were accidentally flown from Minot to Barksdale AFB, La.

Setting Up for Nuclear Success

During the Cold War, Strategic Air Command had responsibility for nearly all things nuclear. In recent years, however, the nuclear mission has been split between Air Combat Command for bombers, Air Force Space Command for ICBMs, and Air Force Materiel Command for sustainment. Nuclear issues were often not the top priority.

To restore the nuclear enterprise to its rightful place at the top of the Air Force's domestic priority list, USAF made many changes that have just recently been realized. Air Force Global Strike Command was created to oversee nuclear operations. It is the first all-new major command since Space Command was established in 1982.

Strike Command encompasses 23,000 airmen at five bases, and just assumed control of the B-2 and B-52 bomber fleets in February.

An additional B-52 squadron, the 69th Bomb Squadron, was activated at Minot so that both BUFF bases would have two operational squadrons and the ability to support the new Global Deterrence Force. GDF calls for one B-52 unit to spend a year at a time dedicated to nuclear missions.

The Air Force Nuclear Weapons Center at Kirtland AFB, N.M., now has Air Force-wide responsibility for sustainment. The NWC was created in 2006, but it is being expanded from less than 10 personnel to more than 200. Brig. Gen. Everett H. Thomas is the first general officer commander of the weapons center.

After several years with no senior officer on the Air Staff having an exclusively nuclear focus, USAF established the A10 assistant chief of staff position. Maj. Gen. C. Donald Alston is the first A10. In recognition of the fact that (short of the Chief of Staff) there was no four-star general directly responsible for nuclear sustainment, AFMC's Gen. Donald J. Hoffman was placed in charge of oversight.

Finally, the Air Force established a new program executive office position for strategic systems, collocated with the NWC at Kirtland. Brig. Gen. John F. Thompson became the first PEO for strategic systems in March.

The commander of Minot's missile wing was later relieved from command, in October 2009, after a pair of high profile nuclear-related incidents at the base. Just two weeks after that, the 5th Bomb Wing's replacement commander was removed after units failed several inspections. (The three Minot wing commanders were all removed before their units joined Global Strike Command.)

"Airmen didn't fail the Air Force when we had these breakdowns," Maj. Gen. C. Donald Alston, later said. "The Air Force failed our airmen. ... We had not given the enterprise the attention that nuclear missions demand."

Morale was down at Minot after the mistakes and failed inspections last year, said CMSgt. Martin K. Smith, command chief for the 5th Bomb Wing, but the confidence has returned.

When the current bomb wing commander, Col. Douglas A. Cox, was first reassigned from Guam to Minot last October, he acknowledged that he was concerned about what he would find. What he found was "commitment and dedication to get [things done] right," he said. This January, the fledgling 69th Bomb Squadron passed its initial nuclear surety inspection and the 5th Bomb Wing simultaneously passed a no-notice NSI.

Getting 95 percent of the questions correct will earn someone an "A" on a test at any university, Klotz said, but 95 out of 100 could cause a base to fail an NSI—if the errors are in the wrong places.

Still, "Airmen will do what they are asked to do," said Smith, and with time and repetition, they "may think this is normal."

A Way of Life

The goal is to identify potential problems early, before they become major issues, not to "pass" or "fail" a given number of units. Inspections that are impossible to pass serve little purpose—but so do NSIs that are not tough enough.

These inspections are important, but just "one indicator of how a unit is performing," said Col. Sandra E. Finan, GSC inspector general at Barksdale.

"In our business, perfection is our output," but this must be achieved by humans who are imperfect, Finan noted. Built-in operational redundancies can mask some problems if inspectors don't dig deeply enough, so finding the correct level of inspection difficulty is a constant balancing act. Global Strike Command today takes larger sample sizes and brings more inspectors, typically about 100 for an NSI. This allows for a deeper drilling down into procedures.

Finan said the no-notice NSIs are a valuable way to evaluate day-to-day performance, and a unit can expect to be inspected about twice per year.

For the younger troops, today's intensity is just a way of life. First Lt. Jannel Emery, an instructor and evaluator in the 91st Operations Support Squadron that tests missileers, put it succinctly: "This is our job." Airmen have "adapted to intense ops," she said.

For bombers, conventional missions were the priority for many years, but it is no longer appropriate to even say the nuclear-capable bomb crews have divided attention, said Cox. Today's focus is on nuclear responsibilities "first and foremost" with conventional operations an additional duty. With the nuclear mission serving as the "foundation" for everything the wing does, Cox said, other responsibilities such as the Pacific presence mission can be methodically worked in.

Bomber crews go beyond being "dual-hatted" by offering both nuclear and conventional capabilities. "We're dual-wardrobed," said Capt. Matthew Guasco, a pilot with the 23rd Bomb Squadron. Crews must "keep both ends of the spear sharp."

Things must be carefully balanced, but Klotz notes USAF has performed

A mockup of a B61 bomb used for nuclear weapons load training at Minot AFB, N.D. AFGSC's B-52s can deliver a wide variety of cruise missiles and gravity bombs.

Staff photo by Adam Hebert

Staff photo by Adam Hebert

Minot is adding operational B-52s to fill out a new bomb squadron. This B-52 in a base hangar is being used for weapons load training. Both Minot and Barksdale AFB, La., home of Strike Command, will have two bomb squadrons and will require infrastructure improvements.

this balancing act many times before. SAC bombers performed conventional missions as far back as the Korean War, and B-2s and B-52s today deploy to support US Pacific Command's continuous forward presence mission on Guam.

Activating the 69th Bomb Squadron gives Minot and Barksdale two operational B-52 squadrons each, so that one squadron can be assigned to the Global Deterrence Force rotation. That job is 100 percent nuclear for a full year.

The new squadron is bringing 800 airmen to Minot—13 percent of the base's population—but it will take time to build to full capability. Many of the aircrew members and crew chiefs are coming in from other weapons systems, and need to ramp up their skills with the B-52. The shortage of midcareer airmen with nuclear skills is a problem here as well. Lt. Col. Patrick Ballard, deputy commander of the 5th Maintenance Group, said sortie rates should stabilize by the fall, but because of the spin-up times for airmen new to B-52s, life may not fully "normalize" until the spring of 2011.

Infrastructure improvements are progressing to absorb Minot's new personnel. Large numbers of new dorms and other base housing are under construction. The new bomb squadron needs additional hangars and maintenance facilities, and there are plans for a brand-new control tower and air traffic control complex.

Klotz said the other nuclear bases are also benefiting from infrastructure improvements. Barksdale is adding 1,100 airmen through various nuclear personnel additions and the stand-up of Global Strike Command. These airmen should pose less of an integration strain than at Minot, however, because Barksdale is surrounded by the large communities of Shreveport and Bossier City.

The base does, however, need new buildings to replace some obsolete structures, along with road and weapons storage area (WSA) upgrades.

The Air Force has decided to recertify Barksdale's WSA, which was closed to nuclear weapons years ago, so that B-52 crews have easier access to strategic weapons for training and exercises. Klotz told Congress that it will take about $150 million to reopen the WSA, but the Air Force was going to wait until the Nuclear Posture Review was completed before moving forward.

The weapons storage areas are of particular interest, because the Minot incident began in the WSA. In the "mid-1990s," Thomas said, 10 domestic weapons storage areas were operated by three commands. Today, the remaining five "CONUS WSAs" belong to the Nuclear Weapons Center—not the local wing. Their profile has also been raised. "Previously, we had a young captain ... responsible for the inner workings inside of the weapons storage area," Thomas testified. "We moved that to a lieutenant colonel's position."

In addition to the construction at the base, Minot airmen have noticed a marked increase in high-level visitors. In the past, "I think we were a little forgotten about," said Capt. Lauren Eiffes, a B-52 standards and evaluation officer. That is certainly not the case anymore, she said, citing visits from Defense Secretary Robert M. Gates and Gen. Norton A. Schwartz, USAF Chief of Staff.

Indeed, Gates cited the erosion in nuclear standards as the reason he forced then-Air Force Secretary Michael W. Wynne and Gen. T. Michael Moseley, Schwartz's predecessor, to resign in June

2008. Renewed attention brings with it more personnel, higher standards, and additional funding.

The nuclear enterprise needs all of this, because much of its resources are ancient, beginning with 40-year-old Minuteman IIIs. "Much of the infrastructure—for example, missile silos, launch control centers, missile alert facilities, underground cables—were fielded even earlier, with previous generations of the Minuteman," Klotz told lawmakers in March.

The last B-52, meanwhile, "left the factory in 1962." There are only 77 B-52s and 20 B-2s, and no new bomber has been produced since 1997. Global Strike Command will advocate for a next generation long-range strike aircraft, one that will in all likelihood be nuclear-capable.

Another aircraft of concern is the UH-1 used to help defend the nation's missile fields. These Hueys date to 1970, and have severe range, size, and performance limitations. Lt. Col. Jay Tewksbury, commander of Minot's 54th Helicopter Squadron, notes that the Hueys are highly reliable and easy to maintain, but their performance limitations are too great to look past. For example, they lack a deicing capability, which can be a major problem at the Northern Tier missile bases.

The helicopter units work with specially trained, 17-man tactical response forces trained for counterterrorism operations. Why 17 men? "Too many people get in the way," said MSgt. Duke McDuffie, superintendent of the 791st Missile Security Forces Squadron's TRF unit. The team—ready to assault a missile launch facility (silo) in "any configuration"—includes a command and control airman, an eight-man assault team, a four-man heavy weapons team, two snipers, and two spotters.

All are security forces veterans serving three-year controlled tours, drawn from volunteers among the security forces airmen at the nuclear weapons bases.

Team member SSgt. Augustin Torres said the team "specializes in close quarter combat," for example within an occupied missile silo. But despite the popular reputations of assault teams like this, Torres added, the TRF's job is "not to kill everybody; ... [it] is to save lives."

The TRF concept originated in 2002 to meet the greater security requirements since 9/11, but Tewksbury notes that it takes three Hueys to transport a TRF. Minot only has eight UH-1s, with six or seven fully mission-capable at most times.

After years of delay, the Air Force included funding in the 2011 budget request to begin a helicopter replacement program, with a target in-service date of 2015. Tewksbury said security forces would benefit from helicopters with greater speed, all-weather capability, and the ability to transport a TRF in two aircraft instead of three.

No "Showstoppers"

Nuclear test and support equipment is a particular concern. For years, Thomas explained, there were questions about who was responsible for nuclear sustainment. At one point the Air Force tried to launch a Mk 21 fuze refurbishment program, but it had no general officer involvement, and ultimately went nowhere. The Air Force was forced to start over.

The Mk 12 and Mk 21 fuzes that arm ICBM warheads both need refurbishment, and the NWC considers these fuzes a top sustainment concern. Col. James D. Fisher, commander of the 526th ICBM Systems Group, notes that the Mk 21 fuze was never designed to be refurbished—part of the reason the service is interested in developing with the Navy a joint/common fuze that could be used for both the Minuteman III and SLBMs.

Nuclear gravity bombs are also on the agenda. The Air Force supports a life extension program for the B61 bomb carried by USAF's heavy bombers and many dual-role fighters. The goal is to improve the safety, security, and reliability of a weapon that still carries vacuum tubes.

As the Nuclear Weapons Center works "on a comprehensive life extension of the versatile B61, [it is] also studying the need for weapons to meet future delivery platform requirements," Thomas said.

Officials have already identified the need for a next generation cruise missile. USAF began developing the requirements for the new weapon this spring, and is expected to soon begin a formal analysis of alternatives.

The service is continuing to decommission its stealthy Advanced Cruise Missiles and cut its inventory of Air Launched Cruise Missiles, but dozens of ALCMs will continue to provide standoff punch for the B-52 fleet. The plan, says Col. Richard M. Stuckey, commander of the 498th Nuclear Systems Wing at Kirtland, is to sustain the remaining ALCMs until 2020, with a "guarded option" of preserving them to 2030.

The Air Force has a "good handle" on which components will not last the life of the weapon, he said. The key is long-term planning.

ICBMs are in a similar situation. The 2007 defense authorization act directed USAF to sustain the Minuteman III through 2030. The service recently put together its first ICBM roadmap in a decade to help meet this requirement.

The roadmap calls for "smaller but steady investments ... to sustain the weapon system until a replacement system is fielded. Block upgrades in flight, ground, and support equipment subsystems are the best approach."

This echoes the approach the Air Force has used on the Minuteman in the past. The service is now wrapping up $7 billion worth of multiyear propulsion and guidance replacement programs. Klotz last year said these have modernized "practically every inch" of the missile. Some Minutemen are even getting replacement re-entry vehicles from decommissioned Peacekeeper missiles.

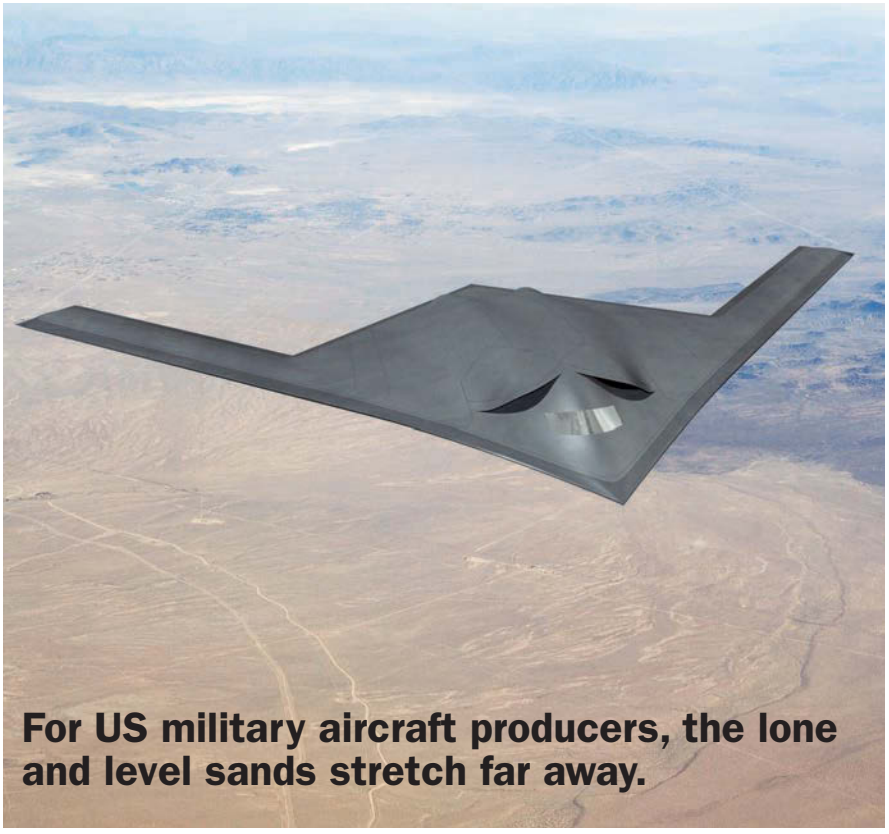
The roadmap notes that 2030 is still a long way off, however, and "additional work" will be needed to identify what parts will need refurbishment to meet the new life requirement.

Fisher said he sees no "showstoppers" on the ICBM sustainment horizon, but the Air Force will "have to refresh some items of concern once again."

It will take time to rebuild the nuclear systems, equipment, expertise, and culture that declined since SAC's dissolution in 1992. Officials have not necessarily become accustomed to the new requirements, but all seem to feel they are now operating at a higher level of proficiency.

The no-notice inspections clearly keep airmen on their toes. Technically, they are "very little" notice inspections because teams might get shot if they showed up at nuclear weapons facilities completely unannounced. Still, Kirtland's Stuckey noted, the last three inspections he was privy to offered five hours' notice, then four hours, then 24 hours. This serves to keep airmen at a "higher and consistent level of readiness," he said.

Last November, when Thomas spoke to *Air Force* Magazine at Kirtland, there were about a hundred inspectors performing a nuclear surety inspection at the base. Despite this and the other difficulties that inevitably lie ahead, Thomas said, "I smile a lot more than I did when I got here." ■



Boeing illustration

For US military aircraft producers, the lone and level sands stretch far away.

The Thirty-Year Drought

By John A. Tirpak, Executive Editor

The Pentagon's new 30-year aircraft investment blueprint delivers to the Air Force this unmistakable message: The pace of USAF modernization will range from slow to extremely slow for many years.

The plan calls for a hiatus of at least 10 years in production of new strategic airlifters and long-range bombers. It envisions acquisition of fewer than a dozen tactical transports per year, on average. It calls for buys of F-35 fighters to build slowly and then level off at a rate that won't meet required force levels until 2035.

The KC-X tanker will be the only large airplane purchase through 2025. Simple, unmanned aircraft will be increasingly prominent. For half of this decade, USAF's airplane budget will be smaller than the Navy's.

The "Aircraft Investment Plan, Fiscal Years 2011-2040" is DOD's first-ever stab at mapping the armed services' entire fixed wing airplane buys over a long period. It was submitted to Congress along with the Fiscal 2011 budget request.

Will the work pace suffice to preserve the aircraft industrial base? Pentagon officials say yes. However, the plan is certain to become leaner in future years, as the services horse-trade over aviation roles and missions and planned procurement numbers come down. (It does not count rotary wing aircraft or upgrades to fixed wing aircraft.)

Congress, prompted by concerns that reductions in defense aviation orders could starve the aviation industrial base, called for the plan in 2008. The Defense Department failed to produce the plan in 2009, blaming the change in Administrations and uncertainties about major programs such as the F-22 fighter, KC-X tanker, and new bomber.

In this first AIP, the Air Force and Navy merely compared notes on their respective aircraft purchase plans; they did not compete for missions or eliminate much overlap. That will begin in earnest with the next version of the plan, which Congress directed be revised and resubmitted annually.

"We needed to start this with sort of a confidence-building approach," explained Gen. Norton A. Schwartz, the USAF Chief of Staff. Schwartz believes the first run of the AIP was a success, but, asked if future versions will be more competitive and seek elimination of overlap, Schwartz said, "I'm certain that's the case."

The plan bears the signature of Defense Secretary Robert M. Gates. In it, he said the AIP had four main objectives:

- "Meet the demand for persistent ... intelligence, surveillance, and reconnaissance (ISR) capabilities," provided mainly by unmanned or remotely piloted aircraft such as Global Hawk, Predator, and Reaper.
- "Provide sufficient enabler capability and capacity," such as a new aerial tanker, early warning aircraft, and tactical jammers such as the EA-18G Growler for the Navy.
- "Acquire fifth generation fighter-attack aircraft" in the form of the F-35 fighter.
- "Modernize long-range strike capabilities" by identifying "a replacement aircraft for the aging aircraft in the legacy bomber fleet."

Answering Congress' original question, Gates said, "This first aviation plan does not foresee major industrial base issues" in the near term. At a minimum, he went on, "there are no immediate concerns" about the strength of the American aviation industrial base, which he said would be sound for years to come. The Pentagon chief acknowledged, though, that "there are impacts to specific corporate interests in certain sectors."

The early portion of the blueprint—the part covering years out to Fiscal 2015—mainly comprises the various "programs of record" already under way for the Fiscal 2011 budget, and in the Pentagon's quarterly selected acquisition reports, which state costs and buying objectives for all major weapons procurement. So said Brig. Gen. Richard C. Johnston, USAF's director of strategic planning, who led the Air Force's AIP team.

Beyond 2015, the builders of the AIP relied on a notional three percent real

Illustration by Erik Simonsen

Far left: A Boeing concept for a new bomber. Above: An artist's conception of the new long-range bomber.

growth in defense spending, as instructed by Gates.

"In the immediate future, I think our major programs are set," Air Force Secretary Michael B. Donley said of the aviation plan at AFA's Air Warfare Symposium in Orlando, Fla., earlier this year. New starts will "have to await an economic recovery" and will be based on "what level of resources will be provided to defense" in the next four to six years.

Donley said the order for a 30-year plan from Congress was "a very ambitious request," given that in a span of three decades, "we could see the defense budget go up and down three times, and we could see the strategic environment change once, twice, three times in significant ways affecting our security requirements. So, it is very hard putting together a 30-year aviation plan that one would actually build to."

He said that the AIP was a useful exercise in confronting "what parts of our fleet may reach a certain age" beyond which they may not be relevant or sustainable, and to "think about how we will need to sequence our work ... to accommodate different mission areas and platform requirements and capabilities."

Given the long-term nature of the study, the Defense Department acknowledged that, within the 30 years, it will be necessary to recapitalize some aircraft now considered still brand-new. For example, the AIP says that, although this decade will see a large investment in "follow-on capabilities for the F-22 Raptor," a successor aircraft, called F-X, "would be needed about 2025."

SLEP for the C-17

Johnston said "economic realities" mean that the F-X would not wholly replace the F-22 in 2025, but "maybe that's the first airplane on the ramp." In assessing a replacement for the F-22 and eventually the F-35, the Pentagon will consider "both manned and unmanned options," according to the report.

Air Combat Command is in the midst of an analysis of alternatives defining the general capabilities of an F-22 replacement, but it will not be done for a year. If it followed the pattern of the F-22, which took 20 years to develop and field, the F-22's replacement might not be in service until 2030.

Intratheater lift—in the form of the C-130J and C-27—peaks at 16 airframes in Fiscal 2011 and declines from there, and drops to just two per year in Fiscal 2013 and Fiscal 2014. The US will purchase aircraft up to the economical build rate; foreign orders will claim a larger share of tactical transports produced in some years.

The Air Force has said that it already has more than the 300 strategic airlifters it needs, and all of the fleet—relatively new C-17s and heavily upgraded C-5Ms—will be sound well into the 2040s, so no new big airlifters are planned for more than a decade. Development of a new strategic airlifter, to replace the C-5, would get started with modest funding beginning in 2016. Although the plan does not delve into modifications, Air Force officials speculated that the C-17 fleet would likely undergo a significant service life extension program starting in the late 2010s.

The overall size of the aircraft fleet operated by the Defense Department (including aircraft already in service) will bottom out at 5,300 in Fiscal 2017. Three years later, it will peak at 5,500 airframes, if aggressive production of

Photo by Jim Haseltine

An MQ-9 Reaper armed with laser guided bombs and missiles. The Reaper can carry a payload roughly equivalent to an F-16 fighter.

Boeing illustration

the F-35 and remotely piloted aircraft is sustained.

During the 2020s, the fighter inventory "will decline slightly (a roughly 10 percent decrease) ... while aircraft in the multirole unmanned aerial system category will more than quadruple," the AIP states. Of course, these levels are subject to change "in response to operational needs, industrial base considerations, and fiscal constraints."

The Air Force-Navy-Marine Corps fighter inventory will decline steadily from 3,264 airframes in Fiscal 2011 to 2,883 machines in Fiscal 2018, at which point the fleet begins a slow increase. Over the same period, multirole remotely piloted aircraft in the MQ-9 Reaper class will increase from 72 aircraft in Fiscal 2011 to 476 airframes in Fiscal 2020. The Air Force would buy approximately 260 of these, and production across all services for Reaper-class aircraft would remain steady at about 48 per year for most of the 2010s. Without explanation, the Reaper-class category zooms to 60 produced in 2018, followed by a drop to 16 in '19 and 24 in '20.

The Air Force will not purchase any more MQ-1 Predator vehicles, as the Reaper offers more endurance and a larger payload—about equivalent to the F-16 fighter—and can carry a wider variety of weapons.

The Air Force will explore a "potential follow-on" to the Reaper in the next decade even as it backfits previously built aircraft with electronic attack capabilities. The MQ-9 will be complemented by the MC-12W manned ISR platform.

The AIP notes that, although some see remotely piloted or unmanned aircraft as a cheap replacement for manned aircraft, "the cost (both in dollars and personnel) of expanding unmanned capacity and capability is not insignificant." The Pentagon has tried to balance unmanned vs. manned "with a view toward providing the resources necessary to meet the demand for persistent, unmanned ISR/strike assets"—read, in the current fight—but "will continue to adapt the mix of unmanned and manned systems as security needs evolve."

EADS photo

Top: Boeing's entry in the tanker competition, the NewGen tanker. Above: The tanker offering from EADS, the A330 Multirole Tanker Transport.

Not an Overarching Roadmap

In today's dollars, "total aviation investments will amount to $268 billion" over the decade 2010 to 2020, according to the AIP.

The Navy will enjoy the larger share of aircraft dollars from Fiscal 2011 until Fiscal 2016, when the Air Force catches up and both services are spending roughly $15 billion a year on airplanes. In Fiscal 2011, the disparity is $4 billion in the Navy's favor, driven largely by continued production of the F/A-18E/F Super Hornet and its variant, the electronic attack EA-18G Growler.

By 2020, about half the Navy's aircraft money will go toward development and production of a stealthy, long endurance unmanned aircraft in the same size class as the F-35. The Marine Corps will also seek an RPA in the Reaper class during the same period. By 2020, the Navy will be spending about $7 billion a year on unmanned aircraft, compared to the Air Force's investment of less than $1 billion in that year.

The Air Force plans no replacements for its E-3 AWACS, RC-135 Rivet Joint, or E-8 Joint STARS aircraft until the 2040s. In the meantime, most of its purchases of ISR aircraft will focus on the unmanned RQ-4 Global Hawk. The Air Force expects to buy about 77 Global Hawks, and the Navy about 60 almost identical aircraft under the Broad Area Maritime Surveillance program.

The Air Force will consider unmanned replacements for its large ISR aircraft if the technology will permit. In the 2010s, however, the Navy will buy the P-8A Poseidon manned surveillance aircraft (based on the Boeing 737) and newly built versions of the E-2D Hawkeye carrier-capable AWACS aircraft.

Johnston said that the airframe selected to be the KC-X tanker might conceivably be the platform for a replacement of the E-3 AWACS, RC-135 Rivet Joint, and E-8 Joint STARS, but because replacement of those airplanes will occur in, as the AIP says, "the far term," specifics about successors for those airframes aren't known yet.

"We wanted to make sure that section was in there because we recognize that those platforms will start to reach the end of their service lives. ... But as far as what platform and exactly when, that's something we ... don't have the knowledge on," Johnston said.

The AIP was not run through operational combat simulations or models, per se, according to Col. Stephen Walters, chief of USAF's long-range planning division.

However, "that's something that we are constantly doing as we change assumptions," Walters said. "We've done those kinds of studies in the past, and that information that we have influences very heavily what exists in the President's budget." He noted that the AIP was intended to inform Congress about new aircraft construction; it is not meant to be an overarching roadmap of aviation because it doesn't include upgraded older aircraft or munitions.

Walters noted that the AIP was based on three percent real growth in the budget in the years following Fiscal 2015—the year the current Future Years Defense Program expires—and did not attempt to predict any "significant dips" or boosts in defense spending.

According to the AIP, the Air Force won't start spending upward of $1 billion a year on a new long-range strike aircraft until 2015, and only reaches $3 billion a year by Fiscal 2020. That was the midline of a level as high as $4 billion that year or as low as $2 billion, since the outcomes of ongoing studies regarding long-range strike are not yet known. Gates and his many lieutenants have said they are seeking a portfolio of long-range strike capabilities to include manned and unmanned, penetrating, and standoff capabilities.

In long-range strike, the "exact investment profile for FY 2016-2020 will be informed by study results," according to the AIP. If spending is required above a notional three percent real growth above inflation, that "would entail making commensurate reductions in other programs."

The KC-X tanker program, the Air Force's highest priority, will produce 109 new airplanes by 2020, at an investment of roughly $3.7 billion a year from Fiscal 2014 through 2020. The program is to produce 179 aircraft before the Air Force seeks a KC-Y and KC-Z, which would replace the KC-10 fleet.

Even with new airplanes coming on, though, the tanker inventory would slide through most of this decade, as KC-135s are retired faster than KC-Xs will come into service. From 551 aircraft in Fiscal 2012, the tanker fleet will slip to 531 aircraft by Fiscal 2018. It begins to rebound in 2020, with 534 airplanes. The tanker inventory counts Air Force strategic tankers and special operations tankers as well as Marine Corps KC-130s.

Northrop Grumman photo

USAF's Global Hawk performs a mission high over a mountain range. The intelligence-surveillance-reconnaissance aircraft can operate above 60,000 feet.

Capability Redundancies?

Brig. Gen. Derek P. Rydholm, Johnston's deputy, said the Air Force was satisfied that all participants in the AIP "had a good chance to look at this before it became a final product," and that the Pentagon's Cost Assessment and Program Evaluation shop (previously known as Program Analysis and Evaluation) "did a good job of ensuring that they incorporated, to the maximum extent possible, everything that we gave them."

Schwartz said that although there was no head-to-head competition for aviation budget share in the first round of the AIP, the two services did recognize that they were developing redundant capabilities regarding the RQ-4 Global Hawk unmanned reconnaissance and surveillance aircraft. As a result, they will make efforts to consolidate RQ-4 production, training, and support facilities, sharing where possible to reduce costs. Unique capabilities developed for one can be used by the other. The Air Force, for example, will benefit from anti-icing features developed for the Navy's version of the airplane.

Referring to Chief of Naval Operations Adm. Gary Roughead, Schwartz said, "Gary and I are committed to not having more differences between these platforms than is truly necessary."

He also pointed out that, partly as a result of the discussions, the Navy has decided it doesn't need to operate remotely piloted aircraft in the class of the Predator and Reaper, and will "migrate that equipment to us because they don't want to operate in that space."

In future years, Schwartz said he and Roughead will seek more ways to economize by sharing aircraft types, training, and support facilities where it makes sense to do so.

Although the Navy has had a shipbuilding plan for many years, and "they've been reasonably successful [with] that," there has never been an aircraft plan before, and Rydholm said the AIP may evolve into something like the Navy's shipbuilding scheme. That plan gets regular attention from Congress, which has shown consistent concern that shipbuilding capabilities not atrophy in the US.

"I think it will evolve to the point where we're ... looking holistically at where we might want to go" across the services with aircraft production, Rydholm said, "but I don't think we're there yet."

The AIP will undoubtedly be in constant revision, Gates said in his summary.

"A changing strategic environment will likely require continuous adjustments in aviation investments. National security requirements could arise in the 2020s and 2030s that cannot be foreseen today, just as the heavy reliance on unmanned vehicles could not have been anticipated 10 years ago." Nevertheless, the AIP has "immense complexity relative to the more mature shipbuilding plan," because it covers three services as well as technology with "a much shorter technological half-life" than ships. ■

Intelligence and operations are no longer viewed as separate entities; that has brought huge changes.

ISR Revolut

By Mich

On one August day last year, some US ground troops were preparing to move out down a certain dangerous road in Afghanistan. SrA. Andres Morales of the Air Force had a related mission. As it happened, his mission grew and grew.

At first, Morales was tasked to supply intelligence information about three specific points of interest along that Afghan road route. Morales, an analyst in DGS-2, USAF's Distributed Common Ground System (DCGS) node at Beale AFB, Calif., provided the information within minutes. It was based on a blend of imagery and electronic communications signals captured by the sensors on surveillance and reconnaissance aircraft flying near the route.

Then came the unplanned items. Morales learned about expanded needs of the troops on this convoy mission. He continued to offer support. Over the course of seven hours, he kept these soldiers supplied with updated intelligence. All the while, he stayed in close contact with them, using a secure chat room on the US military's classified network.

Morales' analysis identified eight areas of suspicious activity along the route, one of which turned out to be an improvised explosive device that might have wounded or killed some of these soldiers had it gone undetected. The soldiers also confiscated three insurgent weapons caches nearby, located as a result of the airman's involvement.

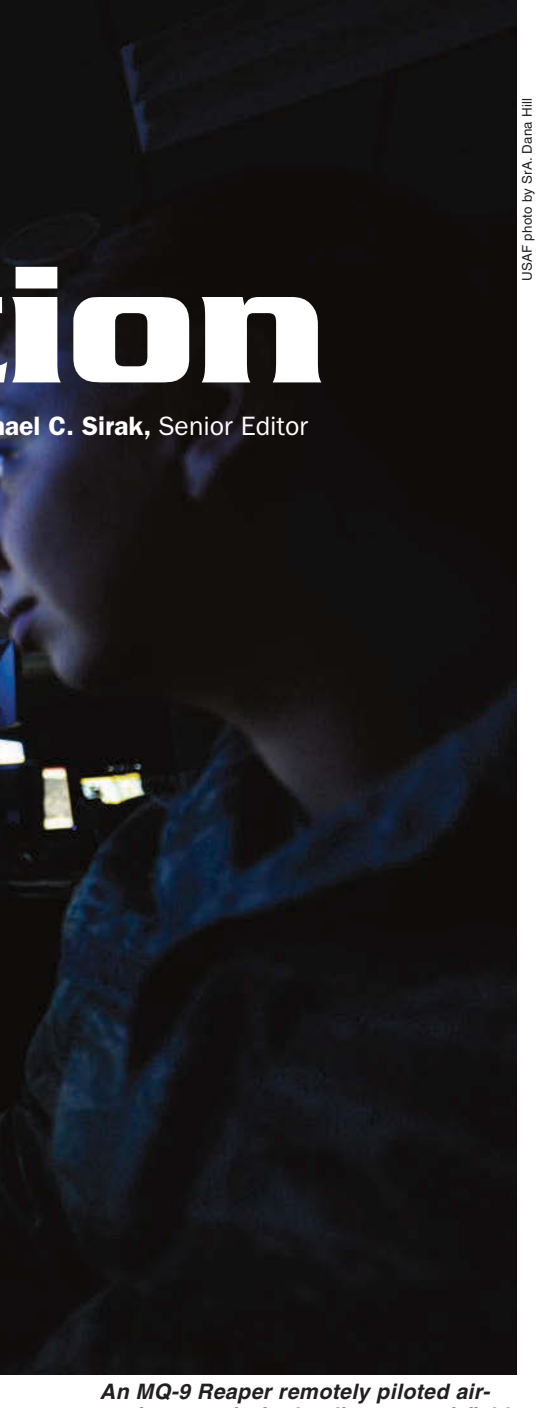
The Air Force today doesn't often disclose the details of its intelligence-surveillance-reconnaissance (ISR) activities in Afghanistan and Iraq or elsewhere around the globe. Yet service officials say this declassified account of Morales' mission is by no means unique in its scope and outcome.

"We literally have thousands of airmen now who operate this weapon system [DCGS] and are in direct contact with the forces forward," said Maj. Gen. Bradley A. Heithold, commander of the Air Force Intelligence, Surveillance, and Reconnaissance Agency (AFISRA) at Lackland AFB, Tex., in an interview.

Five years ago, however, this type of support was not the norm. While DCGS existed then, this sophisticated intel-

tion

hael C. Sirak, Senior Editor



USAF photo by SrA. Dana Hill

SrA. Julia Richardson analyzes computer imagery on the new operations floor of Distributed Ground System-1 at Langley AFB, Va.

ligence fusion system was organized very differently across the Air Force. The system prevented USAF officials from fully exploiting the synergy of its distributed global analytic hubs.

Simply put, it was not possible for an airman at Beale to provide the same type of actionable intelligence to troops at the forward edge of operations, as Morales did.

Skilled in the Arts

Air Force leaders saw these limitations. More broadly, they recognized that the nature of warfare had inexorably shifted; intelligence and operations could no longer be viewed as separate entities, and quickly finding and identifying targets loomed as the US military's biggest challenge. The Air Force in 2006 launched an ambitious overhaul of its ISR enterprise.

The service leadership created a new Air Staff directorate for ISR, and other organizations were revamped to streamline authorities and optimize how ISR echelons present themselves to Air Force and joint force commanders as well as the national intelligence community.

Strong emphasis was placed on creating a cadre of senior officers and enlisted airmen skilled in the arts of this realm. A new foundation of the trade was built on new strategies and far-reaching documents stating how the service would pursue future ISR systems, including remotely piloted aircraft.

All this happened against the backdrop of the Air Force pushing more ISR assets—in particular the MQ-1 Predator and MQ-9 Reaper remotely piloted aircraft—into the war theater at an accelerated pace to meet the insatiable demand for the overwatch that they provide.

Fast forward to today. These actions have borne fruit.

"I think the changes have been quite profound," said James R. Clapper Jr., undersecretary of defense for intelligence, in an interview. Their impact, he continued, "is a reflection of the fact that ISR kind of drives everything else. It drives operations."

DCGS has been freed from its organizational restraints, and is now a no-kidding globally networked system able to swiftly and easily draw upon the expertise of analysts from any one of its distributed worldwide sites.

Clapper characterized this capability as the US military's "central nervous system" for processing, exploiting, and disseminating imagery and signals intelligence products. The ability of DCGS to link with intelligence centers in the war theater "has been tremendous," he said.

Success is evident on other ISR fronts, too. After a drought of several years, the Air Force now has a career intelligence officer serving as the head of the ISR directorate in a combatant command. In this case, it is Brig. Gen. VeraLinn Jamieson, the J-2 at US Southern Command. And the way has been cleared for an Air Force general officer to serve as J-2 of US Strategic Command.

The number of Air Force RPAs supporting operators in the war theater has ballooned from one continuous MQ-1 air patrol in the early days of the war in Afghanistan in 2001 to more than 40 around-the-clock orbits of MQ-1s and MQ-9s today. Plans call for the Air Force to have 65 orbits in place in 2013.

The service needed only about 10 months to take the MC-12W ISR

An MQ-9 Reaper remotely piloted aircraft comes in for landing at an airfield in Afghanistan.

USAF photo by SSgt. Brian Ferguson

USAF photo by MSgt. Scott T. Sturkol

A U-2 spyplane lands at an undisclosed air base in Southwest Asia.

Liberty Project Aircraft all the way from concept to fielding in Southwest Asia, a feat Clapper described as "a superb achievement" on a timeline "virtually unheard of." These aircraft provide invaluable full-motion video and electronic eavesdropping support to troops in Afghanistan and Iraq.

Back when the service launched the makeover, USAF's stated goal was this: "Transform Air Force intelligence, surveillance, and reconnaissance into a set of premier military intelligence organizations with the most respected personnel and the most valued ISR capability."

"We have made significant progress on that journey," said Lt. Gen. David A. Deptula, deputy chief of staff for ISR, the so-called A-2 of the Air Force, during an interview in his Pentagon office. However, he added, "There is always more to go."

For Deptula, the need for the ISR overhaul was a no-brainer.

"We are at a transition point between an era of industrial age ... warfare to one in which we are in an information age," he said. The US military is now operating "in an era of much more rapid assimilation and distribution of information," yet it is "still dealing with processes and organizations" developed in the industrial age of warfare.

Muscle Move

"We need to change our processes and organizations to meet that technological shift," he said.

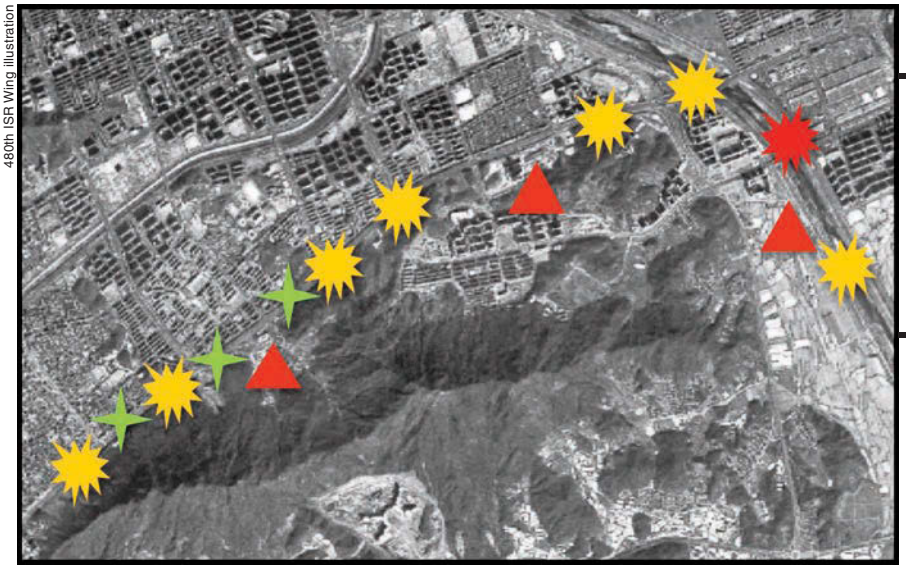
Deptula spearheaded the ISR changes since he took over the service's top ISR job in July 2006. The A-2 office is now the focal point for all Air Force ISR matters, ranging from the oversight of RPA programs to monitoring developments across ISR capability portfolios to ensure "the left hand knows what the right hand is doing," as Deptula puts it.

He said that the biggest organization "muscle move" was USAF's bringing in of all ISR units under one house so that they could be treated as an integrated whole and serve users across all domains—such as air, space, and cyberspace—as opposed to stratified entities answering to a single command that specializes in one domain. Such domain-centric ownership only decreased ISR effectiveness, he said.

That new organization is AFISRA, which grew out of the former Air Intelligence Agency that was structured under Air Combat Command. AFISRA is a field operating agency that reports directly to the DCS for ISR.

The agency oversees the 480th ISR Wing, at Langley AFB, Va., the organization that manages the Air Force's worldwide DCGS activities; the 70th ISR Wing at Ft. Meade, Md., the Air Force's sole cryptologic wing; the National Air and Space Intelligence Center (NASIC) at Wright-Patterson AFB, Ohio; and the Air Force Technical Applications Center,

480th ISR Wing illustration



Key

Original Targets

Weapon Cache

IED Location

Disturbed Earth

Illustration representing the route that US ground troops took during an August 2009 mission in Afghanistan, supported by SrA. Andres Morales, an intelligence analyst in the DCGS node at Beale AFB, Calif. The soldiers safely traveled the route and, in the process, confiscated three weapons caches and found an improvised explosive device.

at Patrick AFB, Fla., responsible for monitoring nuclear treaty compliance and detecting nuclear events.

Deptula said the new structure has "had some huge positive benefits." For one, it allowed the Air Force to realign the DCGS enterprise, which had been inefficiently divided across several Air Force major commands. It now resides under the administrative control of the 480th ISR Wing, but with clearly defined lines of support from the five core Distributed Ground System (DGS) sites to the component numbered air forces that they support.

The five core sites are at Beale, Langley (DGS-1), Osan AB, South Korea (DGS-3), Ramstein AB, Germany (DGS-4), and JB Pearl Harbor-Hickam, Hawaii (DGS-5). They are supported by six Air National Guard DGS sites that analyze about 60 percent of all the full-motion video coming off Air Force ISR platforms today.

This new setup allows for DCGS to be operated as a regionally focused, but globally controlled, weapon system out of Langley. That means that if one of the core sites is fully engaged supporting some missions, 480th ISR Wing officials are able to task another one of the sites to help out.

"We can swing the weight of the effort wherever we need to," said Heithold, the AFISRA commander. This setup, he continued, "allows us to apportion where needed rather than to build huge ISR capacities in all of the theaters, which we can't afford to do."

For example, when the US military, including Air Force drones, mobilized to support humanitarian relief efforts in Haiti after the devastating earthquake hit there in January, the 480th ISR Wing was able to shift DCGS analysts at Beale who had been supporting US Central Command to the relief mission without any impact to the work being done for CENTCOM, said Col. Daniel R. Johnson, 480th ISR Wing commander, during an interview at his headquarters.

"Our ability to flex that mission from one location to another is just incredible," he said.

The DCGS primarily works with U-2 Dragon Lady surveillance-reconnaissance aircraft and MC-12s, along with MQ-1, MQ-9, RQ-4 Global Hawk, and RQ-170 Sentinel RPAs.

"We are the ones who make sense out of what is coming off of the sensors," said Johnson.

The 480th ISR Wing has also embedded ISR liaison officers with ground forces in Afghanistan as well as Iraq. They "tell us exactly what are the products that the ground troops want," said Johnson. Army liaison personnel are also now resident at the core DGS sites. A British airman recently became certified for DCGS work, and soon, Australians will be, too.

USAF photo by SrA. Brittany Y. Bateman

An MC-12W ISR aircraft prepares for takeoff at JB Balad, Iraq. The Liberty Project Aircraft went from concept to fielding in just 10 months.

Last Month's Game

Along with the DCGS realignment, Deptula said AFISRA's establishment allowed for the creation of ISR groups that integrate elements of imagery intelligence and signals intelligence drawn from the 480th ISR Wing and 70th ISR Wing to an unprecedented degree in the Department of Defense. This has removed an old seam between the two sources of intelligence, thereby allowing more effective ISR support to the combatant commanders.

"Now we have clear lines of authority and responsibility and function that has dramatically increased the output of ISR to users in each one of the [combatant commands]," he said.

NASIC has also transformed, with a focus on "being operationally relevant," Col. D. Scott George, center commander, said in an interview in his office. This has been "a big change in mind-set" for NASIC analysts, since their focus in the past was more on long-term analysis, he said.

George has been selected for promotion to brigadier general and is scheduled to receive his star and assume his new post as STRATCOM's director of intelligence following a June 2 change of command. He follows Jamieson as just the second USAF career intelligence officer to be selected to lead an intelligence directorate for a joint warfighting command in about eight years.

NASIC is the primary producer of foreign air and space intelligence for the nation. Today, it has about 3,000 total staff. George described the center as "the one place in DOD where all sources of intelligence come together." This includes imagery intelligence, such as geospatial intelligence (Geoint), Sigint, open-source intelligence, foreign material exploitation, and human intelligence, among others.

The center's analysts are not meant to operate in the same time frames as the airmen in the DCGS. While DCGS analysts are like football referees observing what is happening on the playing field at the moment, NASIC analysts are more like the officials back in the NFL booth.

"We aren't looking at the game right now, but we look at what happened in yesterday's game and last week's game and last month's game," George explained. "We are compiling all the information from any of these events to help provide a better understanding of what we think will happen in tomorrow's game."

NASIC has also undergone a process of "unitization" to align its internal structure along the lines of the Air Force in groups and squadrons in order to give Air Force officials a better understanding of how to use and leverage the center. But it maintains an overall structure still recognizable to the national intelligence community.


GET REAL
What's real? Our KC-45 tanker. It's the only tanker in the Air Force competition that is in production, flying and ready now. By contrast, our competitor's concept aircraft exists only on paper—an unproven design that's never been built or flown. Our warfighters deserve a real tanker—one that will be built here in the U.S., by tens of thousands of Americans. So let's get real: KC-45.
www.eadsnorthamerica.com

F-16 refueling operation, Nov. 3, 2009
See the video at **www.KC-45now.com.**

EADS
NORTH AMERICA

USAF photo by MSgt. Scott T. Sturkol

Members of the 380th Expeditionary Aircraft Maintenance Squadron prepare an RQ-4 Global Hawk remotely piloted aircraft for a combat mission at a forward base.

Further, a "distributed mission site" recently stood up at NASIC that is linked into the DCGS enterprise. With it, George said the center is, for the first time, "leveraging broader Geoint into the fight at increased speeds." NASIC also now regularly dispatches liaison officers to Southwest Asia to help get the word out on how the center can support the warfighter.

Heithold said AFISRA had made the brunt of its organizational changes; now it is making some refinements to apply its finite manpower billets to the areas most in need. For example, it is establishing a human intelligence squadron within the NASIC this summer. There is also "untapped Guard and Reserve capacity" that the agency seeks to access to strengthen the ISR enterprise, he said.

AFISRA is also working to ensure that 24th Air Force, the service's new cyber operations arm, receives the intelligence support that it needs. To that end, the agency is standing up a new ISR group under the 70th ISR Wing this summer to support 24th Air Force.

"They require signals intelligence," Heithold said. "We haven't quite got all of those pieces right yet, but we are stepping through that."

Despite the successes, many issues lie ahead for the Air Force's ISR force. Among them, the service is still under strain to fill the thousands of spots needed for airmen to operate and maintain its burgeoning RPA fleet and to process, exploit, and disseminate the information produced by their sensors.

For example, the 480th ISR Wing currently has about 4,100 total personnel, but will grow by nearly 2,200 billets in the next several years. "ISR is a future mission growth area for the Air Force, and we encourage the kids in high school to come join the Air Force and be imagery analysts or signals analysts," said Johnson.

Like Rain

There has been talk that the Air Force's ISR enterprise may morph into a major command at some point. Last September, the Air Force held an ISR summit and this idea was mulled, but the decision was made to maintain the current setup and see how developments unfold.

"This is a pretty new organization and it has been working very, very well. That is the key," said Deptula. However, "I do support the idea of having a majcom for ISR to serve the entire Air Force. I don't support putting ISR underneath a domain-focused majcom."

There is also a new DOD push to integrate ISR professionals in the acquisition community so that there is more intelligence input as major new weapon systems are developed. Along those lines, NASIC is "pushing really hard" to get weapons developers to think differently about the design of new systems, said George.

For example, the F-35 Lightning II strike fighter will be a sophisticated platform with state-of-the-art sensors. For the aircraft to be effective, its sensors "have to be smart on what the threats are," said NASIC spokesman James K. Lunsford.

Whereas in the past, the center's input came only in the early stages of an acquisition program, it now remains engaged and continues to inject updated threat data as the design of the new weapon system matures.

For Deptula, there is also the issue of how one approaches new aircraft designs. Designations such as "bomber" are outdated, he contends. "Every shooter we build needs to be an effective sensor system," he said. "And every sensor we build ought to have the capability to achieve some sort of kinetic effect." Accordingly, the new "bomber" that the Air Force acquires is more accurately deemed an ISR-strike platform.

His office has also been working on a new naming construct to potentially supplant "combat air patrol" as the term used to measure ISR sufficiency. "There is a big difference" between a normal CAP today and one with MQ-9s carrying the new Gorgon Stare wide-area airborne surveillance (WAAS) pods that are expected in the inventory soon. With Gorgon Stare, one Reaper will be able to provide 10 separate video feeds at once, vice just one today. Later versions will be capable of many more simultaneous feeds.

That, in turn, brings up the issue of what is the best way to quickly add more overhead ISR capability, said Deptula. "If you want to get capability out there soonest, the way to do it is by buying more WAAS pods," he said, noting that this option is also much more affordable, doesn't take up any more ramp space at the operating bases in theater, and doesn't require more RPA pilots.

There is also the need to start designing RPAs that are survivable in contested airspace. "When we get into environments that are populated by advanced air defense systems," RPAs "are going to be falling from the sky like rain," said Deptula.

There are also "huge questions yet to be resolved" facing all of the services regarding RPAs, with no single senior DOD organization having responsibility for dealing with them.

Deptula said they include arriving at an optimal joint concept of operations, airspace deconfliction, and air defense in the face of greater numbers of RPAs flying around, perhaps including enemy remotely piloted assets in large numbers at some point.

"The bottom line is, this is no time for 'old think,'" he said. "We have got to take some new approaches to the way we move into the future. It is not just an option. Given the increased demand and fewer resources we have available, it is an imperative." ■

Verbatim

By John T. Correll, Contributing Editor

It Never Happened

"Sept. 11 was a big lie and a pretext for the War on Terror and a prelude to invading Afghanistan."***—Iranian President Mahmoud Ahmadinejad,*** **Washington Post,** ***March 7.***

Not a War

"There is no cyberwar. I think that is a terrible metaphor and I think that is a terrible concept."***—Obama Administration cybersecurity czar Howard Schmidt, declaring that the focus should instead be on fighting online crime and espionage, Wired.com, March 4.***

The Outlook for Osama

"Let's deal with reality. The reality is that we will be reading Miranda rights to the corpse of Osama bin Laden. He will never appear in an American courtroom. The possibility of catching him alive is infinitesimal. He will be killed by us or he will be killed by his own people so he can't be captured by us."***—Attorney General Eric Holder, Associated Press, March 16.***

No New F-15s or F-16s

"We do not think it is wise to dissipate the limited pool of resources that we have available for [the] F-35 by procuring new, lesser capable aircraft that will last as long."***—Air Force Chief of Staff Gen. Norton A. Schwartz, Reuters, March 30.***

Army's Own Airpower

"The airpower provided by our sister services has dominated the third dimension, but the Army is unable to leverage that third dimension. [During the past year], we've had two combat outposts overrun by superior forces. Those are losses that we consider unacceptable, because we couldn't see what was going on around the outposts."***—Timothy Muchmore, director of Army Quadrennial Defense Review, on Army need for its own remotely piloted aircraft,*** **National Defense,** ***April.***

Crud Cruise Missiles

"One of my very real concerns is the ability of a nation state or a non-nation-state actor to gain access to a lower-tech missile that could be launched from somewhere off our shore. ... Our ability to detect what I'll call cruise missiles or crud cruise missiles is limited to the existing radar systems that we have today. ... This is an area [where] we have concern, and we're continuing to work within the department to expand."***—Gen. Victor E. Renuart Jr., commander, US Northern Command and NORAD, House Armed Services Committee, March 18.***

Watch Out Below

"My fear is that the whole island will become so overly populated that it will tip over and capsize."***—Rep. Henry C. Johnson (D-Ga.), House Armed Services Committee hearing on stationing troops on Guam, March 26.***

New Approach to History

"I wanted to increase the focus on joint, interagency, coalition warfare and expose the cadets to more of that. That's much different than the wars our history department was teaching. ... No one service does its missions without the capabilities brought by other services, but for our airmen to understand the challenges of our brethren on the ground, it is paramount."***—Lt. Gen. Michael C. Gould, superintendent of the Air Force Academy,*** **Fort Worth Star-Telegram,** ***March 29.***

Vanishing Air Superiority

"One of these days, over the Taiwan straits or Central Asia, we will learn that eternal air superiority is not guaranteed to the United States as some kind of codicil to Manifest Destiny. American air forces will inevitably suffer a whipping unlike any they've endured in decades, and American troops and sailors will have to learn how to operate in conditions where we lack air superiority, something unheard of since 1943."***—J. R. Dunn,*** **American Thinker,** ***March 4.***

Fighter Risk

"It appears to me that the recommendation to retire 250 fighters from the Air Force and the subsequent budget reductions were made before the Secretary of Defense announced he was terminating the F-22 production and before any of us learned of the years of delay now forecast in Joint Strike Fighter fielding. So while the Air Force assumptions back in 2008 led to a conclusion that short-term risk was manageable, the fact is today those assumptions are not reality. Despite that, it appears the Air Force is going ahead with the plan."***—Rep. Roscoe G. Bartlett (R-Md.), House Armed Services subcommittee hearing on Navy and Air Force combat aviation programs, March 24.***

Russia and Its Terrorists

"We have torn off the heads of the most odious bandits, but clearly this was not enough. [Expanded measures] need to be not just more effective, but harsher, crueler."***—Russian President Dmitry Medvedev,*** **Wall Street Journal,** ***April 2.***

Wars of Racism

"Back in World War II, we viewed the Japanese as 'yellow slant-eyed dogs' that believed in different gods. They were out to kill us because our way of living was different. We, in turn, wanted to annihilate them because they were different. Does that sound familiar, by any chance, to what's going on today?" ***—Actor Tom Hanks, co-producer of HBO series "The Pacific," declaring World War II in the Pacific to have been a war of racism and terror,*** **Time,** ***March 11.***

Division of Labor

"In the early 1980s, US officials were particularly worried that the system for command and control of nuclear weapons had become outdated and began taking actions to improve it. One day, President Ronald Reagan told one of his assistants, Thomas C. Reed, that he didn't want to fly away in a helicopter if there was a nuclear alert. 'I want to sit here in the office,' Reagan said. Referring to Vice President George H. W. Bush, Reagan added, 'Getting into the helicopter is George's job.'"***—David E. Hoffman,*** **Foreign Policy,** ***April 2.***

Importing Sand to Iraq

"Based on the specs that we have for blast walls, it takes a particular grain and quality of sand. That sand is not in Iraq, so you have to bring the sand in."***—Maj. Gen. Phillip E. McGhee, director of resource management for US Third Army,*** **New York Times,** ***March 31.***

Wildcats Meet the

The New Hampshire ANG boosts its power through a new association with active duty airmen.

Photography by Ted Carlson

Ugly Babies

An F-16 from the Vermont Air National Guard takes on fuel from a New Hampshire Guard KC-135 during a training mission in the skies over New England.

Total Force integration brings active duty, Air National Guard, and Reserve units together to maximize efficiency. Last October, the New Hampshire ANG began receiving personnel through an active-associate arrangement in which active duty airmen are assigned to a Guard or Reserve base. In this case, active duty airmen of the 64th Air Refueling Squadron (McConnell AFB, Kan.) are stationed with the 133rd Air Refueling Squadron at Pease International Tradeport ANGS, N.H. This linkup of the 133rd—known as the "Wildcats"—and the 64th, known as the "Ugly Babies"—has become a closely watched experiment. ***I1I*** *A Boeing KC-135R comes in for a landing at Pease.* ***I2I*** *One of the 157th Air Refueling Wing's KC-135s delivers fuel to a KC-10 from JB McGuire, N.J. The 157th is the parent unit of the 133rd ARS.*

1

2

3

4

I3I *MSgt. Erik White (l) and SSgt. Thomas Michaud, of the 157th Security Forces Squadron, stand watch at Pease.* ***I4I*** *The tail of Stratotanker No. 62-3515 at Pease. The KC-135s are old, but they have been well-maintained and frequently upgraded.*

*/**1**/ SSgt. Jason Inglis observes from the ground as other airmen prepare to work on the vertical stabilizer of one of the Wildcats' KC-135s. **/2/** View from the cockpit of a Vermont Air Guard F-16 as it approaches the boom in a mission over New Hampshire. **/3/** View of the flight line and parking ramp at Pease. **/4/** A KC-135 of the 157th ARW is readied for its next mission. The integration plan will increase use of the eight tankers shared by the157th ARW and the 64th ARS, by bolstering the traditional Air Guard staffing with full-time active duty airmen. **/5/** TSgt. Paul Burke directs a KC-135 at Pease. Guard bases are attractive homes for Total Force arrangements because highly experienced Air Guardsmen tend to make good mentors for younger active duty airmen.*

|1| TSgt. Christie Rouleau flies the boom toward an approaching KC-10 during a refueling mission. *|2|* Maj. Scott Sigfried of the Vermont Guard's 158th Fighter Wing brings his F-16 in for fuel over New England. *|3|* View of a KC-135's boom. *|4|* The KC-135R has been upgraded many times, such as with the modern engines visible here. A pair of the Vermont F-16s trail the Stratotanker. *|5|* TSgt. Mark Brophy, boom operator, works at the navigator's station aboard a KC-135R.

1

2

3


4


5

I1I *SSgt. Edward Chaison (l) and TSgt. John Sequin secure a KC-135 after a mission.* ***I2I*** *The business end of a Stratotanker.* ***I3I*** *MSgt. Michael Viera inspects a KC-135 engine in preparation for another refueling mission.* ***I4I*** *In the tower, A1C Andrew Parla (foreground), MSgt. David Pinard, and A1C Joseph Yahnia (with binoculars) manage the airspace.* ***I5I*** *The crew returns after a successful day spent delivering fuel. From left are Rouleau, MSgt. Mike Dunlap, Capt. Ryan Jones, Capt. Wiley Semrau, and Capt. Toby Pellenz. This blended crew consisted of enlisted Guardsmen and active duty pilots.*

|1| *A C-17 from Dover AFB, Del., refuels over New Hampshire.* *|2|* *In the hangar at Pease, SSgt. Owen Murray inspects the outboard spoiler assembly.* *|3|* *The KC-135 boom operator's view of a JB McGuire KC-10 crew in flight.* *|4|* *Once all the additional crewmen have arrived to fly and maintain Pease's KC-135s, such as this one, there will be approximately 130 active duty airmen participating in the base's Total Force initiative.* *|5|* *Jones (l) and Pellenz, active duty pilots, in the cockpit of a Guard tanker. The venerable KC-135s have received upgraded cockpit displays, auxiliary power units, navigation systems, and other enhancements to keep them viable.*

1

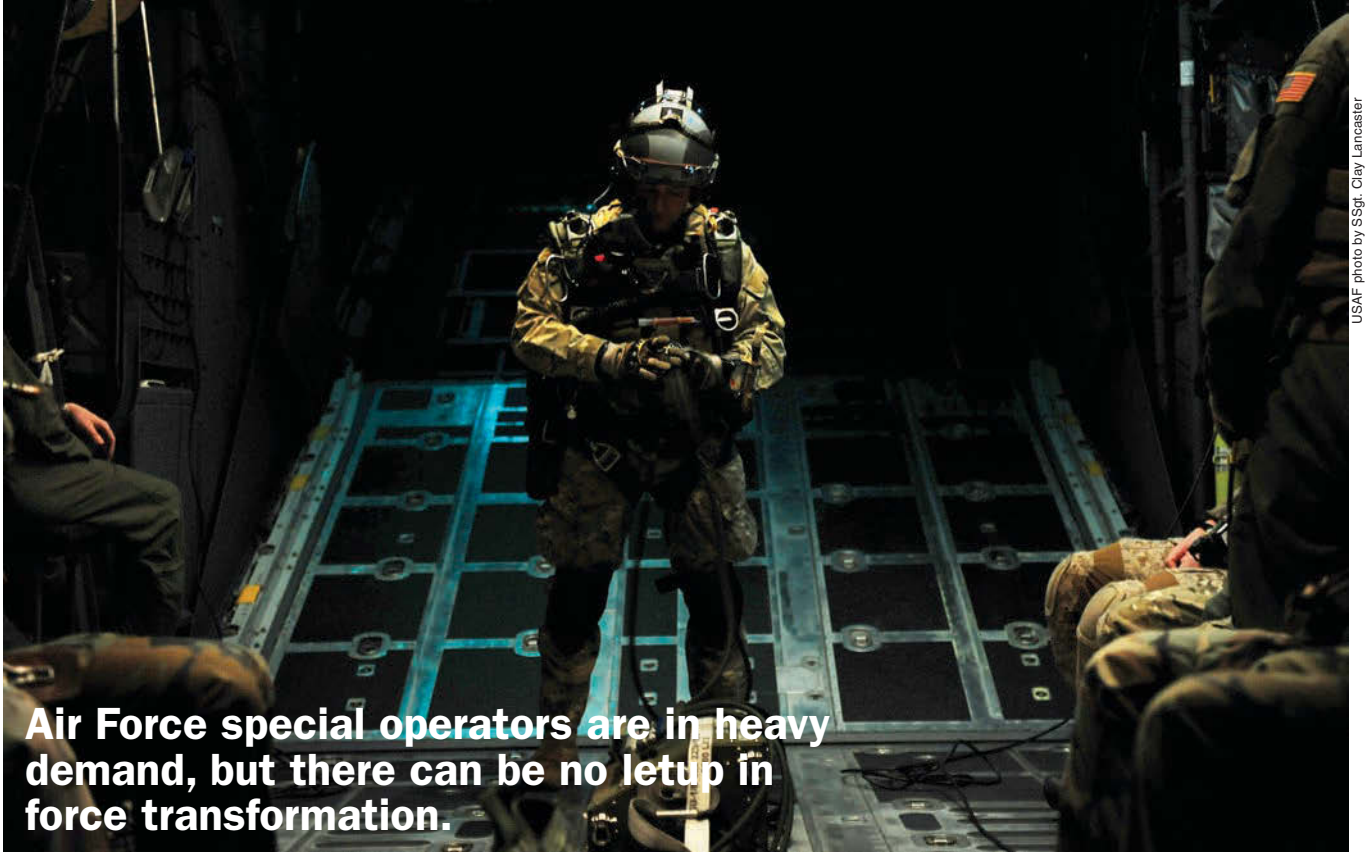

2

3


4


5

I1I *The increased manning of the Total Force integration arrangement ensures the Air Force will get the most out of its ancient KC-135s, which will not ride off into the sunset any time soon.* ***I2I*** *A KC-135R comes in for a landing.* ***I3I*** *Airspace controllers SrA. Ray Miller (rear), A1C Jacob Richards (center), and A1C Elizabeth Gray monitor the radars on base.* ***I4I*** *ANG tankers were not being flown as frequently, so adding active duty personnel at Pease and other active-associate locations allows the Air Force to increase its utilization rates. The Guard averages about 350 hours on each KC-135 airframe per year, while the active duty ute rate is closer to 800 hours. The tankers may date to the Kennedy Administration, but the hard work and professionalism of their crews will ensure their value for years to come.* ■



USAF photo by SSgt. Clay Lancaster

Air Force special operators are in heavy demand, but there can be no letup in force transformation.

The SOF Makeover

Airmen with USAF's special tactics training squadron prepare for a high-altitude, low-opening mission during a joint training exercise.

By Marc V. Schanz, Associate Editor

Not long ago, several AC-130U gunships were idling on the ramp at Hurlburt Field, Fla., the home of Air Force Special Operations Command headquarters. This was as a notable event; gunships are rarely seen there in groups anymore.

The Spookys haven't changed bases. Rather, these deadly, cannon-firing aircraft have become some of the busiest in the Air Force, deploying to many parts of the world. They are most prominent, however, in the wars of Iraq and Afghanistan, where they are in constant demand and perpetually in motion. They almost never come home.

The Spooky gunship fleet could be said to represent Air Force Special Operations Command. It is heavily tasked for today's conflicts. Yet it is also trying to manage an expanding mission set, growing inventory, and much needed weapon modernization.

USAF's special operations forces contribution is of enormous importance to the war effort. The Air Force is developing irregular warfare capabilities by investing in specialized airlift, newer close air support assets, counterinsurgency training, and more aircraft suited for continuous intelligence-surveillance-reconnaissance flights over the discontinuous battlespace.

The Pentagon's Fiscal 2011 budget proposal allocates $6.7 billion over the next five years for recapitalization and growth of Air Force special operations forces. A large chunk will go to recapitalize the command's air assets. Special operations forces have experienced major growth since the 9/11 attacks, but the air component has lagged.

"People think we've invested a lot of money in special operations, and so we have fixed it," Lt. Gen. Donald C. Wurster, AFSOC commander, once observed. "We have not invested a lot of money in the air. ... We are starting to."

Capt. Brian Chesko, a navigator who has accumulated about 1,400 flight hours, says the next 18 months will be important for all Spooky crews. Chesko says he has averaged two to three deployments a year, but notes that AC-130 gunners are deployed even more often than that.

Even as Chesko spoke, a contract airliner waiting nearby prepared to transport a new batch of Air Force SOF troops back to Southwest Asia. Some had completed critical training tasks days earlier.

Since September 2001, the size and scope of the SOF contingent has undergone a transformation. The wars have pulled in the command's men and aircraft, ranging from the AC-130 for close support to MC-130s for specialized tanker support and the CV-22 Ospreys for fast and flexible mobility. This leaves precious little time for home-station training or recovery.

"We have a wide diversity of operations right now," said Col. Ray Chapman, the command's deputy director of operations and vice commander of 23rd Air Force.

Though operating tempo remains high, he went on, AFSOC seeks a balance between meeting immediate combat demands and taking care of airmen longer term.

There is a lot of balancing going on now, between growth in both requirements and on forces in the field and the future demands anticipated, Chapman said. "We're getting these weapons systems and turning them as fast as [we] can."

Gunship crews may be fine deploying two to three times a year for five years, but there comes a point where that level of activity and time away from home begins to cause damage. The squadron looks for opportunities to put heavily used airmen in wing or operations group positions so they can spend some time at a lower tempo before coming back to their primary specialties at a later date.

"I would not say it's an easy ops tempo," even for the airmen that AFSOC manages to protect somewhat, said Lt. Col. Brenda Cartier, commander of the 4th Special Operations Squadron. "It's a sustainable ops tempo. Sustainable means we can continue to meet the requirements."

The squadron possesses 17 AC-130Us. On any given day, only about five are available for operations. Most of the U models are receiving new center wing boxes, and others are beginning their programmed depot maintenance cycle earlier than anticipated. Fleet management is a "day-to-day" task, said Cartier. This makes it even harder to balance training and operations.

"We've worked hard to replace old aircraft that have flown at up to three times their planned utilization rates," Chapman said. "In five years, we're going to look completely different."

Plans call for Air Force Special Operations Command to request $1.6 billion to begin replacing the fleet's Vietnam-era AC-130H Spectre gunships with modern J models. The new gunships will be bought between Fiscal 2011 and Fiscal 2015.

In all, the command will acquire 16 new J gunships—based on the MC-130J airframe and fitted with a strike package. This will increase the size of the fleet to 33 aircraft, a net growth of eight after accounting for the retirement of eight Spectres.

A Growth Field

Having outgrown its Florida Panhandle home, Air Force Special Operations Command is now shifting many CONUS assets to Cannon AFB, N.M., where the 27th Special Operations Wing stood up in October 2007.

The command will get all 50 of its Ospreys by 2015. For the time being, operators are doing their best to balance training demands back home with combat needs with a small fleet.

The Osprey offers SOF teams twice the speed of traditional rotorcraft, said Lt. Col. Matt Glover, operations officer for the 8th SOS at Hurlburt. This allows teams to move twice as far in a single period of darkness—or get somewhere in half the time—a huge combat benefit.

The 8th SOS saw its first CV-22 combat deployment to Iraq last year, where a great deal of information was gleaned about the tilt-rotor in combat conditions. While downwash from the powerful twin rotors remains a "significant issue" and some small fixes had to be made, the aircraft have proved overwhelmingly effective, Glover said.

On April 9, disaster struck the CV-22s. One of the Ospreys crashed in southern Afghanistan, killing four. An accident board is investigating the cause.

Photo by Sgt. Kieran Cuddihy

A CV-22 Osprey takes off during a joint training mission near Bamako, Mali.

The big challenge for the future will be training new aircrews. The pool of experienced helicopter crew members is drying up. The last MH-53 was retired in 2008 and the Air Force's HH-60 and UH-1 communities can't give up too many more bodies to help cover deficiencies, Glover said.

For its airlift, Air Force Special Operations Command seeks 37 MC-130Js to replace 10 Vietnam-era MC-130Es and 23 MC-130Ps. The new specialized tankers are enablers, said Col. Bill Lane, the command's deputy director of plans and programs.

Elsewhere in the SOF community, Army and Navy components have experienced 25 percent growth since 2006, reported Lane. This means the Air Force SOF establishment is attempting to catch up in critical areas: mobility, armed overwatch, ISR, and so forth. There are gaps, both short and long term, that Air Force Special Operations Command is attempting to fill.

US Special Operations Command has repeatedly pressed for light mobility and strike capability to support its small teams of operators at war around the world. A smaller gunship variant, known as the Stinger II, based on the C-27J, was proposed but later canceled. As recently as last year, AFSOC had no recapitalization plans for gunships.

However, the command hopes to fill a portion of the gunship gap by the end of this year. It will do so by modifying existing aircraft. MC-130W Combat Spear aircraft are being equipped and tested with the precision strike package, an upgrade to the modified C-130, which will give the aircraft armed overwatch tools to assist SOF teams in combat.

In March, Adm. Eric T. Olson, commander of the multiservice US Special Operations Command, said the Air Force is fielding four aircraft fitted with the package. Dubbed "Dragon Spears," the former tankers of the 73rd SOS at Cannon, will receive sensor upgrades, a standoff precision guided munitions system, a 30 mm gun, and new sensor and communications gear.

The retrofitted tankers are a temporary fix for AFSOC's stressed gunship fleet in the near term, and are making up for the cancellation of the "light gunship" concept.

Chapman said the MC-130 can perform cargo and security assistance missions in addition to pop-up strikes. The aircraft "makes its money" by providing persistence over the battlespace, he added.

USAF photo by A1C Jams Bell

An AC-130H Spectre gunship taxis onto the flight line at Hurlburt Field, Fla.

Battlefield awareness capabilities have received close scrutiny recently. The command now boasts its own MQ-9 Reaper squadron in the 33rd SOS (activated May 29, 2009 at Cannon) plus the 3rd SOS Predator squadron and Reserve associate unit, the 2nd SOS. Chapman noted AFSOC is also aggressively expanding its use and proficiency with small unmanned aerial vehicles, such as the Raven, often utilized by security forces and special tactics airmen.

AFSOC is planning to add a small-UAV schoolhouse to the Air Force Special Operations Training Center at Hurlburt later this year, preparing air commandos to use the small UAVs for route reconnaissance, relief operations, and in tactical engagements with other SOF troops.

Beyond the gunships and heavy lift, one of Air Force Special Operations Command's largest growth areas is in "nonstandard aviation"—or NSAV in Hurlburt parlance.

Hurlburt's 319th SOS, which flies the U-28A, a variant of the single-engine Pilatus PC-12, is a pioneer in the field. Air Force Special Operations Command is tight-lipped, as are the U-28A's small crews, about the aircraft. Its ability to operate on short and unimproved surfaces, and suite of advanced radar, communications, and navigation tools make the U-28 ideal for small, secretive missions.

In 2008, a second nonstandard aviation unit stood up—the 318th SOS at Cannon. It is home to the PC-12 and will soon add additional light and medium twin-engine aircraft. By Feb. 10, the squadron had one of 10 planned M-28 Skytrucks—a Polish light twin-engine transport based on the Antonov An-28 design.

In total, the NSAV program will deliver 20 Pilatus aircraft, 10 M-28s, and 17 medium aircraft by 2012. Chapman noted the requirement came from the field—small operations detachments were often using contract airplanes to get to and from isolated and remote locations.

A Grass Hut in the Sahara

"These are very sensitive missions which require a low profile and not [the] large footprint that a C-130 or C-17 would necessitate," he said. The NSAV field has grown quickly through streamlined acquisition processes and the relative simplicity of the aircraft. The aircraft are needed not only in Southwest Asia, but across Africa, the Pacific, South America, and other combatant commands.

The "small footprint" approach is critical to another expanding piece of AFSOC's program—aviation foreign internal defense, performed exclusively by the 6th SOS.

The 6th SOS' combat aviation advisors work with allied militaries across the world to develop their aviation assets into effective partners. Advisors are proficient in a range of languages and aircraft, from UH-1 Hueys to Mi-17 helicopters common in former Soviet-bloc nations, to the BT-67, a retrofitted version of the venerable DC-3 twin-engine prop transport still used by many small militaries across the world.

Lt. Col. Joseph Michalek, commander of the 6th SOS, said, "For us, the weapon system is the advisor." The advisors come from all across the force and include security forces, mechanics, and intelligence personnel but are trained to be interchangeable.

Between a four-phase training program encompassing advanced SOF skills, flying, protocol, exercises, and other tasks, it can take two years to develop a fully qualified CAA. Advisors work under some of the most autonomous conditions possible and must be almost completely self-sufficient—separate from what Michalek called the "Fortress America" operations of general-purpose forces in Iraq or Afghanistan.

If the mission calls for "living in a grass hut in the Sahara and sleeping on a mat, ... that's what we do to make the mission effective," Michalek said. The hard part is taking functional experts and turning them into adaptable, flexible advisors.

MSgt. Ace Jones, a veteran of multiple advisory deployments with the Philippine armed forces, said much of his team's work is building durable relationships and helping allies integrate their own militaries.

Advising is not just about irregular warfare and finding bad guys, Jones noted. CAA work protects allied governments by allowing them to project power, authority, and aid. "If they can't project [to meet] their country's civil needs, ... that shows a lack of governance," he said.

A great deal of the 6th SOS' work involves developing mobility assets in areas of Asia and Africa with vast spaces and little infrastructure. When disaster strikes, air assets can swing into action.

The 6th SOS is authorized to roughly triple in size, but this takes time. "We are still growing to meet our authorizations," Michalek said. Airmen who began training in 2007 didn't make it to the operational level until 2009 because "they have to meet our standards."

In the years ahead, Michalek hopes to bring back experienced airmen who were in the unit earlier in their career. They could provide institutional knowledge and help train a new generation of advisors.

"We like to say we are a tactical unit on a strategic stage. Everything we do has a strategic implication, and if we do something bad, we may never be invited back to that country again," he added. Getting the right people with the right temperament is critical to the unit's continued success.

At the same time, the command is modernizing its training and education regimes to better support operators.

To accomplish this, the command consolidated training and education under the Air Force Special Operations Training Center at Hurlburt. The center was activated in October 2008 at the direction of AFSOC commander Wurster, to take training out of operational squadrons to

give it a permanent home under a single organization.

"The problem" said Col. Mark B. Alsid, AFSOTC's commander, was that oddly enough, "the old institution didn't institutionalize training."

Buckling under the post-9/11 operations tempo, the old training arrangement was unsustainable, AFSOTC officials say.

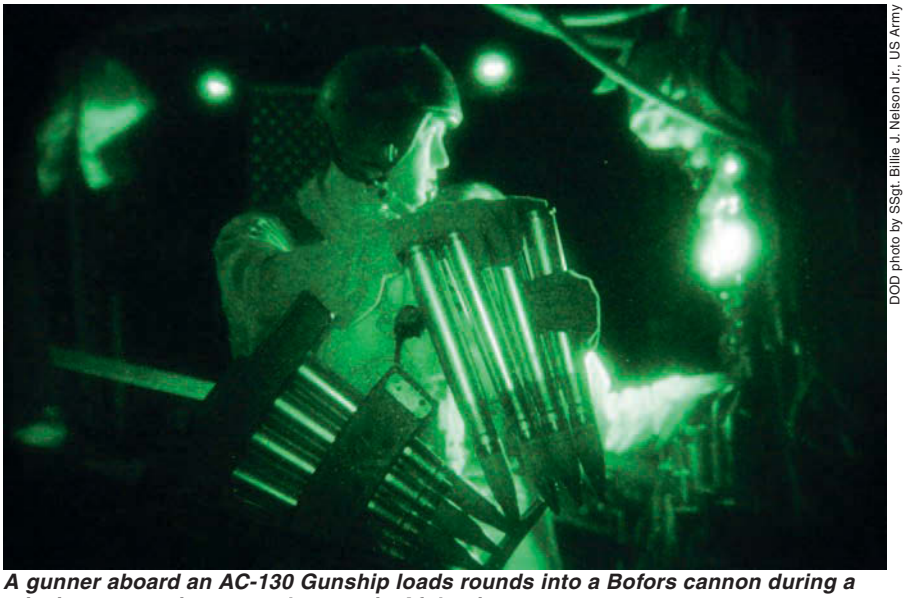
For example, the 19th SOS—Hurlburt's flight training squadron—was formerly under the auspices of the 1st Special Operations Wing. Rather than focus on deploying its operators downrange, the squadron frequently juggled training obligations with combat requirements of the 1st SOW. This meant having to spend valuable resources and manpower training up and qualifying personnel—rather than focusing on deploying its operators into combat, Alsid noted.

Still under way, the massive reorganization is drawing all of Air Force Special Operations Command's training, recruitment, assessment, and indoctrination activities under a single roof—from combat aviation advisors to battlefield airmen pilots and support and administrative personnel.

Col. William D. Andersen, commander of the center's Air Force Special Operations School is responsible for conducting introductory training for air commandos and combat aviation advisors. US Special Operations Command receives less than two percent of the Pentagon's budget, he points out, but almost all of its assets are low density, high demand. With the growth in operational requirements, AFSOC's support and training infrastructure needed to be changed to reflect reality and help sustain combat forces better, he said.

Lt. Col. Steven Spanovich, a veteran combat controller and commander of the center's Special Tactics Training Squadron, heads up advanced training for in-demand battlefield airmen. Security forces, pararescuemen, combat controllers, combat weathermen, and others must go through Spanovich's squadron after their initial training for the advanced skills needed in operational units.

Arriving at the STTS as "three levels," they leave as "five levels" after a battery of specialized skills training, courses, and conditioning, depending on what color beret they wear. "When we get them, they've graduated high school," Spanovich explains. "Here, they're in college."



DOD photo by SSgt. Billie J. Nelson Jr., US Army

A gunner aboard an AC-130 Gunship loads rounds into a Bofors cannon during a mission supporting ground troops in Afghanistan.

Training activity takes up a large—and growing—chunk of resources for the expanding command.

Just prior to 9/11, the flight training squadron graduated a little under a thousand students a year, said Lt. Col. Dag Anderson, commander of the 19th SOS. In 2009, the number was just under 4,000 as the squadron has taken on the addition of more ambitious and effective flight simulators as well as keeping up with demands for newer light aircraft crews and combat aviation advisors.

The Indirect Approach

In 2009, the squadron established a new training pipeline for AFSOC's PC-12 and U-28 light aircraft while divesting the AC-130H training mission, which was passed to Cannon's 551st SOS. Anderson noted that around 70 percent of the 19th SOS trainees are out of undergraduate pilot or navigator training, or another initial training pipeline.

Instructor pilots are at a premium. Young AC-130 gunner students, for example, must be able to place 40 mm shells "danger close" in engagements within weeks of graduating from Anderson's course. "We're not trying to haze people," he quipped about the course's difficulty. "We just haven't relaxed our standards."

Cartier said her 330 or so airmen are younger than in previous years but maintain the high standard expected. "We're getting brand-new folks out of tech school," she said. "But their talent is second to none. They are the reason we are successful."

Several command officials pointed out the nature of SOF is one of limited duration and low profile but high impact. This is markedly different from the long duration theater campaigns in Iraq and Afghanistan.

Air Force Special Operations Command's core skill sets are geared toward time-sensitive operations ranging from earthquake relief in Haiti (where combat controllers helped jumpstart airfield operations earlier this year) to any number of critical anti-terror operations. "Sustained operations are someone else's bag," Chapman noted. "We get in, we set things off, and we get out."

The limited public evidence supports Chapman's observation. Over the past several years, military statements and open sources have documented limited SOF strikes in places such as Pakistan's frontier regions, Yemen, and East Africa. Targeted operations, military assistance, and advisory work with allies are expected to continue to grow in importance.

"The indirect approach is going to be huge in the years ahead," Chapman said. "We make our money by operating as a coalition, in partnerships. ... If we build up these relationships, you become a better coalition" and a better force.

The 4th SOS' Cartier said it is a priority to make sure her gunship crews are keeping skills up to perform both conventional warfare and other types of missions.

"We don't know where we'll be in six or seven years," she said, so what might be needed next is never far from her mind. "We have to train to fight in Afghanistan, but we have to look to train for the other fight, the undefined fight. ... We have to always keep it in mind." ■

Penny Packets, Then and Now

By Rebecca Grant

USAF photo by SSgt. Aaron Allmon

Breaking up airpower into smaller, ground-controlled units was a bad idea in World War II. It hasn't gotten better with age.

A-10 Thunderbolts fly in a two-ship formation over Afghanistan.

In World War II, Field Marshal Bernard L. Montgomery and other British commanders derisively used the term "penny packets"—that is, "small units"—to describe the improper dividing up and parceling out of airpower to ground forces. They turned the phrase into common currency among American airmen, too.

The concept was explained best by Air Marshal Arthur Coningham. "The strength of airpower," he contended, "lies in its flexibility and capacity for rapid concentration; it follows that control must be centralized in an air commander and command exercised through Air Force channels; and air forces must be concentrated in use and not dispersed in penny packets."

Penny packets, warned Montgomery, are the poorest use of airpower. "Worse than useless," said Air Chief Marshal Arthur W. Tedder. Generations of airmen have heeded lessons from World War II, which established basic doctrine for unified control of airpower in a theater of war.

No one disputes that the needs of land forces, especially those under attack, should often be the top priority mission. The trouble comes when individual ground units want their own penny packets of airpower. Over the years, there are recurring calls to allow ground units of brigade size, or even smaller, to "own" Air Force aircraft, assign targets, and tend to their airspace deconfliction.

Today, airpower's penny packet problem has re-emerged, with new twists. The issue is not just about who has operational control of fighters and bombers. The penny packets of the 21st century center just as much on intelligence-surveillance-reconnaissance (ISR) aircraft. For example, the Army plans for its Sky Warrior unmanned aerial vehicle, a derivative of USAF's Predator, to be a medium-altitude aircraft wholly owned by individual Army units.

Early ISR

War experience says this is a bad idea. New Army policy and doctrine says otherwise.

The debate is international as well. In February 2010, Air Chief Marshal Stephen Dalton, who heads the RAF, warned that the airpower advantage "must not be squandered by nonexperts who do not really understand the third dimension, or relative time and space advantage that mastery of the air can deliver."

During World War I, centralized control of the air was a given. US Army Gen. John J. Pershing's American Expeditionary Force in France kept aircraft under high-level control at the field-army level, which aggregated several corps.

"Air units were parceled out to divisional and subordinate headquarters only for specific operations," noted historian John Schlight. The Army's ground-oriented leaders and staff would later push to abandon this system of centralized control and decentralized execution, while the Air Service, Air Corps, Army Air Forces, and independent Air Force would fight to maintain the concept.

In those very early days, ISR would be done by observation aircraft assigned to perform corps-level tasks, such as artillery spotting.

When US Col. William Mitchell commanded the Allied air component at St. Mihiel in 1918, he rounded up American aircraft using First Army's authority and borrowed French units to compose his pursuit and striking force. The observation aircraft were dedicated to corps tasks for the big offensive, and went back to central ownership after it was completed.

The 1930s saw a break between the Army's "air service" units—providing observation and general support—and its

"air forces," the pursuit and bomber arms. Debates flared on how best to command and control aircraft performing a ground attack role on the front with friendly troops engaged. Limitations on radio communications and a lack of procedures and training all created obstacles.

In World War II, the first to encounter the air control problem was the collection of British commanders fighting in the North Africa campaign. (Hence the term penny packets—an Anglicized reference to small packages of candy or cigarettes.) They worked through the worst of their problems while battling Lt. Gen. Erwin J. Rommel's Afrika Korps in the desert in 1941.

RAF commanders such as Coningham, who led the Western Desert Air Force, used fighters to keep the Luftwaffe at bay while attacking Rommel's tanks and columns roaming North Africa. Also, Coningham used airpower to provide close air support to British troops in contact with enemy forces.

Centralization of airpower forces was critical in North Africa. In 1941, Prime Minister Winston S. Churchill left no doubt of his own view. "The idea of keeping standing patrols of aircraft over our moving columns should be abandoned," he said, because it was militarily "unsound to distribute aircraft in this way." Churchill cautioned against diverting RAF fighters needed to hold air superiority against the Luftwaffe. Soon enough, the British Army and the RAF took battlefield integration to an exceptionally high level. American forces had not yet learned these lessons, and serious problems erupted shortly after the US Army landings in North Africa in late 1942.

A Crucial Difference

At that time, observation and transport aircraft were organic to Army ground units. Airmen installed at forward Army headquarters arranged close air support operations. Just as their British counterparts had done early in the campaign, the US Army's inexperienced ground commanders wanted visible air patrols over ground forces. With the Luftwaffe contesting the air, the piecemeal parceling out of airpower meant aircraft could not always concentrate for maximum effect.

It was a mess: The failure to concentrate airpower and attack deep targets often led to disaster. The RAF's Tedder later called the Americans' air arrangements "almost crazy, with two air forces but no effective command."

According to then-AAF Brig. Gen. Elwood R. Quesada, who was serving in the US coastal command, it was Coningham who helped the Americans overcome their outdated concepts. Coningham identified the crucial difference in outlook between a tactical formation dealing with targets in its immediate battlespace and that of a higher echelon which is aware of the location of more important and more dangerous targets.

"It often happens," said Coningham, "that an Army formation at the front sees a good target which, though reported, is not attacked." For example, a ground formation at the front reports a concentration of 200 motor transports and accompanying arms, but its request for an air attack is turned down. Why?

The reason, Coningham went on, might be that, only 20 miles away, there is a huge concentration of 2,000 vehicles, indicating an armor force of division size or even larger. This concentration, planners know from experience, will probably affect the battlespace in perhaps as little as 10 hours.

It is this concentration that will receive the weight of an air attack—not the comparatively small target on the front. The ground unit at the front, however, often is unaware of the larger formation, and cannot see the big picture. All it knows is that it requested an air strike and was turned down.

The Casablanca Conference of January 1943 put an end to debate over penny packets by acknowledging that the missions of air superiority and deep interdiction of enemy forces and supplies were top priorities. Subsequent campaigns in Sicily and Normandy brought application

Top right: German tanks wind their way through North Africa during World War II. Above: British Field Marshal Bernard Montgomery surveys his ground troops.

of airpower to a high art and provided air superiority, deep interdiction of moving German columns, and increasingly responsive close air support.

Superficially, World War II's penny packet disputes were about whether the land component leaders acknowledged the value and effect of centralizing air resources. The underlying problem was the contrast between the narrow (but urgent) tactical view of a small ground unit and the wider leadership view of the battlespace. Only senior commanders had the "big map" perspective of multiple ground units and areas beyond the front.

Beyond this, only airmen had a thorough knowledge of what aircraft were available for theater tasks and land component support at any one time.

World War II commanders finally agreed air superiority was top priority and wrote operational orders and doctrine giving senior airmen the resources and authority to manage air assets. Those in lower ranks would inevitably complain when the airplanes didn't hit "their" target. The press of combat meant that, most likely, no one would tell them why.

By early 1943, the British Army had drawn the requisite conclusions and had ended debate on the issue. "The Air Force ... must be centralized and kept under Air Force command," declared Montgomery. "I hold that it is quite wrong for the soldier to want to exercise command over the air striking forces. The handling of an Air Force is a life study, and therefore the air part must be kept under Air Force command."

Such remarks reflected an understanding by the senior commanders that airmen needed centralized control to carry out their tasks, and this was also the best way to respond to ground force needs taken as a whole. Nothing could have been clearer.

However, the wisdom gained in the bloody war did not stick for long. Integration atrophied as the highly skilled joint commands broke up. The World War II doctrine forged in North Africa did not permanently eliminate the divided perspective.

ISR Demand

When new conflicts came, the clash of tactical and theater perspectives reemerged, and the tactical view was too strong for many commanders to resist. The penny packet problem came back again as Korea and Vietnam forced rework of air control arrangements—with new technologies such as armed helicopters churning up new air control issues.

Probably the most important development in eliminating penny packet problems was the eventual creation of the joint force air component commander (or, in multinational operations, the combined force air component commander). The presence of a JFACC or CFACC as co-equal to the land and maritime commanders allowed airmen to nip in the bud any notion of dedicating aircraft to ground force units.

From 1991 through 2003, land campaigns were short, sharp, and successful. CFACCs provided lavish aircraft for on-call close air support and used their quickly won dominance of the air to strike deep targets at will. It seemed once again that penny packet problems were a thing of the past.

Then along came the lengthy and draining stability and counterinsurgency operations in Iraq and Afghanistan. As more ground forces deployed, the question of penny packets came roaring back. The big difference between the current battlespace and World War II North Africa emerges from air superiority, which was quickly achieved in Afghanistan and Iraq. Coalition forces have become accustomed to air superiority, allowing new penny packet debates to rise up around two main issues—providing close support and ISR to coalition ground forces.

Until recently, American ground units turned for indirect fire support mainly to their own artillery. The two recent wars in the Greater Middle East have seen this function performed mostly by aircraft. This is in part the result of advances in the technology of precision attack. By 2001, the air component boasted effective advanced technologies such as the satellite guided joint direct attack munition (JDAM), which allows aircraft to efficiently strike ground targets with great accuracy.

Changing concepts of operation also altered the debate. Dispersed ground operations on Iraq's roads or in Afghanistan's mountains obliterated the concept of front lines. In these kinds of discontinuous battlespaces, ISR, fire support, and combat support logistics increasingly have come to depend on the air component.

The first change was the demand for more ISR, which inevitably raised calls for penny packet control of individual air assets. Later came calls for more-direct tactical control of aircraft allocated for strike. However, the nascent penny packet problem for strike aircraft was cured by a deliberate effort to improve air and ground cooperation.

As in North Africa decades earlier, the solution took time and the commitment of both air and ground leaders. Army commanders such as Maj. Gen. Curtis M. Scaparrotti, commander of NATO's Regional Command East in Afghanistan, have praised the quick response of airpower in Afghanistan and the strong working relationship.

Scaparrotti said he and USAF Brig. Gen. Steven L. Kwast, commander of the expeditionary wing at Bagram Airfield, begin every day with a "combined update with our close staff on what we're going to do that day." He added, "The way we operate could only be done with airpower."

Once, a visiting Vietnam veteran warned Scaparrotti that he was taking great risk with his dispersed forces. In Vietnam, he said, platoons were within a short march of each other and always under cover of their own artillery. Scaparrotti replied he was comfortable with his maneuver plan because he had airpower "no more than 11 minutes from

US Army photo by Spc. Gregory J. Argentieri

Army soldiers tend to a Shadow unmanned aerial vehicle at Forward Operating Base Fenty, Jalalabad Air Field, Afghanistan.

USAF photo by SrA. Nancy Hooks

An MC-12 Liberty Project Aircraft assigned to the 361st Expeditionary Reconnaissance Squadron taxis at Kandahar Airfield, Afghanistan.

a dead stop over top of those troopers who are out there in harm's way."

The question of whether ISR assets should be assigned directly to ground forces proved a tougher issue for airmen. The Army has moved ahead with plans for its own ISR air fleet based on recent combat lessons and new concepts. Early RQ-1 Predator video changed overnight the conditions of maneuver by allowing the command post to see the battle in real time—although early Predator sensors and operating altitudes limited the view to a so-called "soda straw" perspective.

The images were compelling and useful, however, and soon came to feel like a prerequisite for maneuvering into an area of potential danger. Much of the mission revolved around the hunt for terrorist leaders and attacks on sensitive targets. Detailed visuals and monitoring of enemy communications are essential to actionable intelligence on high value targets.

The result was a tug against the doctrine of unified control. As the demand for airpower intensified, the impulse of land forces was to call for direct control of aircraft by lower and lower tactical echelons. Benign airspace conditions created just what Churchill had vigorously denounced—a demand for ISR aircraft to act as airborne standing patrols.

Partly because of this incessant drumbeat for more ISR support, Predator combat air patrols rose from a handful in 2001 to 34 in early 2009, and are on their way to a planned 65 orbits by 2013.

Debate stuck on control of the platform. All signs indicate that, as a result of Iraq and Afghanistan, Army leaders will take home an intense new passion for organic air assets. This is especially true for ISR aircraft.

Army doctrine and operational concepts are laying a deep foundation for this. In the late 1990s, the Army began a major shift to more reliance on close air support and less emphasis on supporting artillery. This process was bound to lead to new questions about air control and support priorities. Iraq and Afghanistan operations only accelerated the debate.

Slicing and Dicing Action

Future Army doctrine, articulated in the Army Capstone Concept of December 2009, calls for an Army based on operational adaptability. It says that the Army's outlook assumes a requirement for organic Army information generation.

The Army now states that fighting for information will be the first task in the battlespace of the future. However, much of this opening battle will depend on air assets. "Fighting for information will require combined arms capabilities, access to joint capabilities, specialized training, and the employment of appropriate combinations of manned and unmanned air and ground systems," the document reads. A steady stream of ISR is crucial for the Army to ensure operational adaptability in a decentralized battle space, it claims.

Proficient, dispersed small units are key to its future fighting style, the Army insists. Vertical lift and maneuver remain part of the picture. "At increasingly lower echelons, Army leaders must be able to integrate the actions, activities, and capabilities of joint assets into operational campaigns," the service notes in its Capstone concept. In short, Army doctrine is opening the door for new penny packet problems.

Beyond this, the Army's aviation roadmap calls for a big shift to fleets of unmanned air vehicles for tasks like cargo resupply, too. "We're integrating [UAVs] into all our formations downrange," confirmed Army Vice Chief of Staff Gen. Peter W. Chiarelli in an April speech at an Army aviation symposium.

The Army doctrinal outlook sees no problem with a penny packet approach to organic ISR. In this respect, the thinking behind Sky Warrior, the Army's Predator variant, speaks volumes. Sky Warrior production will ramp up to 24 aircraft per year. The Army will attach each of these to its units, where they will work with other Army aircraft and helicopters to allow Army operators to see and strike in the airspace.

Col. Gregory Gonzalez, the Army's project manager for unmanned air systems, told a UAV conference earlier this year, "The bottom line is the Army is not rethinking its [decision] to assign these aircraft to specific units. We're going to have a direct-support relationship. We're not considering pooling all of our resources and running them from some location back in the United States."

This may seem all well and good, but one showstopper looms over the debate—the issue of airspace control.

The Air Force has mastered the process of airspace allocation. A lesson from Afghanistan was to avoid complicating the battlespace with superfluous restricted operating zones. An ROZ is designed to protect airspace over a special operations forces patrol or engaged Army unit, but an ROZ in the wrong place can block the air component from sending fighters or UAVs to help out. It can also confuse routing across a battlespace—a modern example of inefficiency of penny packet allocations.

Twenty-first century warfare will be more dependent than ever on airpower. As such, airmen are holding fast to the strong arguments against a modern-day return to the slicing and dicing actions of yore.

This is evident to airmen everywhere. Command and control must be retained at the highest possible level to ensure optimum tasking, warned Air Chief Marshal Allan G. Houston, Australia's Chief of the Defense Force. He added, "It is imperative that we do not penny packet these assets." ■

Rebecca Grant is president of IRIS Independent Research. She has written extensively on airpower and serves as director, Mitchell Institute, for AFA. Her most recent article for Air Force *Magazine was "Battling the Phantom Menace," which appeared in the April issue.*

The Question of What to Target

In the quandaries of World War II, one finds the origins of Operations Research.

By Phillip S. Meilinger

Pre-World War II air doctrine, both in the US and Britain, called for employing a strategic major bombing campaign against an enemy's industrial centers. It was a "faith-based" theory, unsupported by hard evidence. Because strategic bombing had been seldom conducted before 1939, things did not work out as planned. For airmen, their weapon's newness meant surprises were frequent.

How did air commanders cope?

First, they realized that some of the most basic questions regarding tactics, procedures, and cause and effect still begged answers.

How do you, for example, disrupt a rail transportation system, or what size and type of bombs are most suitable for putting an oil refinery out of commission? What is the ideal bomber formation to maximize accuracy while also minimizing exposure to enemy defenses?

These types of questions had never really been asked before, for the simple reason that the air weapon did not exist to strike such targets. To address these unique questions required a new discipline, Operations Research. Essentially, OR was the use of scientific and mathematical methods to study military operations with the intent of making them more efficient and effective.

The concept of OR was first tested in World War I when British scientists were called in by the Admiralty to help devise a solution to the German submarine menace. After the war, however, this discipline was largely forgotten. The scientists returned to their private and academic pursuits, and military officers were busy with other matters.

World War II quickly identified the need for such methods once again.

The Royal Air Force began attaching scientists and other specialists to its principal operational commands in 1940,

and by the autumn of 1941, they had been organized into OR sections, each responsible to the unit's commander. The leading members of these sections were scientists and engineers, while the rest of the staff consisted of personnel trained to "think numerically."

The problems studied by the OR sections were largely tactical or technical—such as the most effective use of aerial photography, camouflage, aerial mines, searchlights, radio, radar, etc.

Perhaps more importantly, they also began studying the effectiveness of strategic bombing. Specifically, Operations Research attempted to answer the question of what happened to RAF bombers over Germany, and then to suggest methods to improve accuracy and effectiveness while also lowering the risk to aircrews.

In 1941, RAF's Bomber Command had a difficult time even locating cities at night; bombing difficulties led to radar and radio aids such as Gee, Oboe, and H2S. Operations Research would test, evaluate, and refine these navigation and targeting technologies.

These aids became increasingly effective: In early 1942, less than 25 percent of bombs landed within three miles of the target. By the end of the war, that number had climbed to 95 percent—with 50 percent hitting within a mile or so of the aimpoint.

Bomber Command's night bombers did not fly in a large formation to the target as did US bombers. Rather, they proceeded individually to the target area in a long trail, usually stretching over a hundred miles. Operations Research showed that, contrary to the belief of the aircrews, concentration of the bomber stream over the target should be increased.

The scientists calculated that the odds of a midair collision were extremely small, not more than one per hour, and the odds of being struck by the bombs of an aircraft above were negligible. Presumably, this estimate allayed the fears of the aircrews, and so the concentration of aircraft in the bomber stream was gradually increased from under 10 aircraft per minute to 30 per minute over the target area.

Determine the Accuracy

Similarly, OR determined that evasive action over the target itself was "meaningless." Although rapid heading and altitude changes may have made aircrews feel better, they did nothing to lower their chances of being hit. Worse, maneuvers increased the odds of a collision while decreasing accuracy.

If the resultant accuracy was so poor as to require a restrike, then the risk to aircrews actually increased through "evasive action." In short, crews were told to stiffen their upper lips, fly straight and level, and put their bombs on target as the best ways to ensure their continued survival.

Operations analysts on the American side borrowed heavily from their British counterparts. In September 1942, Maj. Gen. Ira C. Eaker, who became commander of Eighth Air Force, set up an OR section for studying bombing accuracy and loss rates.

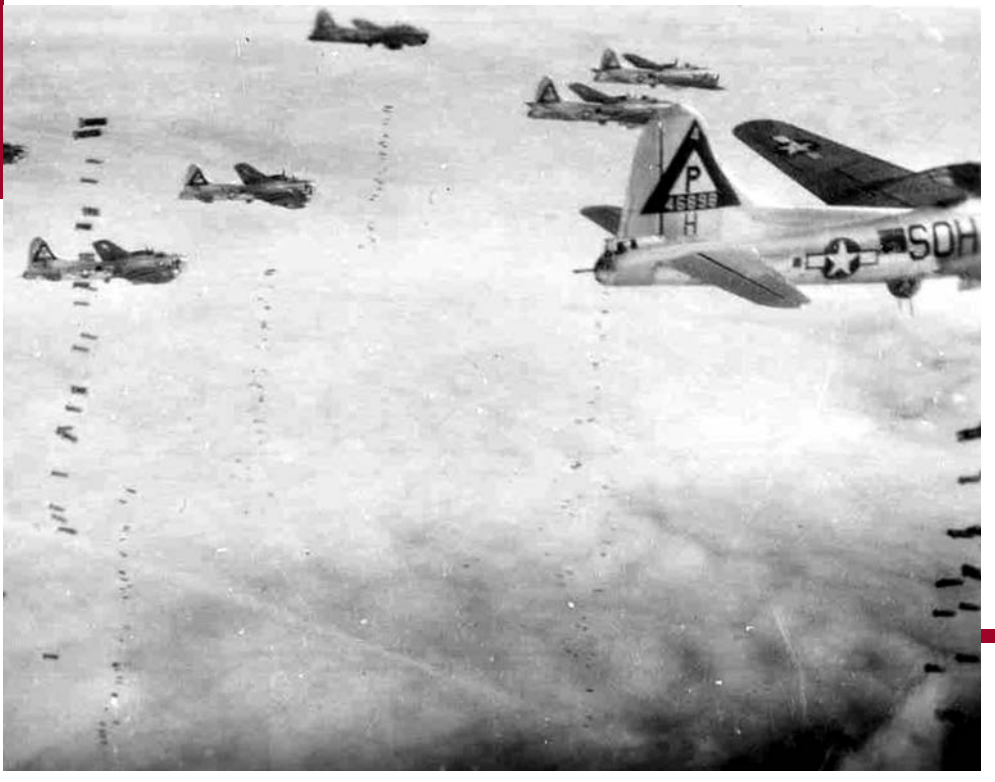
About the same time, Gen. Henry H. "Hap" Arnold, commander of the Army Air Forces, established in Washington the Committee of Operations Analysts (COA) composed of mathematicians, lawyers, physicists, engineers, and even one architect.

The types of problems examined by the committee and its detachment at Eighth Air Force were similar to those studied by the OR sections at Bomber Command. Their first task was to determine the accuracy of the American bombers and then suggest ways to improve it.

Using cameras that automatically took photos during bomb runs, they found that, not surprisingly, the better the weather, the better the accuracy. Electronic bombing aids were therefore essential because the weather over Germany was usually miserable. Regardless of the radio or radar aids employed, bombing through weather never matched visual bombing for accuracy. By October 1944, 41.5 percent of Eighth Air Force's visually aimed bombs fell within 1,000 feet of the aimpoint. Using only radio or radar aids, accuracy plummeted to a miserable five percent.

As in Bomber Command, the operations analysts tackled many specific problems, including range extension, tactical formations, bomb weights and fuses, the utility of incendiary bombs, and the optimal strike mission size.

A typical problem involved determining the relative threat from enemy fighter airplanes versus anti-aircraft artillery. After extensive interviews with crew members, especially those who had been shot down and lived to tell of it, operations analysts discovered that stragglers had it the worst. When a bomber fell out of formation, it was almost immediately pounced on by a half-dozen enemy fighters. A bomber usually fell out of formation, however, because it had been hit by AAA. Specifically, hits to an engine



Opposite: A B-17 with the 359th Bomb Squadron seen from above. Left: B-17s with the 547th Bomb Squadron drop their weapons on a mission during World War II.

Gen. Ira Eaker (shown here as a brigadier general) called for the creation of the Enemy Objectives Unit, which was tasked with providing detailed analysis of designated targets.

started fires that caused an aircraft to lose power, drop out of formation, and become a straggler.

The solution: Put armor around the vulnerable engines to reduce AAA damage, which would in turn reduce the number of stragglers and losses to enemy fighters.

Another problem considered by the analysts involved accuracy. After studying countless poststrike photographs, analysts determined, contrary to procedures and popular belief, that bombing accuracy would be greatly enhanced if an entire group released its bombs when the leader did—rather than if every bombardier chose his own drop point.

Such technical problems had not been entirely ignored before the war, but many assertions were later proved absurd. In 1938, for example, one school's bombardment text stated that 100-pound demolition bombs were "particularly efficacious against the average factory or warehouse." Such small bombs proved useless in combat.

It was precisely because of such muddled thinking that OR was so essential to the success of the strategic bombing campaign. Top Allied air commanders recognized this and gave the scientists their full support, but also faced other problems. Theories and doctrine assumed that strategic bombing against the industrial infrastructure of an enemy would have decisive results: It would sap and eventually break both the will and capability of the enemy to resist. This was an article of faith, not science.

Research gave commanders and planners guidance on how best to destroy specific elements of enemy infrastructure, but the broader question remained: What effect did destroying an oil refinery or railroad marshaling yard have on the overall goal of winning the war or breaking the enemy's will and capability?

In short, because you knew how to destroy a factory did not necessarily mean you should destroy it. Operations Research told air commanders how to hit the target correctly; they now needed to hit the correct target.

Intelligence Gathering

To address this problem, air leaders had to move analysis to a higher level of abstraction. Airmen realized that they had not developed a clear understanding of what made an economy work. After all, strategic bombing, like a naval campaign of blockade and surface raiding, is at base a form of economic warfare. But if you aren't sure how an economy functions properly, how can you know what makes it fail?

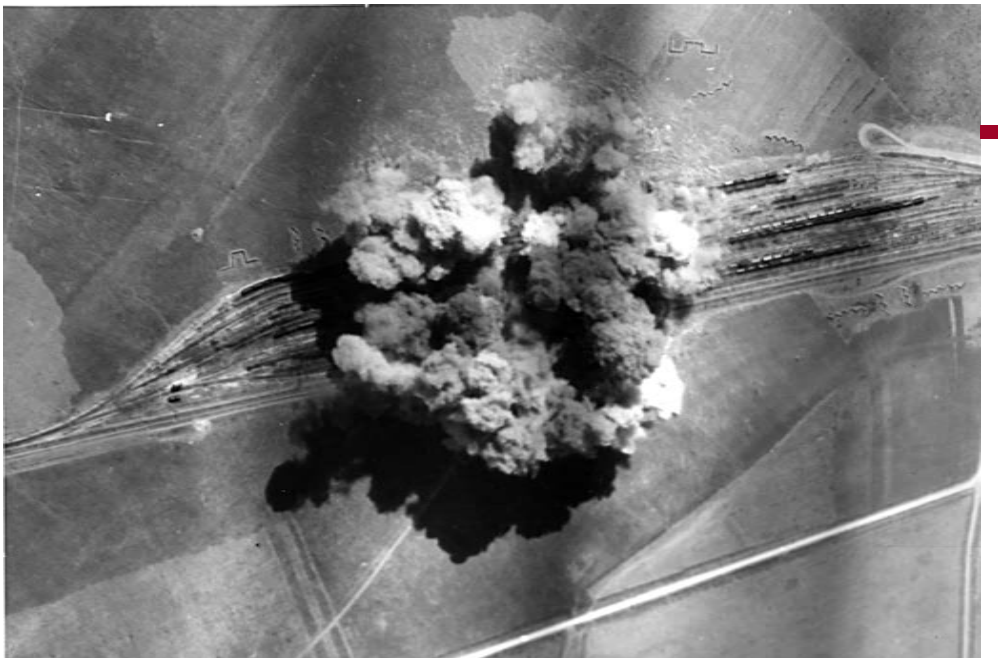
The officers at the Tactical School recognized this problem and made the first rudimentary attempts to study the workings of a modern industrialized nation during the 1930s. The War Department forbade the gathering of intelligence on foreign economies, however, so in 1936, students and instructors studied the industrial infrastructure of the northeast United States. Their investigations led them to conclude that 100 well-placed bombs could shut down 75 percent of the region's electrical generating capacity. Other targets to be struck included rail lines, fuel storage depots, steel plants, and food distribution and preservation facilities. The result of these attacks would be paralysis.

This sounded promising—although it proved overly optimistic in practice—so at the start of the war, air planners called in industrialists to study the German economy. They also went to New York City financial institutions that had heavily invested in Germany before the war. These banks had blueprints of factories, production schedules, and other crucial data on the German economy.

Using this information, intelligence provided by the British, and knowledge of American industry, planners projected what specific systems were most important and also most vulnerable.

Even more important were the questions that arose after obtaining basic economic and industrial data. If you were able to neutralize a portion of a country's rail network, what effect would that produce on the enemy's economy as a whole? In short, air commanders and planners were vitally interested in determining the effects of their bombing campaign.

A large formation of B-17s streaks across the sky. Operations Research added science to the art of bombing.



A large billowing cloud of smoke obscures the view of the railyards at Munich, Germany, after B-17s pummeled that area in September 1944.

How did airmen address this problem? They hired or drafted hundreds of men and women to serve as intelligence gatherers and analysts from business, financial, scientific, engineering, and legal backgrounds.

It was a slow process. As late as 1939, there were only 22 people in the Army's entire G-2 intelligence division. Although G-2 expanded rapidly, virtually none of the hundreds of new people hired had any experience in intelligence gathering or analysis.

Fortunately, much help came from the British. Britain's Ministry of Economic Warfare was established early in the war with an intelligence division that collated and interpreted economic information. When the US entered the war and Eighth Air Force began deploying into British air bases in 1942, Eaker called for a similar advisory body. The result was the Enemy Objectives Unit, attached directly to Eighth Air Force headquarters, composed of civilian economists and lawyers. Their job was to provide detailed analysis of designated targets, to include the importance of a particular plant within an industry, the vulnerability of those plants, and the time necessary for recovery after an air attack.

For this last function, the British established a section, termed RE8, which focused almost exclusively on bomb damage assessment. By mid-1943, Americans joined RE8, which then provided detailed BDA to both Bomber Command and Eighth Air Force. Given the difficulty of measuring damage from photographs taken at high altitude, combined with deliberate German attempts to hide and mislead Allied analysts, it soon became apparent that BDA, then as now, was as much an art as a science.

Despite all of these efforts, basic questions regarding strategic bombing remained either unanswered or in dispute. In early 1944, for example, Normandy invasion planners pondered how best to employ heavy bombers to support the landings.

Rail vs. Oil

The British, based on the results of the bombing campaign in Italy, concluded that a concentrated air campaign against the German railroad network in northern France would be most effective.

The Americans, backed by the analysis of their Enemy Objectives Unit, argued for a campaign against German oil. In this view, destruction of the oil refineries and storage facilities would bring the entire German war machine to a halt. This "rail plan versus oil plan" controversy raged on for several weeks until the supreme commander, Gen. Dwight D. Eisenhower, opted for the rail plan in March 1944 because it seemed to offer more immediate results and speed was imperative.

What is interesting about this controversy is that the two most capable and informed agencies tasked to examine the German war economy looked at the same data and came up with totally different conclusions.

The controversy over targeting seems never ending, and is illustrative. One historian has since argued that based on his extensive review of German railroad records, he is convinced that coal was the key commodity in the German economy, and since it was almost exclusively transported by rail, the transportation plan was the road to victory—albeit not for the reasons posited by rail plan advocates at the time. On the other hand, an author of the official history of British intelligence in the war maintained that his extensive study of German signals intercepted during the war had convinced him that oil was the key target set after all. Maj. Gen. Haywood S. Hansell Jr., one of the key planners of the American bombing campaign, argued in his memoirs that it was not oil, coal, or railroads, but electricity that should have been given top priority. And so it goes.

Air commanders were dependent on intelligence, but the state of that art in World War II made it difficult to have even a reasonable confidence that the chosen targeting strategy was correct. Small wonder that specific target sets moved up or down the priority list with little explanation. Confused commanders were forced to use their intuition, their limited experience, Operations Research, and intelligence analyses.

Regardless, the US and British air doctrines prior to World War II were clearly flawed. Bomber operations over occupied Europe demanded new organizations, new techniques, and new ideas so Operations Research and a unique strain of air-based intelligence grew and evolved to answer these fundamental needs.

The results were dramatic. By early 1945, the German economy was a shambles, and Japan's would soon be as well. ■

Phillip S. Meilinger is a retired Air Force pilot with 30 years' service and a Ph.D. in military history from the University of Michigan. He is the author of seven books and more than 80 articles on military affairs. His latest book is Hubert R. Harmon: Airman, Officer, and Father of the Air Force Academy. *His most recent article for* Air Force *Magazine, "Paradox List," appeared in the April 2009 issue.*

In 1966, Israel got its hands on a MiG-21, with major benefits for itself and the US Air Force.

Have Doughnut

By John Lowery

On Aug. 16, 1966, Iraqi Air Force Capt. Munir Radfa defected to Israel in a MiG-21 jet fighter. The MiG-21 was, at the time, a state-of-the-art Soviet aircraft and the pride of Russia's aircraft industry. The defection, orchestrated by the Israeli government, soon gave both Israel and the United States access to intelligence from a front-line Soviet fighter that the two nations would face in battle in the coming years.

Code-named "Fishbed-E" by NATO, the Mach 2 fighter posed a serious threat to Israel's ability to maintain air superiority in that nation's dangerous and tense neighborhood. In the air order of battle, the Israelis faced down enemy air forces that included 18 Fishbeds in Syria, 10 in Iraq, and 34 in Egypt.

At the time, the Israeli Air Force had nothing comparable to the MiG-21—the IAF was equipped with slower French-made Vautours and Mirage IIIC fighters. A 20-year arms embargo imposed by the US Congress had denied Israel modern aircraft such as the Lockheed F-104 Starfighter and the newer McDonnell Aircraft F-4 Phantom.

Top: The MiG-21 demonstrates slow flight over the Nevada desert. Above: The aircraft at Groom Lake flight test center.

Following orders from then-Prime Minister Levi Eshkol, Israel's ultrasecret Mossad intelligence agency had orchestrated the Iraqi pilot's defection. Mossad officers reportedly cultivated Radfa's frustration on being passed over for promotion due to his Christian origins.

In addition, Mossad officers learned that—following completion of a US military training course—Radfa had become excited about life in the West.

A test pilot carefully performs a preflight check. Testers were tasked with evaluating the aircraft's effectiveness in comparison to US fighters.

On the morning of his fateful training-flight-turned-defection, Radfa's MiG was fitted with a 108-gallon auxiliary fuel tank. This ensured he would have adequate fuel for the 560-mile flight to Israel.

After climbing to 30,000 feet, Radfa departed Iraqi airspace with no problem, but over Jordan, he was intercepted by two Royal Jordanian Air Force Hawker Hunters which attempted to make radio contact.

Although they got no reply from Radfa, they allowed him to continue on, presumably because of the Iraqi insignia on his aircraft.

As prearranged, Radfa was met at the Israeli border by two IAF Mirage IIIs whose pilots escorted him to a safe landing.

With Radfa's assistance, Israeli test pilot Dani Shapira began a detailed evaluation of the MiG-21, according to a later account published in *Israel News.*

After testing in Israel, the aircraft was moved to the US government's secret Nevada airfield commonly known as Area 51 or Groom Lake. It was here—birthplace of the Mach 3-cruising SR-71 "Blackbird" and the stealthy F-117—that the US had the opportunity to put the MiG-21 through its paces.

Redesignated as the YF-110, the Fishbed's test and evaluation project was code-named Have Doughnut.

Because the MiG-21 was then doing battle in Vietnam, US analysts sought urgently to determine the MiG's performance, compared to select US aircraft, and to formulate tactics for both defensive and offensive maneuvering. The Have Doughnut test objectives were to evaluate the airplane's effectiveness as a day fighter-interceptor and its secondary role in ground attack.

What DIA Found

While its armament was adequate for an interceptor, US analysts found the Fishbed's gunsight deficient.

"The tracking index drifts off the bottom of the windscreen when tracking targets in excess of three Gs," reads a declassified report from the Defense Intelligence Agency. Typical of delta-wing aircraft, the airspeed bleed-off during high-G turns was excessive. This speed-bleed decreased the MiG's turn radius, however, and the G force could be sustained at slower speeds than comparable US fighters.

Obviously, in a turning fight, this gave the Fishbed a tactical advantage.

The DIA assessment identified several major aerodynamic limitations in the MiG-21. These included:

- Exceptionally heavy pitch force required above 685 mph.
- Severe buffeting below 15,000 feet when approaching 685 mph or a .98 indicated Mach number.
- Exceptionally slow engine acceleration from idle to full military power.
- Poor directional stability in turbulence.

The heavy pitch forces at high speed limited the pilot's ability to recover from a diving attack or maneuver while approaching and departing the target area. This was no doubt intended to prevent overstress problems during pull up from a target. However for a fighter-bomber it made "high pitch rates difficult or impossible to achieve."

Thus, the US analysts determined, recovery during dive-bombing, strafing, or air-to-ground rocket firing was problematic.

One of the most significant findings was the discovery that below 15,000 feet, the aircraft could not go supersonic. At low altitude, the severe buffeting simply prevented it from exceeding airspeeds of 685 mph or .98 Mach. This airspeed limitation was a major exploitable design flaw.

Later in the Vietnam War, US F-105Ds and F-4s typically approached an aerial target at 633 mph then departed well in excess of 702 mph—often supersonic.

The exceptionally slow engine acceleration was a characteristic that had been corrected in American jet engines in the 1950s. The MiG-21 engine was technologically behind its US counterparts, so spool-up from idle to full military power required 14 seconds, with a tendency to hang up in the process. This could lead to hot compressor stall or engine overtemperature.

Another exploitable discovery: The Fishbed's afterburner marked the aircraft's location by producing white puffs of unburned fuel when it was engaged or disengaged. This was small consolation, however, because the MiG pilot's ability to visually acquire his own aerial targets was similarly aided by the smoke trail left by the engines of all contemporary American jet fighters.

A special limitation for the day-visual conditions fighter-interceptor was the front and rear visibility. Forward visibility through the gunsight was restricted by the combination of a bulletproof glass slab and the windscreen.

Visibility in the 50-degree tailcone, meanwhile, was handicapped by the protective seat flap over the pilot's head and the narrow design of the ship's canopy and fuselage structure.

For the point interceptor role, the MiG-21's basic weapons included a 30 mm cannon loaded with 60 rounds of ammunition and two AA-2 "Atoll" heat-seeking missiles.

Flaps and gear down, the MiG comes in for a landing during tests in Nevada.

The Soviet-built Atoll missiles were copies of the US-made AIM-9 Sidewinder. Communist forces had obtained a Sidewinder when a Nationalist Chinese F-86F pilot fired one at a MiG-17. The AIM-9 failed to explode—but lodged in the MiG-17's fuselage. Using reverse engineering, the Sidewinder was copied by the USSR and became the standard Soviet air-to-air missile for the MiG-21 and other fighters.

Unaware Victims

In the air-to-ground role, the MiG-21 had the 30 mm cannon and could carry two pods containing a total of 32 57 mm folding-fin aerial rockets.

The cannon proved potentially lethal against tanks. When strafing, however, DIA analysts found there was considerable pipper (gunsight) jitter during firing. The aircraft's high speed-low altitude stability in rough air was also deemed unsatisfactory.

It is noteworthy that by the time the US became heavily engaged in the Vietnam War, the Soviet sponsors and North Vietnamese Air Force commanders very effectively planned around the Fishbed's limitations. They never committed their fighters unless there was a good chance of success and subsequent escape. In fact, in 80 percent of the North Vietnamese Air Force kills, the victims were unaware they were under attack.

As USAF's "Red Baron" study of aerial warfare in Vietnam determined, before the US obtained effective radar coverage of North Vietnam, the winner of an air engagement usually initiated the combat from a position of nearly unbeatable advantage.

Typically, DIA found, the Fishbeds were "vectored into the rear hemisphere for a high-speed, single-pass attack," generally from a cross-course intercept.

For example, when US fighters were bombing targets north of Hanoi, such as the Paul Doumer Bridge, enemy MiG-21s would be vectored by ground control intercept radar from Chinese airspace to a position behind the Phantoms.

As the F-4s pulled up from their target, the MiGs would launch Atoll missiles and zoom back to political sanctuary in China. Air forces called these attacks "blow-throughs."

At high altitude the Fishbed's small size made it very difficult to visually acquire or keep in sight while maneuvering. In a frontal or trailing attack, its slight silhouette also made it difficult to acquire on radar.

Seriously complicating air superiority efforts was the fact that North Vietnamese airfields, parked aircraft, command centers, and main radar installations were forbidden targets.

During the late 1960s, thanks to this combination of technical strengths, tactical advantages, and political pro-

The aircraft was kept inside a hangar much of the time, the better to avoid Soviet reconnaissance satellites.

Maj. Fred Cuthill, a test pilot, straps into the Have Doughnut aircraft's cockpit. Assisting is Maj. Jerry Larsen.

tections, MiG-21s shot down more American F-4s and F-105s than the US was able to kill in return.

Despite its sleek shape, the MiG-21's performance at high altitude was found inferior to the F-4, F-105D, and F-104. The Fishbed's top speed was Mach 2.05, whereas the F-4 and F-105D were both capable of about Mach 2.14.

The F-104 Starfighter was limited only by a rise in skin temperature that took place at about Mach 2.21.

Despite being heavier, both the F-105D and F-4 were found basically superior to the MiG-21. Maintaining a high airspeed and avoiding turning engagements was the key to US success, although the F-4 was also aerodynamically superior in a vertical contest.

The Have Doughnut tests showed the F-4 had the capability "to control an engagement below 15,000 feet by exploiting the MiG-21 airspeed limitation and airspeed bleed-off characteristic at high G." In a visual encounter, the recommendation was to get behind the MiG and operate "in the vertical" during air combat maneuvering.

The Soviet fighter's slow engine spool-up was a special handicap. The 14-second acceleration from idle to full power made formation flying difficult for the MiG pilots, and formation maneuvers required constant use of speed brakes and rapid throttle movement.

Using full military power up to about 30,000 feet, the F-4 accelerated much faster than the MiG-21. Below 15,000 feet, the advantage was even greater as the F-4 could easily accelerate to above the Fishbed's subsonic top speed. In the zoom maneuver—from low altitude to 30,000 feet with full military power—the Phantom had a significant advantage. In afterburner, the F-4 held a slight advantage in a zoom to 20,000 feet.

In instantaneous hard (high-G) turns that the MiG-21's delta wing allowed a tight turning radius superior to all the major US fighters in Vietnam. Have Doughnut's DIA analysts therefore warned against participating in "prolonged maneuvering engagements," aka dogfighting. Analysts recommended that pilots press an attack only if they had an initial rear-hemisphere advantage. In particular, F-105 Thunderchief pilots were advised to emulate the MiG-21's hit-and-run tactics.

The Results

This advice was confirmed by the actual combat results in the skies over North Vietnam. "The American fighters flew faster than ours: We had to force them to turn," North Vietnamese MiG ace Luu Huy Chao told Ralph F. Wetterhahn, a former F-4 pilot. When US fighters got sucked into turning engagements, their superior speed "did not matter," he said. "We just made use of an appropriate angle to cut their [circle], and our guns became effective."

The F-105D proved surprisingly effective against the Fishbed-E. The Thunderchief could easily exceed the MiG's top speeds, but maintaining high speed at low altitude was the key to survival. "Thud" pilots regularly departed heavily defended targets at supersonic speed.

The final USAF MiG kill of the Vietnam War occurred Jan. 8, 1973. The engagement took place in Route Pack 3, 80 miles southwest of Hanoi—after the cessation of the Christmas bombing in the north under Linebacker II. Capt. Paul D. Howman and weapons system officer 1st Lt. Lawrence W. Kullman were leading a predawn MiG CAP, protecting B-52s bombing surface-to-air missile sites around Vinh.

Red Crown, the Navy's shipborne radar control platform, identified a MiG-21 65 miles to the northeast, but the MiG came off the radar scope. Howman found it again when he spotted the flame of the Fishbed's afterburner and was able to maneuver behind the MiG.

The engagement ended the way the Have Doughnut analysts had suggested years before: "By orienting an attack towards the Fishbed-E's blind [rear] cone in lag pursuit-type maneuvering, ... the F-4 can defeat the MiG-21."

USAF finished the war Jan. 28, 1973 with a two-to-one overall kill-loss ratio. The Air Force had downed 137 MiGs, with 65 aircraft (including bombers) lost to MiGs.

The North Vietnamese pilots were carefully trained and competent warriors. Their top ace, Nguyen Van Coc, was credited with seven aircraft and two Firebee unmanned aerial vehicles destroyed. His aircraft victories included two Air Force F-4s, one Navy F-4B, two "Wild Weasel" F-105Fs, one F-105D, and the only F-102A kill of the war.

Enemy command and control was excellent, too. North Vietnamese interceptors were expertly guided by their ground controllers, who set up the MiGs perfectly to ambush the American fighters. MiG interceptors used their advantages in ambush and hit-and-run tactics to great effect.

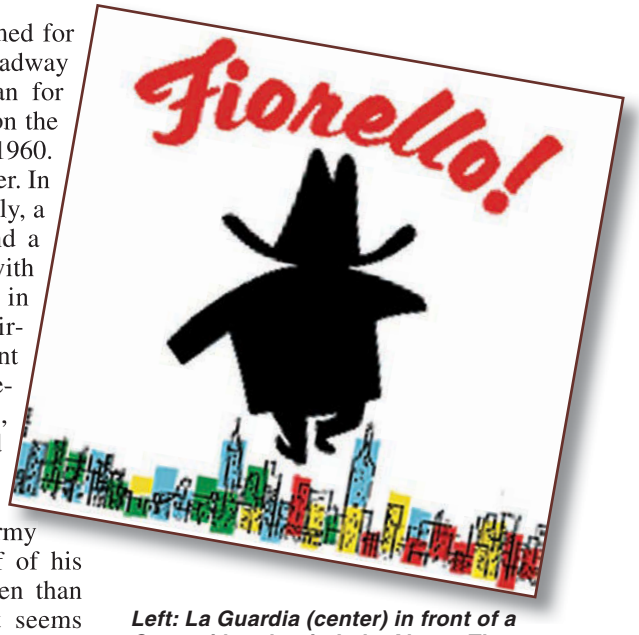
Despite facing worthy opponents and severe political constraints throughout the war, Air Force fighter crews ended the war with a positive kill-loss ratio. The bulk of the credit for this goes to USAF's airmen, but the knowledge gleaned by testing a front-line MiG-21 borrowed from Israel surely contributed to the success. ■

John Lowery is a veteran Air Force fighter pilot and freelance writer. He is author of five books on aircraft performance and aviation safety. His most recent aricle for Air Force *Magazine, "Zoom Climb," appeared in the February 2005 issue.*

The indomitable La Guardia led American airmen on the Italian Front in World War I.

Fiorello's Foggiani

By John T. Correll



Left: La Guardia (center) in front of a Caproni bomber in Italy. Above: The logo for the Pulitzer prize-winning Broadway play based on La Guardia's life.

When Fiorello La Guardia died in 1947, the *New York Times* called him "the little firebrand"—he was 5 ft. 2 in.—and "New York's most colorful mayor since Peter Stuyvesant." La Guardia was elected to an unprecedented three terms and served as mayor from 1934 to 1945. He wrested control of the city from the Tammany Hall political machine, which had dominated New York politics for more than 80 years. In 1934, he hefted a sledge hammer and led a search-and-destroy mission against mob boss Frank Costello's slot machines.

He is fondly remembered for reading the Sunday comics to kids on WNYC radio during a newspaper strike in 1945. La Guardia Airport is named for him. There was even a Broadway musical, "Fiorello!" It ran for 795 performances and won the Pulitzer prize for drama in 1960.

But all of that came later. In 1918, he was, concurrently, a member of Congress and a captain on active duty with the Army Air Service in charge of American airmen on the Italian Front in World War I. In between his military duties, he made speeches and had dinner with King Victor Emmanuel III. He constantly upset Army bureaucrats on behalf of his airmen and more often than not, he prevailed. It seems unlikely that anyone other than La Guardia could have done it.

Fiorello ("Little Flower" in Italian) was born in 1882 in Greenwich Village in Manhattan. His father, a recent immigrant from Foggia in Italy, was a musician. He joined the Army as a band leader when Fiorello was a few months old. Fiorello grew up on Army posts, mainly Ft. Huachuca and Whipple Barracks in Arizona. When his father retired, the family moved to Trieste, where his mother had been born. Young La Guardia entered US consular service in Europe and returned to the United States in 1906 to work as an interpreter at Ellis Island by day and attend New York University School of Law by night. He eventually became deputy attorney general for the state, assigned to the New York City bureau.

In 1915, "having convinced myself that we were going to get into the war, I decided that I wanted to go into our Air Corps," La Guardia said. A friend, Sicilian immigrant Giuseppe Bellanca, ran a small flying school at Mineola, Long Island. The trainer aircraft was a light Bleriot monoplane with a three-cylinder engine. It was a single-seater, so the student was alone in the aircraft.

Into Congress, Into War

Training began with "grass cutting" runs of about a mile and a half on the ground. The student then got out, turned the plane around, and taxied back. Once the student was able to keep the machine straight, La Guardia said, "the next step was a straightaway hop on the same course. We would lift the machine about 15 to 100 feet in the air and then land. This simple instruction went on for quite a while before we were allowed to circle the field."

La Guardia was elected to Congress in 1916. He introduced a bill to make the fraudulent sale of war materials a

felony punishable by imprisonment in peacetime and by death in time of war. It never got out of the Judiciary Committee.

When the United States entered the war, La Guardia supported the administration's request for a military draft. "I had told the young men in my district that if I should vote for putting them into the Army, I would go myself, and personally I was eager to get into action," La Guardia said. "I was 34 years old, physically fit, but too short to become a foot soldier. Whatever further war measures might be needed could easily pass the House without my vote. So I was ready to go to the front and determined to do so." In July 1917, he applied for a direct commission.

He saw no reason to resign from Congress. Some members who joined the military did resign their seats; others did not. "I felt it would be good for Congress and good for the Army to have some of us serving abroad," La Guardia said.

As he told the story in his memoirs, he put nothing on his application blank to indicate he was a member of Congress. The officer who interviewed him was "impressed by the fact that I had some little flying training," he said, and offered him a commission as a lieutenant. A few days later, he reported to the Aviation Section of the Signal Corps and was taken to see Maj. Benjamin Foulois, soon to be chief of air service for the American Expeditionary Force.

Foulois "asked me if I was related to Congressman La Guardia," he said. "I asked him if that would make any difference one way or the other. 'No, not at all,' he said."

Foulois knew, of course, exactly who La Guardia was. A contingent of 150 aviation cadets was to be sent to Italy for pilot training. The United States had only 26 pilots and a few military airfields. Most training had to be done abroad, in France, Britain, and Italy. By amazing coincidence, the site chosen for training in Italy was Foggia, which was La Guardia's father's hometown.

La Guardia was assigned to Mineola, where the cadets were being assembled for overseas deployment. He was promoted to captain and assistant to the contingent commander.

One of La Guardia's first tasks in Mineola was to make travel arrangements. The War Department order specified use of "any passenger liner sailing from the port of New York." La Guardia booked 156 first class passages on the Cunard liner SS *Carmania.* He took the position that he had helped shape the law that created the cadets and knew that the intent of Congress was to provide them first class passage. The ship left New York Sept. 11.

"Our boys soon took over the ship and were running all over the decks," La Guardia said. The colonel in command of all Army personnel aboard was furious and ordered the cadets sent down to steerage because they were not yet officers. Fiorello took exception, arguing that they had first class tickets and the status of commissioned officers.

"It came out that I was a member of Congress," he said. The colonel continued to fume, but "we managed to win the argument," La Guardia said.

When the ship docked in Liverpool, there was a change of plans. The cadets were sent to British flying schools, and La Guardia went to Paris, where he met a different group of 125 cadets and took them by train to Foggia, about 150 miles southeast of Rome. La Guardia's detachment arrived Oct. 17. Forty-six American cadets were already there, under command of Maj. William Ord Ryan and training as pilots on Farman biplane pushers. La Guardia was the second-ranking American officer at Foggia.

Lt. Willis Fitch, one of the original Foggiani. Fitch later became the first executive director of the Air Force Association.

Unfortunate Happenings

World War I on the Italian Front was often forgotten, lacking the scope and intensity of the Western Front. The Italians had declared war on Austria-Hungary in 1915 and used their Caproni trimotors to bomb Austrian airfields, roads, and railways. The Americans had been settled in at Foggia only a short time when the Italians were defeated and pushed back by the Germans and Austrians in the Battle of Caporetto in November. Reinforced by the British and French, the Americans established and held a line along the Piave River in northern Italy near Venice.

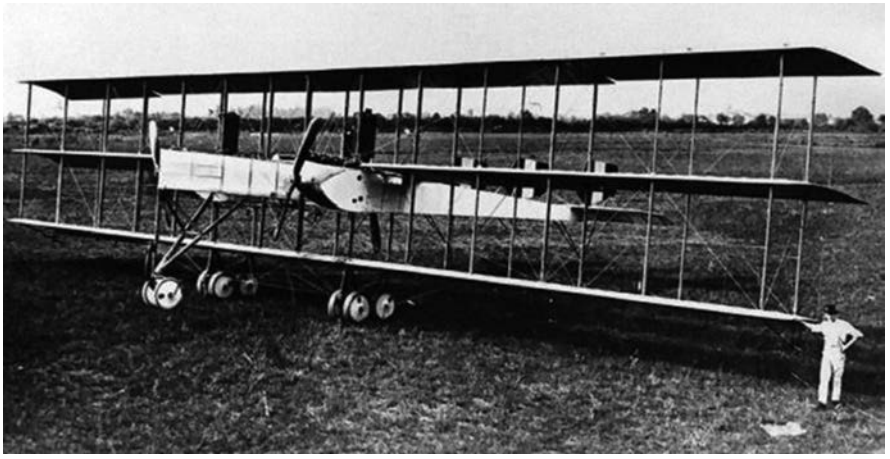
"There can be no doubt that Caporetto caused panic in Italy," La Guardia said. The Minister of Finance told him that "within the Cabinet there was a strong feeling that a separate peace might be necessary." From that point on, La Guardia's diplomatic skills, his ties to Italy, and his status as a member of Congress took on special importance.

"He went to Italy at the time of the unfortunate happenings of Caporetto last fall," the *New York Times* said later. "President Wilson and the United States could not have chosen a better representative in Italy than this brave soldier. On many occasions, La Guardia has spoken to the King, to soldiers, and to the people of Italy, in ammunition factories, in the trenches of the Piave, and elsewhere. ... La Guardia's achievements in Italy have gained the admiration, the praise, and the gratitude of the entire nation, from the King down."

Between Sept. 28, 1917, and June 25, 1918, a total of 406 US pilots graduated at Foggia. They were known as "the Foggiani," and sometimes as "Fiorello's Foggiani" in honor of their flamboyant leader and champion.

In January 1918, the students at Foggia were divided into two camps. Ryan kept overall command and was head of one of the camps, with LaGuardia in command of the other. Before long, La Guardia again riled the chain of command, this time over food.

The rations provided for students were meager: dark black bread for breakfast, "a boiled macaroni paste" at noon, gruel or soup in the evening, and "a diminutive piece of boiled meat" once



Caproni bombers, such as this "heavy" one, had three motors—two in front, one behind, in a push-pull configuration.

a week, La Guardia said. "I did not see how we could keep Americans, used to our diet, healthy on that kind of food." He arranged for a caterer to provide well-balanced meals, with meat or fish every day. Major Ryan was doubtful of the authority to do this, so La Guardia signed the contract.

In due time, La Guardia was ordered to report to an outraged general in the Chief Quartermaster's office in Tours, France. The general told La Guardia he was going to charge him with violating the law, disregarding Army regulations, and squandering public funds.

The general kept citing Army regulations. La Guardia said regulations could be changed. The general said that would take an act of Congress. "Well, I can get an act of Congress," La Guardia said. When the general learned that La Guardia was a member of Congress, the atmosphere changed. "For the first time since I had come into the room, he asked me to be seated," La Guardia said. "We parted as friends." From Tours, La Guardia went to see the head of the Interallied Finance Commission, which worked out a plan for paying for the meals.

La Guardia was equally ready to challenge Italian authorities when the need arose, as it did in 1918 over problems with the SIA-7B biplane, which the United States had ordered from Societa Italiana Aviazone, an affiliate of the Fiat motor car firm. It was one of several airplanes used for training at Foggia.

Student pilots began with the French Farman MF.11 "Shorthorn," a biplane with pusher propellers. It had tandem cockpits but no windscreen, so student and instructor were exposed in the slipstream from the waist up. After his solo in the Farman, the student was rated a military pilot and commissioned a second lieutenant. About 50 of the graduates went on to train in aerial gunnery and become pursuit pilots, but that program faltered because of a shortage of aircraft and other reasons. Follow-on training for bomber pilots was more successful.

Caproni Training

Initially, the new pilots were given a choice between training in the big Caproni bomber or the new, nimble-looking SIA-7B reconnaissance bomber. Naturally, most of them picked the SIA. The United States had ordered a number of the latest SIAs, which offered increased speed and efficiency—but which had a reputation for structural troubles. Several test pilots had been killed. The first American to fly a SIA at Foggia was also killed when the airplane buckled under him.

La Guardia declared the SIAs to be "junk" and suspended training. "I informed the Italian factory making them that we did not care to receive any more of them at Foggia," he said. He made his decision stick, despite the protests of the company and the Italian government. The United States took the planes already on hand but canceled the rest of the order.

The rest of the Foggiani trained in various models of the three-engine Caproni bomber.

Caproni pilots could go on to complete the bombardment course at Foggia, and 131 of the Foggiani did so. Administrator-student La Guardia began his own training in the Caproni in October 1917 but did not finish until the middle of March 1918 because so much of his time was taken by administrative duties.

In February 1918, La Guardia was designated to represent the United States in dealing with Italy on aircraft contracts. Ryan was reassigned to France in June, and La Guardia, operating from an office in Rome, was responsible for both training and procurement. He was still a captain, without enough rank to be in charge of all Air Service officers in Italy, but he did not let that bother him.

Most American pilots trained in Italy were sent to France for service with the AEF, but a detachment of about 75 remained under command of La Guardia and flew missions with the Italian air force. Among them was Lt. Willis S. Fitch, one of Fiorello's original Foggiani, who went on to become the first executive director of the Air Force Association, 1946-47, and the first peacetime editor of *Air Force* Magazine.

The first American bomber pilots left Foggia for the front on June 15. They were attached to Italian bomber squadrons at Padua, Verona, and Aquila to gain experience and augment understrength units. After flying four or five missions with experienced Italian pilots, they were given command of a CA-450 or CA-600 and an Italian combat crew.

King Victor Emmanuel III came to Padua to visit the airmen and had La Guardia as his dinner guest at a former monastery near the front. They conversed easily in both Italian and English. La Guardia divided his time between Padua and duties in Rome. He was promoted to major Aug. 8, and managed to fly five combat missions in the Caproni in September. His total combat time logged was 10 hours and 20 minutes.

La Guardia returned to the United States in October. "After it looked certain that the German collapse was only a matter of weeks, I was ordered home on some military planning mission, which proved unnecessary because of the impending victory," he said.

As the war ended, US pilots on the southern front were withdrawn and the combat division headquarters was closed Nov. 19. Eighty American pilots served with the Italians. The greatest number at the front at any one time was 58. They took part in 65 missions and flew 587 hours of combat operations.

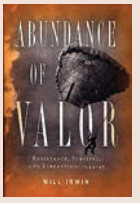
La Guardia was re-elected in November. He resigned his commission, went back to Congress, and served until 1932. La Guardia was elected mayor of New York Jan. 1, 1934 and began his long and successful run at City Hall. ■

John T. Correll was editor in chief of Air Force *Magazine for 18 years and is now a contributing editor. His most recent article, "MiG Alley," appeared in the April issue.*

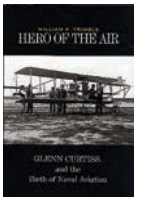
Books

Compiled by Chequita Wood, Media Research Editor

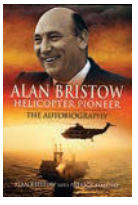
Abundance of Valor: Resistance, Survival, and Liberation: 1944-45. Will Irwin. Ballantine Books, New York (800-733-3000). 378 pages. $30.00.



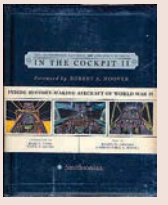
Hero of the Air: Glenn Curtiss and the Birth of Naval Aviation. William F. Trimble. Naval Institute Press, Annapolis, MD (800-233-8764). 270 pages. $37.95.



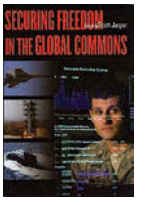
No Need To Die: American Flyers in RAF Bomber Command. Gordon Thorburn. Quayside Publishing Group, Minneapolis (800-826-6600). 246 pages. $34.95.



Alan Bristow: Helicopter Pioneer. Alan Bristow with Patrick Malone. Casemate Publishing, Havertown, PA (610-853-9131). 384 pages. $50.00.

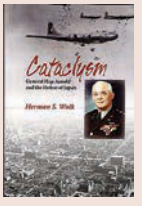


In the Cockpit II: Inside History-Making Aircraft of World War II. Roger D. Connor and Christopher T. Moore. HarperCollins, New York (800-242-7737). 143 pages. $26.99.

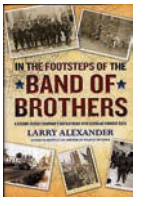


Securing Freedom in the Global Commons. Scott Jasper, ed. Stanford University Press, Palo Alto, CA (800-621-2736). 293 pages. $24.95.

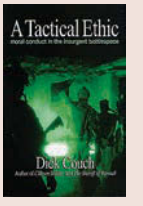
Cataclysm: General Hap Arnold and the Defeat of Japan. Herman S. Wolk. University of North Texas Press, Denton, TX (800-826-8911). 300 pages. $24.95.

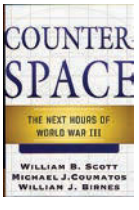


In the Footsteps of the Band of Brothers: A Return to Easy Company's Battlefields With Sergeant Forrest Guth. Larry Alexander. NAL Caliber, New York (800-631-8571). 322 pages. $24.95.



A Tactical Ethic: Moral Conduct in the Insurgent Battlespace. Dick Couch. Naval Institute Press, Annapolis, MD (800-233-8764). 140 pages. $22.95.



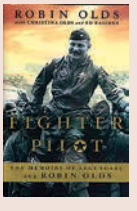


Counterspace: The Next Hours of World War III. William B. Scott, Michael J. Coumatos, and William J. Birnes. Forge, New York (888-330-8477). 352 pages. $25.99.

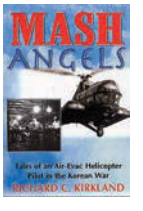
The Iraq Effect: The Middle East After the Iraq War. Frederic Wehrey, Dalia Dassa Kaye, et. al. RAND, Santa Monica, CA (877-584-8642). 187 pages. $40.00 (download at http://www.rand.org/pubs/monographs/2010/RAND_MG892.pdf).

We Won: And Then There Was Linebacker II: Strategic and Political Issues Surrounding the Bombing Campaign. Albert Atkins. Authorhouse, Bloomington, IN (888-519-5121). 237 pages. $9.90.

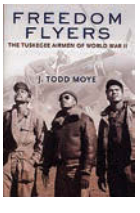
Fighter Pilot: The Memoirs of Legendary Ace Robin Olds. Robin Olds with Christina Olds and Ed Rasimus. St. Martin's Press, New York (888-330-8477). 400 pages. $26.99.



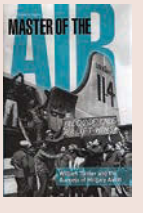
MASH Angels: Tales of an Air-Evac Helicopter Pilot in the Korean War. Richard C. Kirkland. Burford Books, Springfield, NJ (973-258-0960). 276 pages. $18.95.



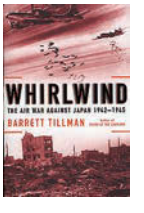
When Janey Comes Marching Home: Portraits of Women Combat Veterans. Laura Browder. The University of North Carolina Press, Chapel Hill, NC (800-848-6224). 157 pages. $35.00.



Freedom Flyers: The Tuskegee Airmen of World War II. J. Todd Moye. Oxford University Press, New York (800-445-9714). 241 pages. $24.95



Master of the Air: William Tunner and the Success of Military Airlift. Robert A. Slayton. The University of Alabama Press, Tuscaloosa, AL (800-621-2736). 291 pages. $43.50.



Whirlwind: The Air War Against Japan 1942-1945. Barrett Tillman. Simon & Schuster, New York (800-223-2336). 316 pages. $28.00.

Back in the Saddle Again

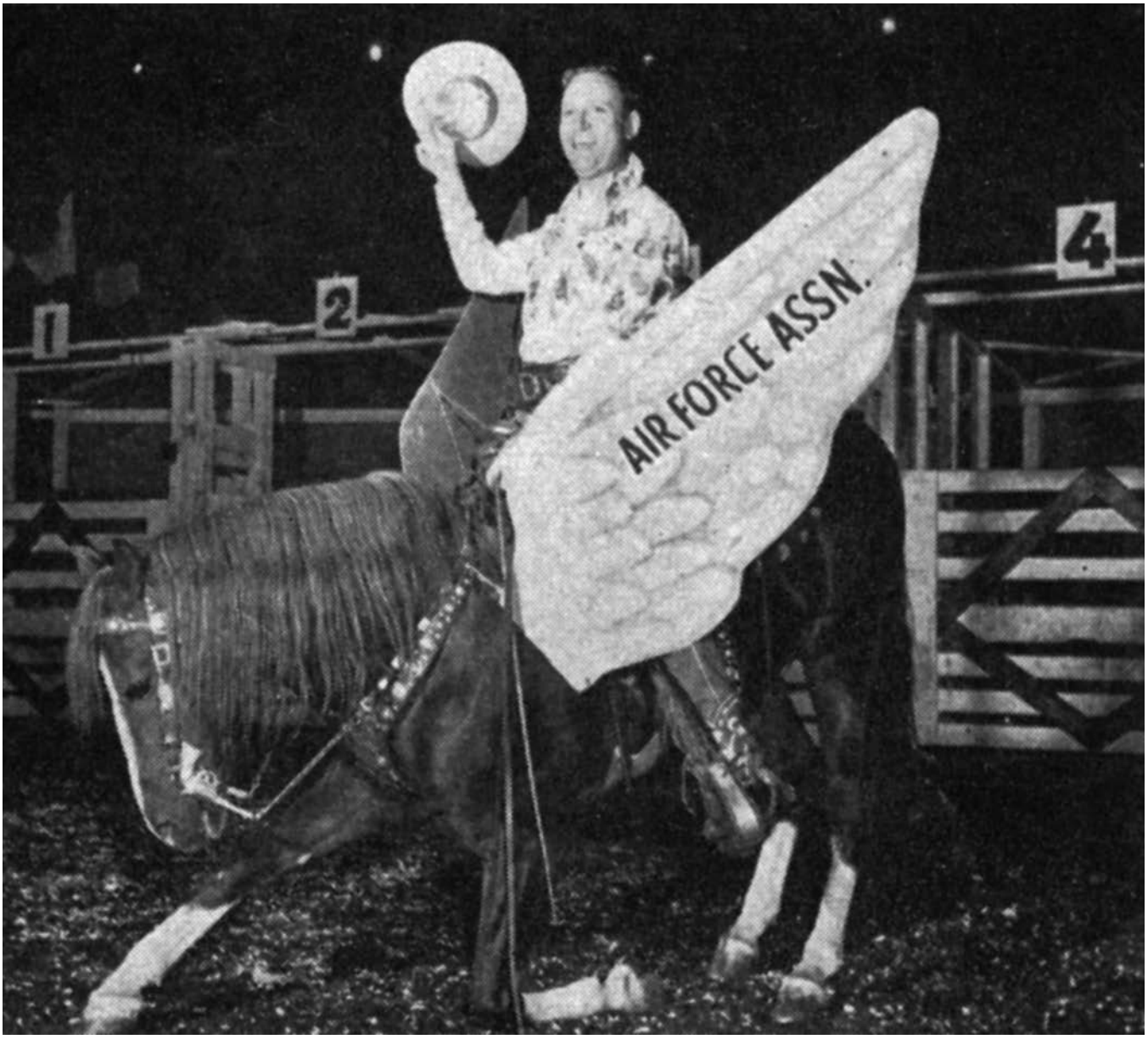
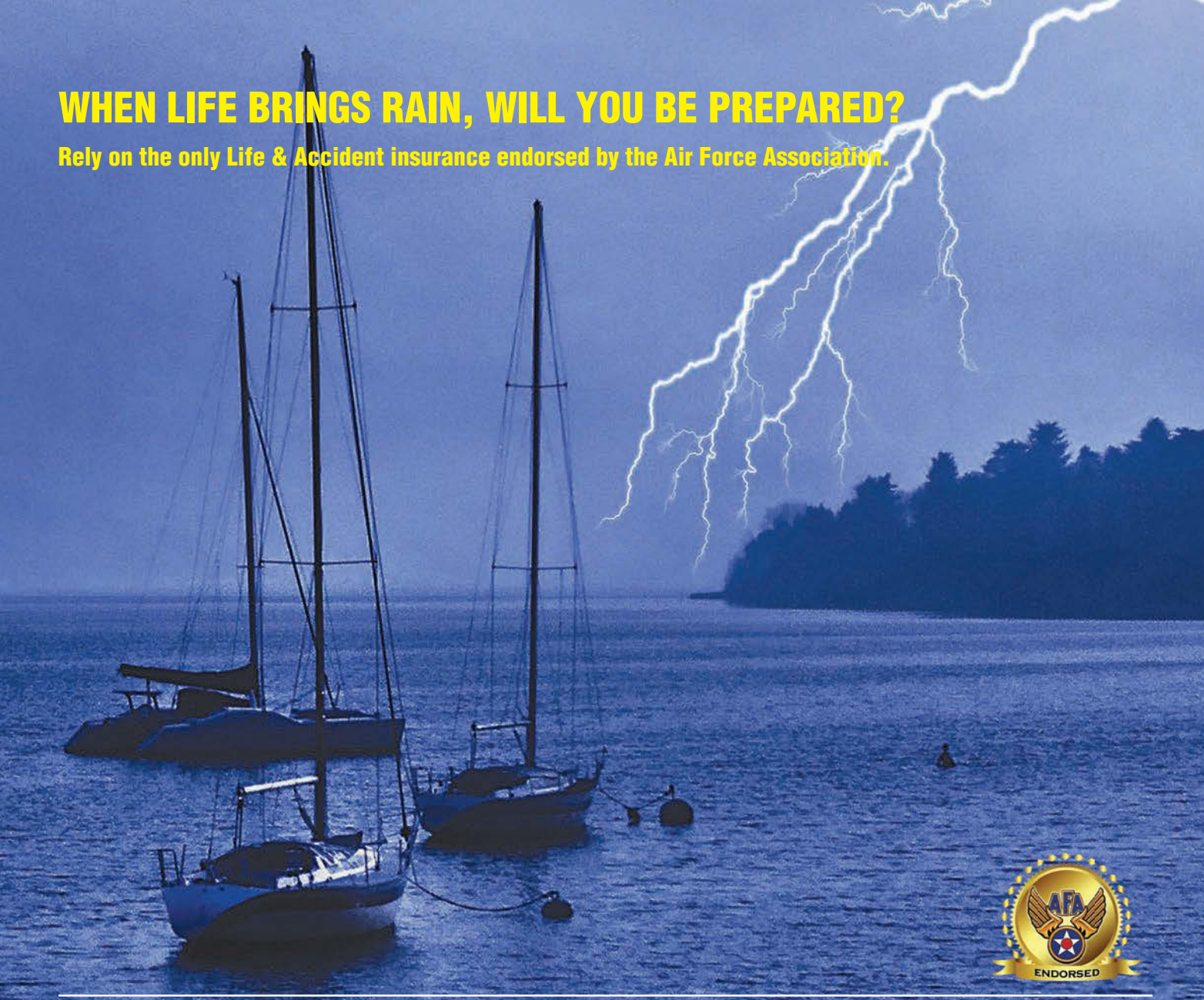


Photo from *Air Force* Magazine. Text by Andrea K. Dudney

Hollywood's "Singing Cowboy," Gene Autry, and his famed horse, Champion, provide AFA a bit of free publicity at the 1946 World's Championship Rodeo at Madison Square Garden in New York. Autry, 39, a charter member of AFA, had been away for a while. He served in World War II in USAAF, where he advanced from enlisted ranks to flight officer and was a transport pilot. This photo was taken shortly after his honorable discharge. By the time he retired from show business in 1964, Autry had starred in some 100 Westerns, sold more than 100 million records, and enjoyed hit shows on radio and television. Even his trusty steed had his own show—"The Adventures of Champion," broadcast on CBS.


SIMPLIFIND
Tap into the incredible network of the Air Force Association with the Airpower Industry Guide. Powered by MultiView, the guide gives you a faster and easier way to find great vendors.
Simplifind your search today at www.afa.org.
MULTIVIEW
AFA



WHEN LIFE BRINGS RAIN, WILL YOU BE PREPARED?

Rely on the only Life & Accident insurance endorsed by the Air Force Association.

TERM LIFE INSURANCE

For Air Force Association and AFAVBA Members and their Families
The only Life Insurance endorsed by the Air Force Association
Administered by AFA Veteran Benefits Association staff so you are dealing with a friend at AFA.

Two outstanding Life Plans with affordable group rates
(No War Clause … No Extra Charge for Flying Status Personnel)

- **Level Term Life —**high level protection at low cost (up to $300,000 until age 65)
- **Decreasing Term Life—**high level coverage in younger years (up to $400,000), less later in life (constant low monthly payment of $30, $20, $15 or $10)

MULTI-BENEFIT ACCIDENT INSURANCE

Accidents are the leading cause of death among people aged one to 41 (and fifth for all ages)*

- Sign up now for Accidental Death Insurance (AFA Members, regardless of age or health, are preapproved for coverage up to $250,000.)
- Get full details and an enrollment form at **www.afavba.org/accident**

****According to the National Safety Council's 2008 Edition of Injury Facts***

AIR FORCE ASSOCIATION
VBA
AFA VETERAN BENEFITS ASSOCIATION

FOR FULL DETAILS AND AN APPLICATION:

- **Visit afavba.org/insurance**
- **Call AFAVBA Member Services 1-800-291-8480**
- **E-mail AFAVBA Member Services at services@afavba.org**

AFAVBA Money-Back Guarantee

When you receive your Policy Certificate, review it at your leisure. If you are not completely satisfied with the coverage, simply return it within 30 days. Any premium paid will be refunded to you in full … no ifs, ands, or buts!

AFA National Report

natrep@afa.org

By Frances McKenney, Assistant Managing Editor

Air Force Orientation

In March, Air Force Association Chairman of the Board Joseph E. Sutter helped the **Gen. Bruce K. Holloway Chapter** in Knoxville, Tenn., introduce its Community Partners to a nearby Air National Guard facility.

A small group of the partners, chapter members, and cadets from AFROTC Det. 800 at the University of Tennessee-Knoxville visited the ANG base at McGhee Tyson Airport, about 10 miles south of Knoxville. Chapter President James M. Mungenast wrote that for some Community Partners, it was the first time they'd been on an Air Force base.

They received a comprehensive introduction.

134th Air Refueling Wing Commander Col. Timothy T. Dearing spoke to the guests about the unit's mission and economic impact on the area.

Col. Richard B. Howard, commander of the I. G. Brown ANG Training and Education Center, presented a briefing on his facility, where more than 4,200 ANG students receive professional military education each year.

Col. David Evans, 119th Command and Control Squadron commander, described his unit. It provides training, standardization, and evaluation for satellite communication and information system operators and has supported the state's civilian emergency services following several hurricanes, including Katrina in 2005.

The AFA guests took a windshield tour of the McGhee Tyson, and with Maj. Jason Brock as a guide, capped their orientation with a close-up look at a KC-135 refueler.

AFA Board Chairman Joe Sutter, third from right, joined Community Partners and other guests of the Gen. Bruce K. Holloway Chapter for an orientation to the 134th Air Refueling Wing, McGhee Tyson Arpt., Tenn.

Drills That Thrilled

The Air Force National JROTC Western Drill Championships, co-sponsored by AFA and Air Force JROTC Headquarters, took place in San Antonio on March 13. A few days later, the Eastern version of the competition filled an arena south of Atlanta.

In San Antonio, **Alamo Chapter** members Edward W. Garland and William D. Croom Jr. represented the association. Garland is a current AFA national director; Croom is a director emeritus. They presented several trophies. The four-foot-tall grand prizes went to the teams from San Antonio's John Jay High School—for top honors in both the armed and unarmed categories—and Tom C. Clark High School, in second place.

Thirty-one teams of cadets competed, traveling to the Alamodome from states as far away as California and North Dakota.

For the East Coast competition, 37 teams gathered in Macon, Ga., on March 19, where S. Sanford Schlitt, AFA's vice chairman of the board for aerospace education, presented the trophies.

Lackey High School from Indian Head, Md., took first place in the armed division and second place in the unarmed division. East Paulding High School, from Dallas, Ga., finished first in the unarmed division. Spring Valley High School of Columbia, S.C., finished second.

The top teams were to go on to an all-services drill meet in Daytona, Fla.

More photos at http://www.airforce-magazine.com, in "AFA National Report"

How I Spent My Winter Vacation

The **Carl Vinson Memorial Chapter** in Warner Robins, Ga., has promoted this slogan, in one form or another, for decades: "Every Day in the USA Is Armed Forces Appreciation Day."

Chapter member Dan Callahan originally coined the phrase in 1968 with a slightly different beginning: "Every Day in Middle Georgia... ." It appeared on the chapter's letterhead, on signs, and even in shrubbery trimmed to form letters of the slogan's acronym.

In February, a group of students at Warner Robins High School spent the

Membership Dues To Increase

On Sept. 13, 2009, AFA convention delegates approved the first association dues increase since 2001. (Previous increases were in 1993 and 1997.) One-year membership will increase to $45; three-year membership to $110; and life membership to $600. The increase will be implemented for all categories on July 1. The delegates also directed a review of the dues structure. The review will begin in 2012.

last weekend of their winter break painting the latest iteration of the slogan, as well as some Air Force images, on the side of a building in a business area near Robins Air Force Base.

High school art teacher Polly Sheehan said that her 19 student volunteers were so enthusiastic about painting the mural that they showed up 90 minutes early to begin priming the wall. They volunteered to start even earlier the next day and to work until dark to finish.

Sheehan reported that her young artists enjoyed the reactions the mural generated: "People were honking their horns as they drove by, giving thumbs-up signs." Some passers-by photographed the mural, and a soldier who had just returned from Qatar stopped to thank the students.

Creation of the colorful 40-foot mural dovetailed with the chapter's kickoff in March of an effort to get the slogan adopted by other organizations. Led by President Timothy P. Callahan, chapter members mailed letters to several military-affiliated associations, asking them to use the patriotic phrase.

Box Lunch on the Budget

Members of the **Donald W. Steele Sr. Memorial Chapter** and the **Nation's Capital Chapter** had a lot to digest at a joint meeting in Arlington, Va.

The topic was the Air Force Fiscal 2011 budget. The speaker: Maj. Gen. Alfred K. Flowers, deputy assistant secretary for budget. The occasion? A "Box Lunch Membership Meeting."

Flowers backed his presentation with some of the budget rollout material that he had delivered at the Pentagon Feb. 1. He described the priorities of Air Force leaders and how the service's budget supports the Quadrennial Defense Review and covered highlights of funding in the various budget categories.

According to George DeFilippi, chapter communications VP, the audience of more than 60 was particularly interested in the Air Force's pending KC-X tanker contract. Other questions covered the Light Attack-Armed Reconnaissance (LAAR) aircraft and the timetable and funding for T-38 trainer replacement.

Afterward, Kevin R. Lewis, Steele Chapter external affairs VP, commented that Flowers' "in-depth knowledge and frank presentation provided a level of detail not normally seen in a briefing of this sort."

Virginia State Meeting

In March, the **Northern Shenandoah Valley Chapter** hosted the Virginia State quarterly meeting with a full house: Representatives from all 10 of the state's chapters attended the gathering, held at Randolph Macon Academy in Front Royal, Va.

The school's chairman of the science department, Mitchell Hubbard, received the chapter's Teacher of the Year honor at the meeting. Hubbard is the school's science department chairman.

Other awards at the meeting's banquet went to the personnel of the 167th Airlift Wing, based at Eastern West Virginia Airport, W.Va.; SSgt. Glenn F. Macher III, from the 167th, named NCO of the Year; and Xing Zhang, an RMA cadet. She received an AFA Medal and Certificate of Achievement.

Retired Gen. Gregory S. Martin was guest speaker. He is a former commander of US Air Forces in Europe and Air Force Materiel Command and is now a consultant.

While at RMA, Martin took the opportunity to get a full briefing—with an emphasis on science and math education—from the school's president, retired Maj. Gen. Henry M. Hobgood. RMA is the oldest coeducational boarding school offering AFJROTC.

More Chapter News

■ The **Gen. B. A. Schriever Los Angeles Area Chapter** co-sponsored another sold-out "SMC Industry Days" in Long Beach, Calif., in April. Nearly 400 representatives from more than

50 aerospace companies attended the annual three-day event. It focuses on the Space and Missile Systems Center's programs, specifically business opportunities in the military space sector. This year's theme: "Facing a New Space Reality ... Cyber, Protection, Budgets, and Architectures." Lt. Gen. John T. Sheridan, SMC commander, was among the guest speakers.

■ In March, the **Paul Revere Chapter** co-hosted a similar conference, the 15th annual Mission Planning Users' Conference. It took place not on its home turf of Massachusetts but in more easily accessible Las Vegas. Some 1,500 developers, users, and sustainment and acquisition personnel who work on mission planning capabilities gathered at the MGM Grand Convention Center. They took in three days of briefings, training classes, and information exchange sessions. There were more than 200 breakout sessions and nearly 50 exhibitors at this event, co-hosted by the Electronic Systems Center, Hanscom AFB, Mass. Lt. Gen. David A. Deptula, USAF deputy chief of staff for ISR, was the keynote speaker.

■ **Southern Indiana Chapter** members got a history lesson on "Hoosier Military Contributions, Yesterday and Today" from guest speaker ANG Brig. Gen. J. Steward Goodwin. The Indiana ANG chief of staff told the group that the state, although 16th largest in population, has the fourth largest National Guard. Chapter President James E. Fultz reported that Goodwin noted how this legacy of service dates to the Civil War, when Hoosiers constituted some eight percent of the Union Army. As for Indiana's military contribution today, Goodwin said more than 16,500 Guardsmen from Indiana have deployed since 9/11.

■ In Connecticut, William H. Forthofer, president of the **Flying Yankees/ Gen. George C. Kenney Chapter,** attended the military ball and awards ceremony for the University of Connecticut's AFROTC Det. 115 to present an AFA Outstanding AFROTC Cadet medal, ribbon, and certificate to Kelsi Ann Horan. Forthofer also presented the UConn junior with a commemorative plaque from the chapter. Retired Gen. William J. Begert, former Pacific Air Forces commander and now a Pratt & Whitney executive, was guest speaker.

■ Wisconsin's **Billy Mitchell Chapter** awarded Roman Ruud, 14 years old, its Civil Air Patrol Cadet of the Year honor. Chapter President Victor L. Johnson Jr. and Leadership Development VP Donald C. Adams presented the medal, ribbon, and certificate at a CAP squadron meeting in March. Ruud earned the recognition through his work as a unit leader and color guard member.

■ With backing from the **Central Florida Chapter,** the 22nd annual AFA Florida AFJROTC drill competition took place in March. Det. 158, University of South Florida in Tampa, hosted competitors from 17 high schools. The Honor Guard from MacDill AFB, Fla., served as judges. Cadets from Sandalwood High School in Jacksonville, Fla., took home the top three of 52 trophies awarded.

■ The **Central Florida Chapter**—headed by William A. Yucuis—can count on student cadets to consistently put them over the top in membership recruitment drives. The chapter ended 2009 by signing up 61 AFJROTC cadets from Lake Brantley High School alone—plus 27 University of Central Florida cadets and a number of other students in JROTC and Civil Air Patrol units. According to the chapter's aerospace education VP, Richard A. Ortega, the chapter is fortunate to have 15 AFJROTC units in the area, but the chapter also works hard on building a relationship with the students, providing classroom lectures on Air Force topics and involving the cadets in chapter activities.

■ In a March ceremony at Hill AFB, Utah, Building 849 was dedicated as Price Hall, to honor Jack C. Price. AFA's president from 1988 to 1990 and board chairman from 1990 to 1992, Price served in USAF for six years, then began a 35-year career at Hill in 1953. He retired as deputy director of distribution, working in the building that now bears his name. It is today headquarters for the 309th Maintenance Wing. **Ute-Rocky Mountain Chapter** President Brandon Strong and Treasurer Audrey L. Wolff, as well as former AFA Board Chairman Stephen P. Condon, attended the ceremony.

Richmond M. Keeney, 1930-2010

Richmond M. "Max" Keeney, AFA's insurance and membership director from 1958 until his retirement in 1997, died April 27. He was a resident of Montgomery Village, Md., and was 79 years old.

He was responsible for field operations for much of his nearly four decades with AFA and had developed group insurance plans as well as the highly successful membership drives in the 1970s.

Mr. Keeney received special recognition at the association's 2006 Air & Space Conference, for overseeing the Air Force 12 Outstanding Airmen awards program for more than 30 years.

Mr. Keeney was a native of Newton, Mass., and had earned a bachelor's degree from Amherst College before serving in the Air Force from 1952 to 1956. ■

Reunions

reunions@afa.org

8th Tactical Fighter Wg/FW. Oct. 13-17 at the Academy Hotel in Colorado Springs, CO. **Contact:** Pete Nash (480-223-2351) (8tfwreunion@cox.net).

12th Bomb Gp (WWII); **12th Fighter Escort Wg/Strategic Fighter Wg** (Korea); **12th TFW** (Vietnam); **12th Fighter Tng Wg,** Randolph AFB, Tex.; and all supporting units. Oct. 7-11 in Fort Worth, Tex. **Contacts:** E. J. Sherwood (480-396-4681) (el.sherwood.biz@cox.net) or Mary Bushnell (651-739-0051) (mhbushnell@aol.com).

38th BG, WWII B-25s in the Pacific Theater. Sept. 29-Oct. 3, at the Holiday Inn in Alexandria, VA. **Contact:** Jack DeTour, 98-1108 Malualua St., Aiea, HI 96701 (jackdet@hawaii.rr.com) (808-487-2842).

48th Fighter Sq/Fighter Interceptor Sq/Fighter Training Sq. Sept. 28-Oct. 2 in Dayton, OH. **Contact:** Joe Onesty, 455 Galleon Way, Seal Beach, CA 90740 (562-431-2901).

71st FS. June 14-21 at Langley AFB, VA. **Contact:** Michael Fritts (716-560-4786) (757-764-3500) (michael.fritts@langley.af.mil).

109th Military Police Co, Frankfurt, Germany. Nov. 4-7 in Tucson, AZ. **Contact:** Rob Fetters, 3602 W. Menadota Dr., Glendale, AZ 85308 (602-405-3182) (rogerdiditagain@yahoo.com) (www.mlrsinc.com/109thmpco).

509th BW. Sept. 27-30 in San Diego. **Contact:** Don Scheid, 10440 Georgetown Pl., Las Vegas, NV 89134 (702-360-4611) (djs509@cox.net).

526th FIS/Tactical Fighter Sq, Ramstein AB, Germany. Sept. 9-12 in Dayton, OH. **Contact:** Tom Lane (419-668-9446) (tomlane@neo.rr.com).

623rd AC&W Assn, including **624th, 851st Sq., 529th Gp, 305 Fighter Control Sq., 313th ADIV, 51st FIW, 2152nd Comm. Sq., 623rd AC Flight,** and all involved in the air defense of Okinawa. Sept. 20-24 in Biloxi, MS. **Contact:** David Hammond (228-388-3085) (dahammond13@msn.com).

AF Postal & Courier Assn. Oct. 8-11 at the Holiday Inn Operland Airport in Nashville, TN. **Contacts:** Jim Foshee (254-774-7303) (jimfoshee@sbcglobal.net) or Frank Vazquez (321-972-3509).

Air Rescue Assn. Sept. 22-26 in Sacramento, CA. **Contacts:** Marilyn Nicholas, 8715 E. Boston, Wichita, KS 67207 (316-686-0430) (mnicholas8cox.net) or Ken Pribyla (703-619-1385) (kprib@verizon.net).

B-52 Stratofortress Assn. Sept. 30-Oct. 3 in Shreveport, LA. **Contact:** Wayne Pittman, 498 Carthage Dr., Beavercreek, OH 45434 (937-426-1289) (kwavn@earthlink.net).

Brady Air Base/Camp Hakata, Japan, veterans of all services, NSA, and civilians. Sept. 13-17 in Hamburg, PA. **Contact:** Gus Cone (253-531-1783).

Buckeye Wg Assn. Aug. 13-15 in Fairborn, OH. **Contact:** James Valeri (937-426-6649) (jvaleri@excite.com).

Pilot Tng Class 56-S. Nov. 8-10 at Chateau LeMoyne Hotel in New Orleans. **Contact:** Bob Watson, 1586 Independence Ave., Melbourne, FL 32940 (321-259-8389) (rwatson31@cfl.rr.com).

SAC veterans. Aug. 25-29 at the Doubletree Reid Park Hotel in Tucson, AZ. **Contact:** Toby Romero (866-260-9302) (520-203-8809). ■

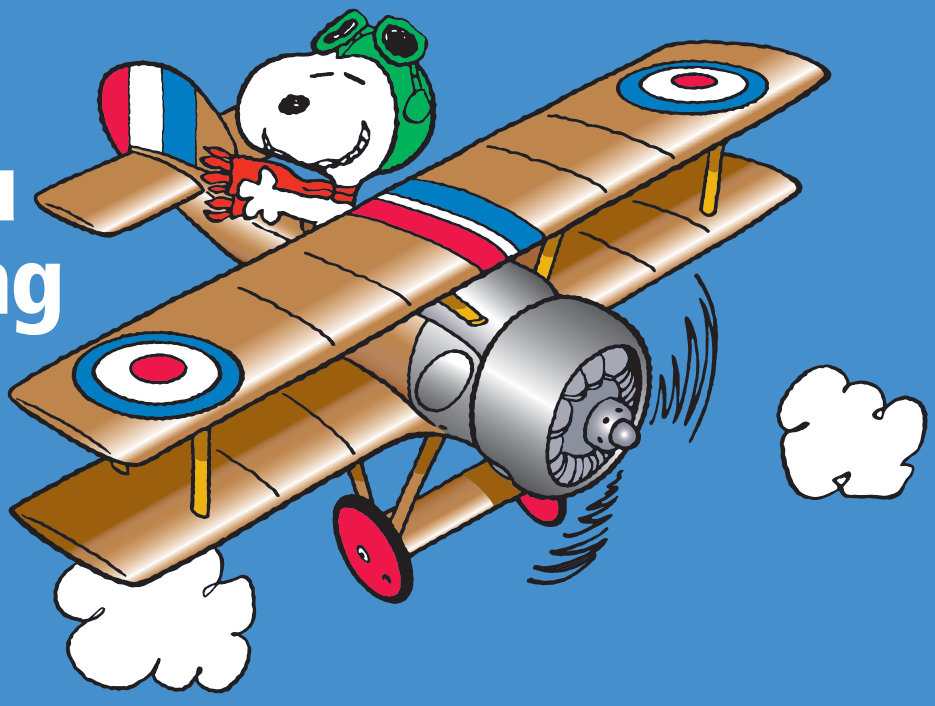
E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

AFA Conventions

June 10-12	**California State Convention,** Beale AFB, Calif.
June 26	**North Carolina State Convention,** Goldsboro, N.C.
July 24	**Alabama State Convention,** Huntsville, Ala.
Sept. 11-12	**AFA National Convention,** Washington, D.C.
Sept. 13-15	**AFA Air & Space Conference,** Washington, D.C.

AFA Members:

MetLife gives you something to smile about...



AIR FORCE ASSOCIATION
AFA VETERAN BENEFITS ASSOCIATION

Dental Insurance for AFA Members: enroll now.

Brought to you by the Air Force Association, dental benefits offered by MetLife, the largest administrator of dental benefit plans among all single commercial carriers.* The savings you need . . . The flexibility you want . . . And the service you can trust. Now AFA Members have access to dental benefits to cover you and your family. The AFAVBA Dental Insurance Policy with MetLife saves you money and gives you something to smile about!

Lower Costs for Covered Services**

In Network Services
MetLife's Preferred Dentist Program (PDP) provides you benefits based on negotiated fees with over 120,000 dentist locations nationwide, including over 28,000 specialists. When you visit a Preferred Dentist, your cleanings and oral exams are covered 100%; fillings 80% and 50% for major restorative work like crowns and root canals (see your Policy Certificate for full details). Participating dentists also provide MetLife negotiated discounts on NON-covered services like cosmetic dentistry and adult orthodontia.

Freedom of Choice
If your dentist is not in MetLife's Preferred Dentist Program, you still receive benefits (however your out of pocket expenses will be greater). Two plans are available:

- Basic—covers cleanings, exams and fillings.
- Comprehensive—covers basic services PLUS crowns, bridges, dentures, root canals, orthodontia and more!

For full details, visit **www.afavba.org/dental** or call AFAVBA Member Services at **1-800-291-8480.**

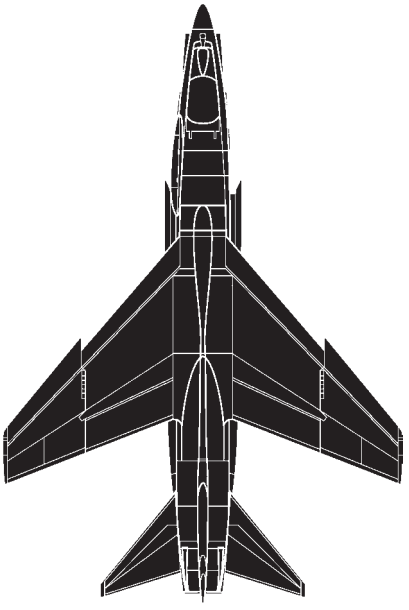
For the **if** in **life**®

MetLife

*MetLife data as of December, 2008 **Savings from enrolling in a dental benefits plan will depend on various factors, including how often participants visit the dentist and the cost of services covered. Like most group health insurance policies, MetLife group policies contain certain exclusions, limitations, waiting periods and terms for keeping them in force. Please contact MetLife for complete details.

Artwork by Zaur Eylanbekov

F-8 Crusader



The F-8 Crusader was beloved by its Navy and Marine Corps pilots. It was the first carrier-based fighter to exceed a speed of 1,000 mph. Though intended to be a day-only, clear-weather air superiority fighter, this Vought aircraft was later given limited all-weather capability. The Crusader is often referred to as the "Last Gun Fighter." Built around four 20 mm cannons, it was the last US fighter to rely on guns as primary armament.

The all-metal aircraft featured a unique two-position, variable-incidence wing which could be raised hydraulically seven degrees, enabling the aircraft to land and take off at low speeds while giving the pilot excellent visibility. It was not the prettiest aircraft in the fleet—Crusader featured a gaping chin inlet and a slab-sided fuselage—but it was aerodynamically sophisticated. Features included a midspan dogtooth extension of the chord, designed to alleviate pitch-up, and wings with inboard and outboard leading edge flaps.

The aircraft gained national fame with a series of high profile record-setting flights, including one by Maj. John Glenn, who in 1957 flew supersonic from coast to coast. In 1962, the RF-8 variant played a crucial role in the Cuban Missile Crisis, providing essential low-level photographs, of Soviet and Cuban deployments. It was active primarily, however, in the Vietnam War, where its guns came in handy during close-in dogfights with North Vietnamese MiGs. The Crusader also served as a bomb truck, employed against communist forces in South Vietnam. *—Walter J. Boyne*

This aircraft: USMC F-8E Crusader—*BN #150663*—of VMF(AW) 312 ("the Checkerboards"), as it looked in late 1965.

Crusaders on deck, with wings raised seven degrees.

In Brief

Designed, built by Vought ★ first flight March 25, 1955 ★ crew of one ★ one P&W J57 turbojet engine ★ number built 1,264. **Specific to F-8E:** max speed 1,120 mph ★ cruise speed 560 mph ★ max range 1,100 mi ★ armament four 20 mm cannons, two Sidewinder missiles, rocket pack, two 2,000-lb bombs or two Bullpup missiles ★ weight (max) 34,000 lb ★ span 35 ft 2 in ★ length 54 ft 6 in ★ height 15 ft 9 in.

Famous Fliers

Medal of Honor: James Stockdale. **Notables:** Dick Bellinger, Donald Engen, Paul Gillcrist, Charles Klusmann, Harold Marr, Paul Speer. **Record Setters:** John Glenn (coast to coast, three hours, 23 minutes), Duke Windsor (1,015 mph).

Interesting Facts

Originally designated the F8U ★ reputed to be an "ensign killer" for its early control difficulties ★ flew in first combat against North Vietnamese MiG-17 (April 1965) ★ posted best kill ratio (6:1) of any US fighter in Vietnam War ★ nicknamed "gator" by its crews ★ suffered from high accident rate ★ used by Marine Corps for close air support ★ enjoyed longest service (until 1987) in photo-recce variant ★ played major role in Cuban Missile Crisis ★ flown off a carrier with wings folded ★ became only aircraft to use the AIM-9C—a radar-guided Sidewinder.

Martin-Baker America

The US16E Ejection Seat was competitively selected by Lockheed Martin for the F-35 Lightning II aircraft. The US16E is a member of the Mk16 family that includes the US16LA, US16N and US16T Ejection Seats fitted to Raytheon T-6 Texan II, NASA T-38 and USAF T-38 aircraft.

Martin-Baker has specifically developed the US16E Ejection Seat to meet the JSF requirements. An integrated modular design which is common to all 3 aircraft variants ensures the lowest life cycle cost and lowest installed mass possible. This innovative design, built on sixty years of continuous Ejection Seat development makes it the most advanced Ejection Seat ever developed: the US16E offers the widest possible aircrew accommodation, while providing the greatest ejection performance for any Ejection Seat introduced into service.

The US16E will be manufactured at Martin-Baker's facility in Johnstown, Pennsylvania.

Martin-Baker is proud to be on the program and proud to be supporting the war-fighter.

Contact:
Martin-Baker America Inc.
423 Walters Avenue
Johnstown
PA 15904 USA
Tel: +1-814-262-9325
Fax: +1-814-262-9556
info@martin-baker.com
www.martin-baker.com

7305 lives saved of which 3502 were USA Aircrew

BETWEEN CARRYING MORE AND COSTING LESS, THERE IS ONE IMPORTANT WORD: HOW.

The C-5M Super Galaxy gets troops and supplies where they're needed faster, more reliably, and at significantly lower cost. With more thrust. Shorter takeoff roll. And faster climb rate. The C-5M will continue performing beyond 2040, and will pay for itself through operational and sustainment savings. Carrying more cargo at a lower cost is all a question of how. And it is the how that makes all the difference.

lockheedmartin.com/c5

LOCKHEED MARTIN

We never forget who we're working for®