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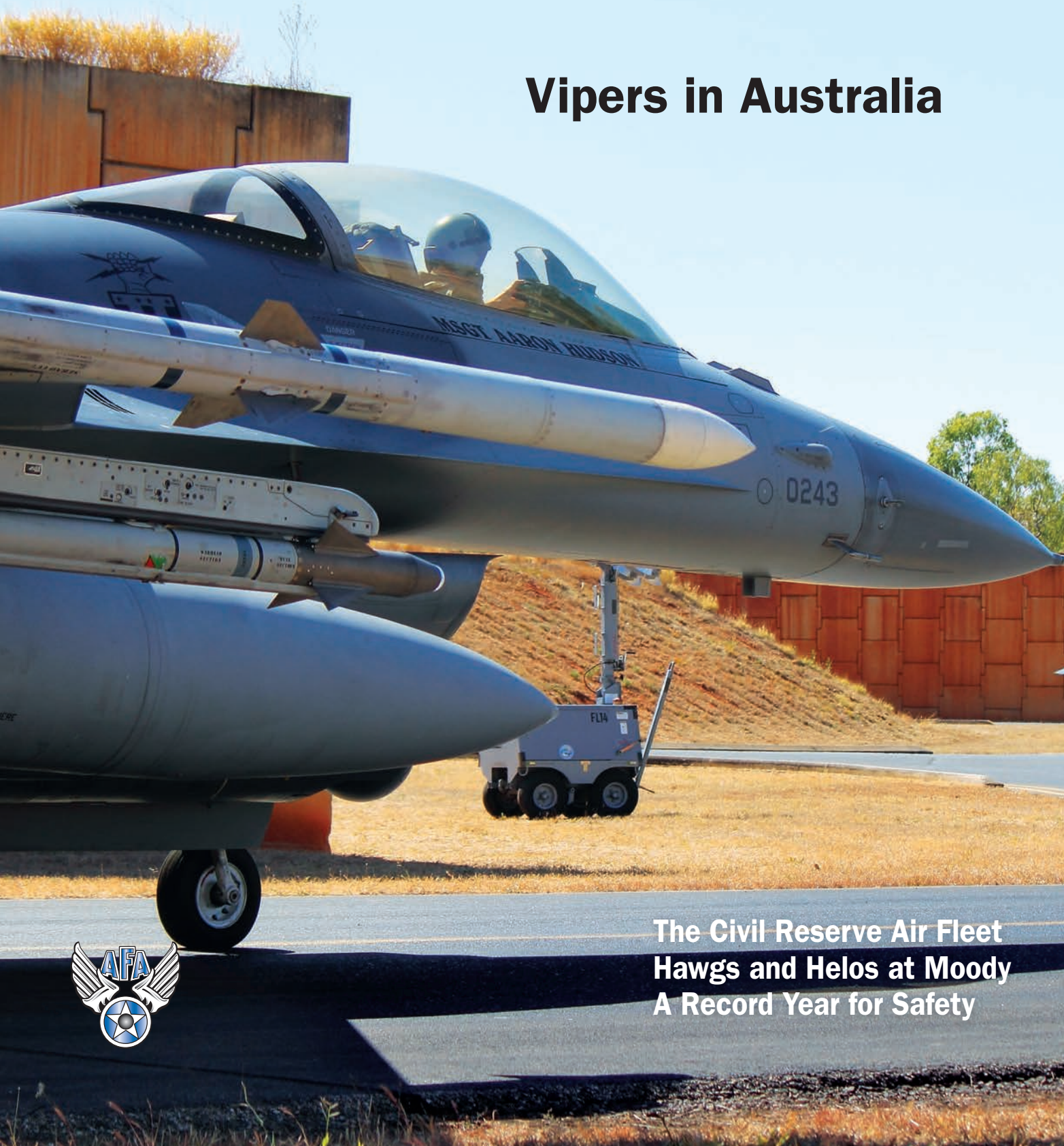

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About the cover: A Washington, D.C., Air National Guard F-16C taxis on the runway at RAAF Tindal, Australia. See "Back in Black," p. 34. Staff photo by Aaron M. U. Church.

FEATURES

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Editorial

By Adam J. Hebert, Editor in Chief

Carter's Coming Challenges

At least Ashton B. Carter knows what he's getting in to. If Carter is confirmed to be President Obama's fourth Defense Secretary, he can quickly and seamlessly take command of the Defense Department. He knows the ins and outs of the Pentagon and the job of SECDEF, having served for years in other top DOD positions. This includes as deputy Defense Secretary, the building's No. 2 position, as recently as December 2013.

This modicum of continuity is important because Defense Secretary Chuck Hagel's surprise resignation late last year meant the Obama Administration has now burned through three Defense Secretaries in less than six years. Hagel, Leon E. Panetta, and Robert M. Gates (who also served under George W. Bush) combined to serve the same term under Obama as Donald H. Rumsfeld alone did for Bush.

Hagel was pushed out before Obama selected his replacement, and three names widely considered to be frontrunners quickly declined interest in the job. Sen. Jack Reed (D-R.I.), Homeland Security Secretary Jeh C. Johnson, and Center for a New American Security CEO Michèle A. Flournoy each asked not to be considered.

Carter may be Obama's fourth choice for Defense Secretary, but he is a safe pick who will likely sail through his confirmation hearings. He offers an in-depth knowledge of the Pentagon's politics, operations, finances, acquisition, and weapon systems. He also brings top-notch academic credentials. He is a Yale graduate who went on to earn a doctorate in theoretical physics at Oxford as a Rhodes Scholar. He later taught at Harvard.

Carter may have just two years to lead the Pentagon, but the issues he must confront are many:

•The war against the ISIS terrorists, primarily in Iraq and Syria, requires deft leadership. The White House is reluctant to send in US ground troops, and the air war has been cautious and highly limited. At the same time, the Administration has been reluctant to just walk away from the fight against these brutal and ambitious terrorists.

•The US combat mission in Afghanistan is technically at an end, but the drawdown will continue for some time. DOD needs to maintain a viable presence in the country so as to not leave a security vacuum. Iraq today is an obvious example of what can go wrong when the US leaves an unstable area to fend for itself.

•Vladimir Putin's Russia is increasingly aggressive and provocative. It has already acted out against Estonia, Georgia, and Ukraine and is ramping up deliberately threatening combat flights near the US, northern Europe, and elsewhere. Russia has shown little willingness to return to a cooperative relationship with NATO and the West.

The predictable difficulties will be tough enough.

•China continues to quickly and significantly bolster its military capabilities while simultaneously making territorial claims that threaten and intimidate its neighbors. It is difficult to understand China's military and national security desires—let alone ascertain how much the nation is actually spending on defense.

•The US is committed to helping defend South Korea from the aggressive dictatorship to its north, where North Korea goes through repeated cycles of quiet provocation—and sometimes overtly hostile action.

•On a more humanitarian note, relief operations must be assumed. Whether it is Ebola relief in West Africa, or helping nations recover after earthquakes, DOD will be called on to help those in need. The department needs to keep the requisite skills and equipment ready.

•Financially, DOD's equipment is old, overused, and in need of modernization and reset. The department must upgrade its gear while managing a shrinking defense budget that might become a whole lot worse in 2016. Absent congressional action few people assume will actually occur, sequestration will rear its destructive and arbitrary head again next year. The effect on DOD readiness and modernization would be devastating.

•The US military is still attempting to adjust its forces and relationships to better meet unique and rising demands throughout the Pacific. This "rebalance" has been repeatedly pushed to the background as crises flared up worldwide.

These are just some of the known problems Carter will have to deal with. It is a certainty that things will not go according to plan over the next two years.

Hagel, for example, was expected to focus on managing a shrinking DOD budget while presiding over the end of the Afghanistan mission. He instead found himself dealing with major crises—Russia's invasion of Ukraine and a desperate-but-tepid battle against ISIS in Syria and Iraq. The world rarely cooperates with America's plans.

Another unknown is just how much leeway Carter will actually have in dealing with these myriad challenges. After leaving office, both Gates and Panetta bitterly complained about being micromanaged by the National Security Council staff in the White House.

"I hope that Dr. Carter fully understands that, as previous secretaries of defense have strongly attested, he will likely have limited influence over the tight circle around the President who apparently control the entire strategic decision-making process," said incoming Senate Armed Services Committee chairman John McCain (R-Ariz.). Carter may "be subject to incessant micromanagement by the White House on a level not seen since the Vietnam War," McCain said.

Asked after Hagel's resignation about the alleged micromanagement, White House spokesman Josh Earnest offered an interesting perspective. "I do believe that if you sort of look back at previous Administrations … there's always some natural tension that exists between the Pentagon and the White House. The President is, after all, the Commander in Chief," Earnest said. "So he obviously has a significant say [over DOD]."

True, and Carter spent enough time as Panetta's deputy to know this is exactly what he signed up for. "If confirmed in this job, I pledge to you my most candid strategic advice," Carter said at the White House ceremony for his nomination. "I pledge also that you will receive equally candid military advice."

Hopefully this will be the case—and that Obama listens to his Secretary's counsel. ✪

Letters

letters@afa.org

Take an A-10 Stand

I'm surprised that the "Statement of Policy" did not take a position on the ongoing issue of retiring the A-10 fleet *["The 2015 Statement of Policy," November 2014, p. 6].* Although USAF leadership has forcefully stated their intent to retire the fleet, it's still a live political issue, with substantial congressional and membership support for retaining the A-10 fleet. Does AFA automatically salute and support the position of the USAF leadership, or is there some independence? As a ground-pounder, I'm strongly in support of the retention of the A-10, given its unequaled capability for CAS and its low cost compared with the supposed equivalents: the F-16 and the F-35. I would agree with Don Chrissinger's suggestion to turn over the fleet to the Army, but USAF is a lot better at operating jet aircraft than the Army *["Letters: Let the Army Have Them," November 2014, p. 10].* And there would be strong congressional resistance to building a CAS air force in the Army.

Col. Charles Kengla, USA (Ret.)
Potomac, Md.

■ *We addressed the A-10 issue in the June 2014 editorial, which can be summarized as follows: The Air Force does not want to retire the A-10, but is being forced to by mandatory budget cuts that Congress could choose to reverse.*—THE EDITORS

We have a real problem with the White House, Congress, and Pentagon in making decisions on our military budget that greatly affect the safety and security of our nation. Your November [2014] issue has two poignant articles that together deal with the matters that count in these issues. They are "Action in Congress," *[p. 20],* dealing with the current status of the A-10, and "Critical 'Patch,' Smaller Window" *[p. 60],* dealing with the crippling effects of sequestration.

These are actually the cause and effect of the same problem, that being the grounding of our most effective ground support aircraft, the A-10 Warthog, the crews who fly and maintain it, plus their bases. This without a program or even a hint of a replacement aircraft!

Yet the Administration continues to involve our country in world situations requiring military airpower and/or protection/support of friendly ground forces. This October we deployed another Air Guard A-10 unit (122nd Fighter Wing, Fort Wayne, Ind.), plus their support equipment and personnel to the volatile sandpile of the Middle East. So, the need for the A-10 exists—a dedicated ground attack/support airplane.

If we really need to decrease airpower (and our military in general), then we have a greater need to stop adding missions requiring those military solutions in world conflicts. Are you listening, members of the White House and Congress?

"Action in Congress" states that we may save $4.2 billion over five years but at a cost of a seriously weakened Air Force—this via the Budget Control Act (more like control via fiscal constipation, my words). Note the words "weakened Air Force." Whatever happened to the promise of providing our military with the best equipment and tools to do its job?

We have some 122 F-22s aircraft and are adding some 18 F-35s in Active Duty. The F-22 has been tested in raids on ISIS and the F-35 is suggested for like

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. (Email: letters@afa.org.) Letters should be concise and timely. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Letters without name and city/base and state are not acceptable. Photographs cannot be used or returned.—THE EDITORS

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AFA's Mission

Our mission is to promote a dominant United States Air Force and a strong national defense and to honor airmen and our Air Force heritage. To accomplish this, we:

Educate the public on the critical need for unmatched aerospace power and a technically superior workforce to ensure US national security.

Advocate for aerospace power and STEM education.

Support the Total Air Force family and promote aerospace education.

duty. These are far more expensive to purchase and operate than any other single-pilot aircraft for use as a ground support aircraft. Our fleet of 334 A-10s is purpose designed to be—and has proven to be—one of totally mission capable, ground support aircraft far less expensive than the F-22.

Curiously, the Russians still retain and maintain (since 1980) their Sukhoi "Frogfoot," historically a competitor airplane/mission to our A-10.

"Critical 'Patch,' Smaller Window" states the "whammy of budget cuts" canceled one of the USAF weapons classes for 2013 at Nellis AFB [Nev.] ("120 graduates lost"). These are crippling cuts. Are al Qaeda and ISIS canceling their recruiting or training in the face of our air attacks? No, terrorists fear the A-10 attacks, so why eliminate a feared and highly effective weapon? You can do all the budget juggling you want to, but the A-10 or a like replacement [is] a mission profile aircraft that will be more cost-effective, with higher ground support mission effectiveness, than anything else in our current inventory. Then save the F-22, F-35, F-15, F-18E for combat air patrol for the A-10, and/or its replacement.

Samuel Conte
Fort Wayne, Ind.

Recon Much?

How about the B-50?

Must be one of the world's most invisible aircraft. So far you guys haven't gotten around to it *["Airpower Classics"].* It got a two-word mention in the Boeing section of *Jane's Encyclopedia of Aviation.*

As near as I can tell, there were about 300 produced. It appeared in bomber, photo mapping, photo reconnaissance, electronic reconnaissance, weather reconnaissance, and tanker versions as well as several variations on each of those. A B-50 carried one of the Edwards AFB [Calif.] X-type aircraft.

There were three or four B-50 bomb wings and at least two RB-50 strategic reconnaissance wings. Before it was retired, various ones were used for just about anything imaginable. There were almost no two alike.

RB-50 made a number of incursions into Soviet airspace. On July 29, 1953, an RB-50G was shot down by MiG-15s over Zalig Petra Velikogo. Only one of the crew survived.

The B-50 went a long way toward bridging the gap between the B-29 and the jet bombers. Its capability precluded the Air Force's acquisition of a strictly reconnaissance aircraft.

As long as we're on the subject, here's another suggestion: the RF-84F.

At one time or another practically every air force in NATO had RF-84Fs. There were two USAF wings in Europe, one in PACAF, and one or more in CONUS. The Royal Flush NATO recon competitions were, except for the Brits, RF-84F events.

And then there is the recon version of the F-4, the RF-4C.

Did you get the idea that [this letter has been] written by a guy who spent his career frogging around with photo recon?

SMSgt. George Hodder,
USAF (Ret.)
Westfield, Mass.

May You Live in Interesting Times

Yes, Missiles definitely helped. I agree with [retired Lt. Gen. Aloysius] Casey and [retired Col. Quentin] Thomas and [retired Lt. Col. Dennis] Lyon *["Letters: Yeah, Pretty Sure Missiles Helped," November, p. 11].*

However, before the Peacekeeper IOC there was another nuclear system known as the Ground Launched Cruise Missile (GLCM), which helped fill the void until Peacekeeper became operational. It was only around from 1983 until 1988, but it gave the missileers of SAC the opportunity to enjoy such places like England, Belgium, Itlay, and Germany.

Dealing with both systems was a major part of my Air Force career. The 1980s was an interesting time to be part of the acquisition world.

I was very proud to be part of General Casey's organization in 1984 till 1989.

Maj. John E. Gooch,
USAF (Ret.)
Dayton, Ohio

Verbatim

verbatim@afa.org

By Robert S. Dudney

Buck's Last Blast

"I hope sometime next year a compromise can come to this floor that will end sequestration. ... Remember the great sacrifice our troops are making around the world. ... They take those risks, they make those sacrifices, because of you. They do it for you. They do it for us. For their families, for their flag. For our freedom. And how we have repaid them? With equipment that is falling apart. By laying them off while they're off in war zones. By docking their pay and their medical benefits. By throwing them out of the service and onto a broken economy. ... They never failed us. Not once. So shame on us, if we're unwilling to pay back the debt we owe them. Shame on all of us, from the White House down."***—Rep. Howard P. "Buck" McKeon (R-Calif.), chairman of House Armed Services Committee, farewell address to the House, Dec. 4.***

The Bad New Normal

"I think we are in a new normal, and the new normal is bad. The new normal is not quite the Cold War. ... We're not quite there. But the new normal will be an aggressive, revanchist Russia that seeks to reconstruct a Warsaw Pact-lite around its borders. ... I think it is probably the most significant strategic shift that is underway in the world today."**—*Retired Adm. James G. Stavridis, former Supreme Allied Commander, Europe, quoted in* Military Times, *Dec. 2.***

From Out of the Past

"On the back of Ukraine, they [Russians] are more assertive in their behavior. We've seen the instances in the Black Sea flying aircraft at NATO ships; their surface ships have [been] interfering with NATO operations in the Baltic Sea, shadowing and intelligence collection. We've seen a more assertive posture over the past 12 months, behavior we haven't seen for 25 to 30 years [since] the Cold War."***—British Royal Navy Vice Adm. Peter Hudson, head of the NATO maritime mission, quoted in* Military Times, *Dec. 2.***

Long Nuclear Haul

"We are all on board that the changes need to happen and that it can't be a one-shot deal for one month or one year. Rather, we all have to keep on it. ... Secretary Hagel predicted—and I think it's a good prediction—that you're going to see even more resources; it will go into the billions of dollars that end up being redirected to the nuclear enterprise, but of course, until it's done, it's not done. So that's why we are continuing to say that we're working on it."***—Secretary of the Air Force Deborah Lee James, on efforts to fix US nuclear forces, Associated Press dispatch, Dec. 2.***

Kill All the Pundits

"During air-focused interventions, it is common for pundits to declare authoritatively—and ultimately incorrectly—that airpower is indecisive, local partners are weak, and victory can only be achieved with US 'boots on the ground.' This was most recently illustrated last month when more than a few experts publicly concluded that the limitations of airpower were being revealed by its apparent failure to stop ISIL from overrunning Kobane—just before air strikes did in fact halt that offensive."***—Karl P. Mueller, RAND Corp. senior political scientist, op-ed in defenseone.com, Nov. 25.***

No Exit

"Presidents propose action, and then reality intervenes. This cycle holds special irony in the case of President Obama. A year ago, it looked like he might end two of the longest wars in US history by the time he left office. As of today, President Obama has involved the United States in five evolving conflicts, and there is little prospect any of them will be over by the time the next president is inaugurated, unless the United States chooses to disengage and lose."***—Anthony H. Cordesman, Center for Strategic and International Studies, essay at csis.org, Dec. 3. He refers to war against Islamists in Afghanistan and Yemen, civil wars in Iraq and Syria, and against ISIS fighters.***

"Only"?

"The United States currently maintains 4,804 nuclear weapons. If you include retired weapons that are awaiting dismantlement and the thousands of components in storage, the United States has the equivalent of around 10,000 weapons. When you consider that the weapons we maintain today are up to 100 times more destructive than the ones used in Hiroshima and Nagasaki, it becomes clear that the only value they offer is in deterring a nuclear attack."***—Sen. Dianne Feinstein (D-Calif.), op-ed in*** Washington Post, *Dec. 3.*

Bring Back Testing

"We should get rid of our existing [nuclear] warheads and develop a new warhead that we would test to detonation. We have the worst of all worlds: older weapons and large inventories that we are retaining because we are worried about their reliability."***—Former Deputy Secretary of Defense John J. Hamre, commenting on deterioration of US nuclear weapons and lack of testing since the early 1990s,*** Los Angeles Times, *Nov. 30.*

Nuclear Knees

"In the nuclear issue, America and colonial European countries got together and did their best to bring the Islamic Republic to its knees, but they could not do so—and they will not be able to do so."***—Ayatollah Ali Khamenei, Iran's supreme leader, commenting on the failure of nuclear talks with Iran,*** New York Times, *Nov. 25.*

Party Line

"I had them tear it out while I was standing there. I told the commanders, 'If you get a call from the White House, you tell them to go to hell and call me.' ... When a President wants highly centralized control in the White House, at the degree of micromanagement that I'm describing, that's not bureaucratic; that's political."***—Former Secretary of Defense Robert M. Gates, referring to his discovery of a direct telephone line from a military headquarters in Afghanistan to the White House, Associated Press dispatch, Nov. 29.***

It's a Fine Line

"The interesting thing about a nuclear deterrent is that enough of it has to be visible to scare the living daylights out of the enemy, but if you are not careful, you scare the living daylights out of yourself."***—Joe Braddock, Pentagon science advisor and nuclear weapons effects expert,*** Los Angeles Times, *Nov. 30.*

Action in Congress

By Megan Scully

When Arizona Republican John McCain takes the gavel of the Senate Armed Services Committee later this month, it could mark the beginning of a particularly turbulent time on Capitol Hill for the F-35 Joint Strike Fighter program.

Long known as an excitable watchdog of government spending, McCain has shown little patience for defense programs that have a track record of cost increases, schedule delays, and technical problems. The Lockheed Martin-built F-35 stealth fighter, which McCain has reminded military brass is the Pentagon's first $1 trillion weapons program (a figure that includes decades of inflation and tangential life-cycle costs), has been squarely in the senator's sights for years.

"Has anybody been fired because of the cost overruns on the F-35?" McCain asked Air Force Chief of Staff Gen. Mark A. Welsh III during a November 2013 armed services hearing. "I don't think so," he quickly added.

That was not true, however. The former F-35 program executive officer, Marine Corps Maj. Gen. David R. Heinz, was fired by then-Defense Secretary Robert M. Gates in February 2010, for mounting problems on the fighter program.

Ashton B. Carter, nominated in December to be Defense Secretary, provided an explanation in a May speech last year. Heinz told Carter he had been approving Lockheed Martin progress payments because he liked the company's program manager and didn't want him to be fired. Carter recommended that Gates fire Heinz. Vice Adm. David J. Venlet was brought in to straighten out the program.

The Lockheed Martin program manager, Daniel J. Crowley, soon moved on to another job outside the company, and within months, virtually the whole Lockheed Martin aeronautics company management was replaced.

McCain has been particularly critical of the Pentagon's decision to buy the aircraft, which will replace older fighters in the Air Force, Navy, and Marine Corps fleets, while they continue to undergo testing. The overlap of the program's procurement and development has come up repeatedly as the aircraft experienced technical problems, including a June 23 engine fire that led to the temporary grounding of the entire fleet.

DOD photo by Glenn Fawcett

McCain criticized the F-35 but now credits the program as being "more stable."

"Even though the DOD has not completed developmental testing, ... that program is already well into production, exposing it to the risk of cost retrofits late in production," McCain said in a May 5 speech, adding that the program has had its share of "costly failures."

Indeed, during an April hearing with the current F-35 program executive officer, Air Force Lt. Gen. Christopher C. Bogdan, McCain admonished the Pentagon for not sticking with a "fly before you buy" approach.

"If we had adhered to that principle, we probably would not have found ourselves in the situation we are in," he said.

For his part, Bodgan acknowledged the so-called concurrency issues associated with buying the planes while they are still undergoing testing.

"Every time you find something new in flight test, you now have to not only go back and fix the airplanes you have already produced, but you have to cut all those fixes into the production line," Bogdan told McCain. "That creates a complexity that is pretty significant and it costs some money."

While McCain has sharply criticized the F-35 program, he has not moved to scuttle it and likely would not do so as chairman. His focus will likely be on driving down costs and improving the performance of the planes.

McCain, a former naval aviator, is a hawk at heart and wants the military to have the most modern equipment possible, and that includes the F-35.

What's more, it would be in his state's best interests for the program to succeed.

Local and state officials in Arizona vigorously campaigned for the F-35 mission and were rewarded with the Air Force's decision to bed down 144 of the aircraft at Luke Air Force Base.

McCain, however, has given the F-35 program credit for being on a "more stable" path to success, has said he is "cautiously optimistic" about the program's future and has generally been pleased with Bodgan's leadership on the program.

But even with home state interest in the program, McCain has been hesitant to heap too much praise on the program. When USAF unveiled the first F-35 at Luke in March, for instance, McCain applauded the base's attributes, rather than the F-35 itself.

"It is no coincidence that the Air Force chose Luke for the stationing of initial F-35s: The flying weather is perfect, the nearby Barry M. Goldwater Range is the premier military aircraft training range in the United States, and our communities' support for the military is unparalleled," McCain said. ✪

Megan Scully is a reporter for CQ Roll Call.

Aperture

By John A. Tirpak, Editorial Director

A low-risk pick; The Iran card; Putin's risk; Pentagon shake-up, Part Two ....

Washington D.C., Dec. 8, 2014

GET CARTER

Ashton B. Carter was probably the safest choice President Obama could have made to succeed Chuck Hagel as Secretary of Defense. The 60-year-old technocrat already had been unanimously confirmed by the Senate twice—for the No. 2 and No. 3 spots in the Pentagon leadership—and Obama needed a quick, uneventful confirmation to offset what is expected to be bruising vetting battles for other new members of his leadership team.

With the new Senate majority, John McCain (R-Ariz.) is expected to take the chair of the Senate Armed Services Committee and preside over Carter's confirmation hearings. As a minority member, McCain led a withering attack on former Senate colleague and fellow Republican Hagel during Hagel's own hearing. Afterward, Hagel was the first Defense Secretary nomination to be filibustered. In the end, he was confirmed with a slim 58-41 majority. However, McCain has taken to the Senate floor to praise Carter's intelligence and dedication, and ranking SASC member Sen. James M. Inhofe (R-Okla.) said he didn't expect Carter would face much opposition.

DOD photo by Glen

Carter speaks to troops in Herat, Afghanistan, in 2013.

Carter has been in and out of government service for 30 years, going back to the Clinton Administration, when he was assistant secretary of defense for international security policy. In that capacity, he supervised implementation of the Nunn-Lugar law, which provided funds to remove fissile materials from former Soviet nations that no longer wanted to bear the cost and effort to have them. He was also deeply involved in negotiations over North Korea's then-budding nuclear weapons program.

At a White House ceremony announcing the nomination Dec. 5, Obama praised this work and Carter's efforts during Obama's Administration to rapidly deploy new body armor, mine-resistant vehicles, and other technologies to Iraq and Afghanistan to combat the signature enemy weapon of the last 13 years—the roadside bomb. Collectively, Obama said, Carter's efforts saved "countless Americans."

Carter spoke briefly after Obama, saying he pledged to the President and Congress "my most candid strategic advice and ... equally candid military advice." He took the job, he said, because of the "seriousness of the strategic challenges we face" and "regard for [Obama's] leadership."

Carter holds bachelor's degrees from Yale in both physics and medieval history. As a Rhodes Scholar, he earned a doctorate in theoretical physics from Oxford, and in his early career worked at the Brookhaven and Fermilab national laboratories. He then advised investment firms, served on various corporate and government scientific advisory boards, and served as chair of the international and global affairs faculty at Harvard's John F. Kennedy School of Government, where he also co-directed the Preventive Defense Project.

He came back to the Pentagon with the Obama Administration in April 2009 as undersecretary of defense for acquisition, technology, and logistics. He became deputy secretary of defense in October 2011, and departed the post two years later. During his five years as a senior Pentagon official under Obama, Carter directed the restructure of the F-35 Joint Strike Fighter program and the KC-46 tanker project, and led several strategic reviews, including the one resulting in the so-called "Pacific Pivot."

At the White House ceremony, Obama said Carter's training as a physicist gives him a unique understanding of "how many of our defense systems work," as well as the insight to know which ones need to be terminated because they are no longer relevant. Given his five recent years of top-level involvement in running the Pentagon, Obama said Carter is amply prepared "on Day One to hit the ground running."

Obama said Carter will face "no shortage of challenges" and will have to juggle the withdrawal from Afghanistan, the fight against ISIS in Iraq and Syria, building international partnerships, preserving old alliances such as NATO, managing the Ebola crisis, and shepherding a military that is "necessarily going to need to be leaner." He will have to "squeeze everything we [can] out of the resources" available, Obama said, hinting at the looming return of the budget sequester.

It will be Carter's job, Obama said, to ensure the US military remains "second to none." He asked Congress to act on the nomination "with speed and dispatch."

In his memoir, *Worthy Fights,* Hagel's predecessor Leon E. Panetta referred to Carter as a "wonk, a nuclear physicist, and author"; a Pentagon veteran "who understood both the policy and budget sides of the agency." Panetta also noted that Carter would make frequent unpublicized visits to wounded soldiers at the Bethesda and Walter Reed hospitals.

Hagel, in a statement closely following the nomination, called Carter "a patriot and a leader" who "has served 11 Secretaries of Defense. ... He is a renowned strategist,

scientist, and scholar with expertise spanning from international security and counterterrorism to science, technology, and innovation. … I relied on him to lead some of the Defense Department's most important initiatives."

He urged Carter's confirmation "without delay." Hagel had agreed to remain on the job until a successor is confirmed.

NOW, WHAT SHALL WE TALK ABOUT?

Facing a Republican Senate Armed Services Committee for confirmation, Carter is unlikely to get the lashing Hagel did. It probably won't be a love-in, though, and Carter will likely be asked to explain the Administration's approach to dealing with Russia and ISIS, with which Republicans have found constant fault.

Of particular interest will likely be an extended interview Carter did with PBS' Charlie Rose in July, when he had been out of the Pentagon for more than seven months. A possible flashpoint from that interview could be Carter's assertion that Iran would have to be involved in resolving the crises in Syria and Iraq.

"We're not going to get a military solution to this," Carter said. "The ultimate solution has to be a political one." When Rose asked if Iran would have to be part of that solution, Carter answered, "Yes." Carter said Iraq fell into deep trouble when the Nouri al Maliki government failed to be even-handed in its treatment of Sunnis and Shiites alike, and the Sunnis in Western Iraq would not support the Iraqi security forces because of it. He said there was no intelligence failure on the part of the US that provided an opening for ISIS.

However, "it's undoubtedly true that ISIS surprised everyone with the rapidity with which they ... caused the collapse of the Iraqi security forces," Carter said. Moreover, he believed that leaving 15,000 US troops behind would have done nothing to quell the anger with the Maliki government by those who felt disenfranchised by it. In "the next phase" of the unfolding situation, it will be essential that the Iraqi government demonstrate it can be "inclusive." As for Syria, Carter said, "I don't think I ... knew [President Bashar] Assad would be as ruthless as he proved to be."

Carter also said that drone warfare will likely be a continuing feature of US foreign policy, but the government will have to constantly "articulate ... when their use is appropriate."

Addressing the prospect of a closer relationship between China and Russia, Carter said he doesn't think "it's something that ... needs to be feared" by the US because each country needs to develop new markets and suppliers. He warned, though, that some elements of the Chinese government have a chip on their shoulder about having been left out of shaping the world in the 20th century and it will be essential to encourage Chinese leaders who want to be full international participants to "prevail over the grudging and historical tendencies."

As for Ukraine, Carter said Russia may never get over the loss of its hegemony over the Warsaw Pact countries, and he hopes that President Vladimir Putin comes to understand that his moves in Ukraine are "tactical" and will have strategic consequences.

"Right now, it's popular [in Russia] for him to keep stirring this pot," Carter said. The economic damage from sanctions, however, is bad and getting worse, and the damage to Russia's reputation "may be irreversible."

TOP-LEVEL TRANSITION

Despite his lengthy list of credentials, Ash Carter was clearly not Obama's first choice to be Defense Secretary.

Early contenders floated by the White House as possible Hagel successors—including Center for a New American Security chief and former Pentagon policy guru Michèle A. Flournoy, Sen. Jack Reed (D-R.I.), and Homeland Security chief Jeh C. Johnson—promptly and publicly removed themselves from consideration. Numerous press reports chalked up their reluctance to a perception that the Obama White House "micromanages" the Pentagon; a charge leveled to different degrees by both Panetta and his predecessor Robert M. Gates, who each talked about the problem in their respective memoirs.

The day before Carter's nomination, Hagel was asked at a press conference whether his abrupt tender of resignation on Nov. 24, immediately accepted by Obama, was due to micromanagement, or whether Hagel had differences of opinion with Obama over how to conduct the war against ISIS that led to him being fired.

Hagel responded that he was not fired, and that he and Obama had, in a one-on-one conversation, agreed that the last two years of Obama's Administration represent "another zone, I think, of kinds of challenges for this country." He said, "We both came to the conclusion that I think the country was best served with new leadership." There wasn't "some obvious issue" between them.

"I never said I would be here two years or four years," Hagel continued, insisting that he was on no set timetable, nor was his departure about "whether I thought I could do the job, whether it was ISIL or any other challenge ... or the budgets."

It was "a responsibility of also knowing when it is probably a good time to let someone come in ... and pick up where you have left off."

Several times Hagel referred to "the challenges that are coming," but he also noted that "most likely there's going to be a rotation" of leadership among the Joint Chiefs of Staff soon, with an expected change-out of the Chairman, vice chairman, and "some of the chiefs."

"That's the President's call, ultimately," Hagel said, "but ... this is probably the right time for a new team."

In his resignation letter to the members of the US military, Hagel said he was "immensely proud of what we have accomplished together." Among the achievements he listed was setting up Afghanistan for a "successful transition" to its defense by indigenous forces. Also, "we have taken the fight to ISIL and, with our Iraqi and coalition partners, have blunted the momentum of this barbaric enemy." He further noted the US military's assistance to "millions of people around the world" who suffered natural disasters during his tenure.

"We have worked tirelessly to sustain our all-volunteer force that has given so much during 13 years of war," Hagel said. "And we have bolstered enduring alliances and strengthened emerging partnerships, all the while setting in motion important reforms that will prepare this institution for the challenges facing us in the decades to come."

Obama chose Hagel because he saw him as a bipartisan Senate insider who could smooth relations with Congress, manage a measured withdrawal from Afghanistan, and shape the military for new world conditions. He was to continue the taming of the acquisition process, wean the military off war supplemental funds, and manage big changes to the Pentagon compensation system, which has ballooned to consume more than two-thirds of defense spending. He was also brought in to prepare the US military for the post-Afghanistan era—in which the principle threats would be terrorism and rising peer powers such as China and Russia—through international partnerships and shifting more of the burden of defense spending to friends and allies under greater direct threat.

Russia's grab of the Crimean Peninsula and proxy war for control of Ukraine, however, as well as the metastasizing Syrian civil war and the rise of ISIS, rocked the Administration back on its heels. Hagel's departure may signal a new Administration tack in these conflicts. ✪

Air Force World

F-16 Pilot Killed in Crash

Capt. William H. DuBois, 30, an F-16 pilot assigned to the 77th Fighter Squadron at Shaw AFB, S.C., was killed Dec. 1 after his fighter crashed "near a coalition air base in the Middle East," according to an Air Forces Central Command news release.

DuBois had taken off on a mission around 11 p.m. on Nov. 30 in support of Operation Inherent Resolve, the US-led air campaign against ISIS terrorists in Iraq and Syria. He was attempting to return to a base in the region, shortly after takeoff, when he crashed.

"Losing Captain DuBois is sad and tragic. Our most sincere condolences go out to his family, friends, and squadron members during this difficult time," said Col. Stephen F. Jost, 20th Fighter Wing commander. "Captain DuBois was a patriot who was willing to put his life on the line every day in service to his nation. He was a valued airman, pilot, and friend ... [and] he will be greatly missed."

DuBois was the first airman killed while supporting Operation Inherent Resolve. A marine was killed after bailing out of an MV-22 Osprey in October.

Air Commando Dies After Training Mishap

TSgt. Sean Barton, a pararescueman assigned to the 320th Special Tactics Squadron, died Oct. 30 from injuries sustained while rappelling during training near Kathmandu, Nepal, according to an Air Force Special Operations Command press release.

"Sean was a selfless leader on our team," said Capt. Michael Erickson, 320th STS combat rescue officer and Barton's team leader.

screenshot

12.03.2014

Lt. Col. Ryan Haden, 74th Fighter Squadron commander, lands an A-10C on a desert landing strip at White Sands Missile Range, N.M. The 74th FS was supporting Iron Strike, a large-scale live-fire exercise hosted by the Army's 1st Armored Division.

"He aggressively pursued excellence with a smile on his face and laughter never far behind. His love for his family, loyalty to his team, and relentless determination serve as an example for us all."

Barton, who joined the Air Force in 2003, had served in both Iraq and Afghanistan and was a recipient of multiple Air Medals, among other commendations.

NATO Announces Interim Spearhead Force

NATO announced Dec. 2 that an interim "spearhead force" will go operational next year as part of the Alliance's efforts to improve readiness and assure eastern allies in light of Russian aggression in Ukraine.

NATO Secretary General Jens Stoltenberg said the move is "the biggest increase in our collective defense since the end of the Cold War." The readiness action plan enables NATO "to meet any threats from wherever they come," he said.

The interim force will primarily be made up of troops based in Germany, the Netherlands, and Norway, although all 28 countries "will contribute to this effort into the next year." The interim force is expected to be available early this year.

NATO's full capacity spearhead force will "provide the quick reaction capability we need," added Stoltenberg. Allied defense ministers are slated to decide the full size and design of the force in February, and the "aim is to stand it up in 2016," according to officials.

Arizona Predators

The Arizona Air National Guard launched its first Stateside MQ-1 Predator sortie from Fort Huachuca, Ariz., Nov. 5.

USAF photo by A1C Ryan Callaghan

The sortie was enabled by the unit's new launch and recovery element, according to a wing news release. "The LRE completion is a product of more than six years of planning and preparation, and the first flight of an Arizona MQ-1 … was a great milestone for our wing," said 162nd Wing Commander Col. Phil Purcell.

The wing's 214th Reconnaissance Group began flying remote RPA combat missions in theater from Davis-Monthan AFB, Ariz., eight years ago.

The new LRE will take on a crew-training role to "prepare airmen from across the country to operate and maintain our nation's RPA assets, and as one of only five ANG LREs in the country, Arizona remains at the forefront of readiness for any federal or state requirement," Purcell said.

The unit has logged more than 70,000 combat flying hours to date and is still awaiting the completion of hangars and support facilities next year.

Missile Forces Adopt Three-Year Rotations

The Air Force will adopt a test scheme forcewide to rotate new missileers after three years of proficiency building into three-year instructing or supervisory roles, announced 20th Air Force, which oversees ICBM forces.

"In the past, the focus was to become an instructor or evaluator, leading to less experienced people" often overseeing more experienced officers, explained Maj. Ray Vann, ICBM operations lead at Air Force Global Strike Command's Applied Capabilities Office.

The new "3+3" plan decreases the length of first-term assignments and allows launch officers to gain experience. It was beta tested at Minot AFB, N.D., earlier this year.

The result, thus far, has been that officers in the missile field "attain a high level of expertise as leaders and operators so they can lead from the front when they become commanders of ICBM units," said Col. Jay Folds, 20th Air Force operations director.

"An added benefit to the '3+3' model is the new perspective gained by serving in multiple units" early in a career, Vann said.

Bears at the Back Door

Russian bombers will expand long-range patrols in the Western Hemisphere, including international airspace in and around the Gulf of Mexico, Russian Defense Minister Sergei Shoigu announced in November.

Long-range aviation units, including Russia's Tu-160 and Tu-95 strategic bombers, will expand exercises to include areas over the Arctic and the Western Hemisphere.

Shoigu previously said Russia is negotiating basing and refueling access rights to airfields in Cuba, Venezuela, and Nicaragua to support such exercises.

The announcement comes on the heels of criticism over recent exercises involving strategic bombers over Europe, which NATO Supreme Allied Commander, Europe, USAF Gen. Philip M. Breedlove called overt acts attempting to message the US and its allies on Russia's military reach and influence.

Partnership or Waste?

US investigators launched several investigations into whether US-handled aircraft procurements for the Afghan Air Force breached criminal law.

The United States is aiming to set the AAF up as a sustainable air arm, but purchases such as a fleet of 20 C-27A transports proved incredibly wasteful, special inspector general for Afghanistan reconstruction John F. Sopko said at a press roundtable in Washington, D.C.

The Air Force ended up scrapping the problem-plagued Afghan C-27s for pennies on the dollar earlier this year. "They didn't fly and didn't work," said Sopko. His office, known as SIGAR, estimates that the total cost of the C-27 contract amounted to between $600 million and $800 million, although his auditors have not yet determined a full accounting of the costs.

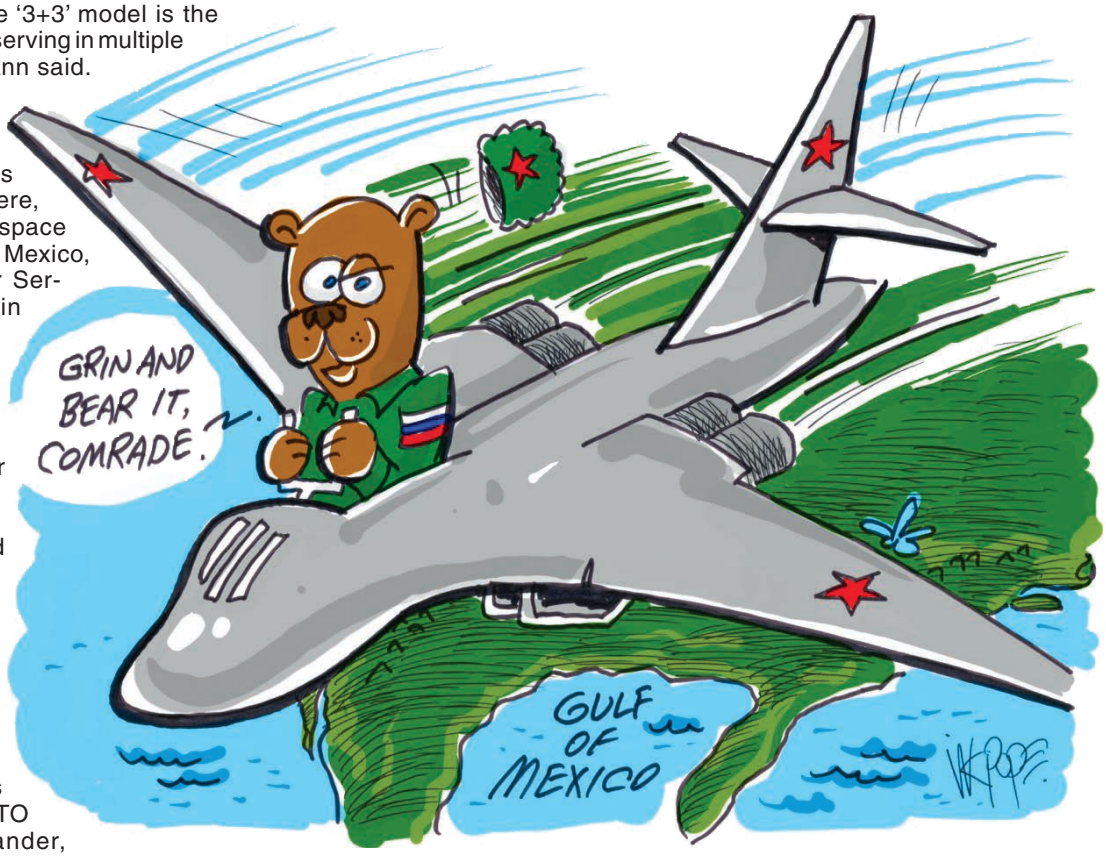
"We want to find out why [the purchase was made] and see if there are lessons learned," he added. The planned acquisition of additional Mi-17 helicopters for the AAF was problematic as well, he said.

That's because the Afghans had difficulty flying and maintaining their existing Mi-17 fleet, and SIGAR saw no need to add new-build airframes to it, he said.

—Marc V. Schanz

Iraqis in the Arizona Desert

The Defense Department will deliver the Iraqi Air Force's first batch of new-build F-16s to Tucson, Ariz., where they will be used to train Iraqi pilots, officials announced.



The jets were originally slated for delivery to Balad Air Base in Iraq, but those plans changed due to the security situation in Iraq, including ISIS terrorist threats that forced contractors involved in the transfer to evacuate the installation, according to a Nov. 10 news release.

Iraqi pilots were already in a training pipeline at Tucson Airport and the first three Iraqi F-16s were expected in Tucson by December, DOD spokesman Army Col. Steven Warren said. Deliveries will continue at the rate of one per month through May 2015, when all eight F-16s have been handed over.

"We expect the Iraqi pilots will begin flying their own aircraft for continuation training beginning in January," said Warren. "All maintenance for the F-16s will be provided by [contractor] logistic support," he said.

Aggressor Gapfiller

The Air Force Weapons School pulled F-15s from Seymour Johnson AFB, N.C., to temporarily fill a gap left by the loss of its dedicated F-15 aggressor squadron at Nellis AFB, Nev.

"Having the Seymour Johnson operators and aircraft here is critical to achieving our Weapons School advanced training objectives," said school commandant Col. Adrian Spain in a Nov. 7 press release.

"We're losing our Red Air capacity, capable of replicating a high-end adversary with the stand-down of the 65th Aggressor Squadron and the accompanying loss of those F-15C aircraft," he said. The bulk of the school's F-15Cs were passed on to Air National Guard units when Nellis officials inactivated the 65th AGRS in September due to budget cuts.

A few F-15Cs were shuffled to Nellis' F-16 aggressor squadron until early this year, after which the school will be without an organic high-end dual-engine adversary platform.

F-15Es from Seymour Johnson's 335th Fighter Squadron supported the school's weapons instructor course from Oct. 11 to Nov. 1, according to the news release.

NATO AWACS End Afghan Mission

NATO's E-3 AWACS component concluded its final two-year rotation to Afghanistan, where it provided air traffic management and command and control over the country for nearly four years.

"The NATO E-3A component flag has been taken down. The mission has been accomplished," said German air force Col. Werner Nemetschek, who led NATO's AWACS detachment.

Alliance-owned AWACS airplanes flew a total of 1,250 sorties, logging 14,000 flying hours and directing more than 25,650 combat aircraft since beginning rotations there in January 2011, according to NATO.

The E-3s initially flew from NATO's permanent AWACS forward operating location at Konya AB, Turkey, until support facilities could be established at Mazar-e Sharif, Afghanistan.

The final NATO AWACS aircraft returned to Geilenkirchen, Germany, at the end of September, two months before the component's last personnel left Afghanistan on Nov. 18.

—Aaron M. U. Church

We Got This: ***Army paratroopers from the 82nd Airborne Division watch a C-17 take off during a USAF Weapons School large-scale air mobility exercise, Joint Forcible Entry, at the Nevada Test and Training Range. More than 100 paratroopers and some 100 aircraft, including more than 50 C-17s and C-130s, took part. During Joint Forcible Entry—a capstone event that culminates a five-month weapons school course—participants seize and hold hostile or potentially hostile areas against armed opposition in the air and on the ground, to make the continuous landing of troops and materiel possible.***

USAF photo by SSgt. Victoria Sneed

Captured, Copied, and Flown

Iran claims to have test-flown a remotely piloted aircraft based on reverse-engineered technology gleaned from a captured Lockheed Martin RQ-170 stealth RPA, the state-run Fars News Agency reported.

"We had promised to fly the final model of RQ-170 in the second half of the current year and this has happened," said Brig. Gen. Amir Ali Hajizadeh, head of Iran's air force, in the Nov. 10 news article. "The footage of its flight will be released soon," he said.

Iran's military claims that the RQ-170 brought down in 2011 was redirected via electronic warfare means. US officials maintain that the RPA inadvertently strayed off course during operations over Afghanistan.

According to the press report, Iran's prototype RPA is a scaled-down version of the RQ-170, intended for both intelligence gathering and ground attack.

Florida Dutch

The Royal Netherlands Air Force inaugurated its first F-35 Lightning II squadron at Eglin AFB, Fla., in a flag ceremony there on Nov. 4.

No. 323 Squadron furled its colors as an F-16 unit at Leeuwarden AB, Netherlands, on Nov. 4 and temporarily relocated to Eglin before heading to Edwards AFB, Calif., where it will conduct the Dutch F-35 operational test and evaluation.

"Performing OT&Es is a familiar task for 323 Squadron," Eglin detachment commander RNAF Col. Bert de Smit said in a press release.

The unit also handled Dutch F-16 operational testing. "Now the squadron has been given the honorable task of preparing the defense organization for operations with an extremely versatile fifth generation jet fighter," he added.

By the Numbers

$32,000

The scrap-metal value of the $700 million C-27A airlift fleet bought for the Afghan Air Force and currently under investigation.

The Dutch plan to operate at least 37 F-35As. Two Netherlands jets are currently flying at Eglin. The squadron was scheduled to move to Edwards at the end of 2014.

Goodbye Spartan

The Coast Guard took delivery of the first of 14 former Air National Guard C-27J transports it is slated to receive.

The airplane, which formerly served at the Mississippi ANG's schoolhouse at Key Field in Meridian, was ferried on Nov. 13 from the Air Force's aircraft "Boneyard" at Davis-Monthan AFB, Ariz., to CGAS Elizabeth City, N.C.

Sharper Eyes in the Sky: ***Workers at Tinker AFB, Okla., install critical Block 40/45 upgrades to E-3 AWACS aircraft during programmed depot maintenance in November. Upgraded Sentrys reached initial operational capability at Tinker in July 2014, and some E-3s with the new equipment are now supporting counterdrug operations. Officials consider the Block 40/45 modifications to be the most significant upgrades the aircraft type has undergone in its more than 35-year history.***

USAF photo

The War on Terrorism

Operation Inherent Resolve

Casualties

By Dec. 16, a total of three Americans had died in Operation Inherent Resolve. All three troops died in noncombat incidents.

No troops have been wounded in action during OIR.

A-10s Back In the Sandbox

A-10s redeployed from Afghanistan to the Persian Gulf region, marking the first confirmed deployment of the close air support aircraft in support of anti-ISIS operations in Iraq and Syria.

The A-10s, assigned to the 122nd Fighter Wing at Fort Wayne ANGS, Ind., joined the recently reactivated 332nd Air Expeditionary Group at an undisclosed base in the Middle East, from Nov. 17 to Nov. 21. The 332nd AEG stood down in 2012 after years of supporting combat operations in Iraq.

"The A-10s now will only be supporting military requirements in the Gulf region, including but not limited to Operation Inherent Resolve," Air Forces Central Command spokesman Lt. Col. Tadd Sholtis told *Air Force Magazine*.

Before relocating to the Gulf, the 122nd Fighter Wing briefly deployed to Afghanistan to meet a "temporary but urgent requirement for additional CAS" with the departure of allied air assets, Sholtis said.

—Marc V. Schanz

Operation Enduring Freedom

Casualties

By Dec. 16, a total of 2,356 Americans had died in Operation Enduring Freedom. The total includes 2,352 troops and four Department of Defense civilians. Of these deaths, 1,846 were killed in action with the enemy while 510 died in noncombat incidents.

There have been 20,060 troops wounded in action during OEF.

Afghans Sign Security Pact

Coalition and Afghan forces signed agreements permitting troops to remain in Afghanistan after combat operations concluded in 2014, amid renewed Taliban attacks.

The Afghan Parliament overwhelmingly approved the long-awaited bilateral security agreement and the NATO status of forces agreement on Nov. 27. The White House said the agreements "represent an invitation from the Afghan people to strengthen the relationship we have built over the past 13 years."

"The BSA fully implements the strategic partnership agreement that our two governments signed in May 2012 and enables our long-term cooperation to promote the security, stability, and unity of Afghanistan. This also contributes to the security of the United States and our coalition partners and to the stability of the region," according to a White House statement.

In the lead-up to the pact, the Taliban increased the number of attacks, notably in and around Kabul. "The signings have intensified their anger as the presence of foreign troops has always been opposed by the Taliban," said Siddiq Siddiqi, a spokesman for the Interior Ministry, according to a Bloomberg report.

Brits End Afghan Combat Ops

British forces ended their combat role in Afghanistan, handing control and use of Camp Bastion over to Afghan forces, in preparation for a transition to the advisory and training role in November.

"We have said farewell to British forces in Helmand and now Kandahar, bringing to a close our combat mission here in Afghanistan," said British Army Maj. Gen. Ben Bathurst, commander of UK forces Afghanistan, in a Nov. 24 Ministry of Defense press release.

Tornado GR4 strike aircraft completed the Royal Air Force's final tactical deployment to Kandahar Airfield, Afghanistan, earlier in November, and the RAF's expeditionary air wing at Kandahar provided close air support, aerial refueling, tactical airlift, intelligence, surveillance, and reconnaissance, and remotely piloted aircraft support.

The British were operationally responsible for Helmand province alongside US marines and Danish forces in southern Afghanistan, often seeing intense action.

Some 453 British troops and defense civilians were killed in action since 2001, according to MOD figures.

Technicians aimed to refurbish the second C-27J destined for the Coast Guard for delivery by the end of November, Teresa Pittman, spokeswoman for Davis-Monthan's 309th Aerospace Maintenance and Regeneration Group, told *Air Force Magazine.*

The first C-27J was stored in Army markings left over from the time of the joint Air Force-Army C-27 program, Pittman noted.

The Coast Guard is passing seven HC-130s to the US Forest Service and curtailing its buy of HC-177 search aircraft in exchange for the C-27Js. This move is expected to save the Coast Guard approximately half-a-billion dollars in acquisition costs. The rest of the Air Force's 21 C-27s are earmarked for transfer to US Special Operations Command.

Pegasus' Picked Men

The Air Force has selected a total of 41 officers and enlisted members from the Active Duty component, Air National Guard, and Air Force Reserve Command to constitute the aircrews for the initial operational test and evaluation phase of the KC-46A tanker.

"Test and evaluation aircrew will evaluate the tanker's capabilities under all circumstances and situations to ensure that it meets all operational mission requirements," said Maj. Broc Starrett, who oversees Mobility Air Forces rated assignments for the Air Force Personnel Center, on Nov. 24.

"This is a significant milestone in the careers of the pilots and boom operators selected to test the new tanker," he said, because the airmen selected for these positions "must be the best in their field."

Senior Staff Changes

CONFIRMATIONS: To Lieutenant General: Mark C. **Nowland. To ANG Major General:** Jon K. **Kelk,** James C. **Witham. To ANG Brigadier General:** Nathaniel S. **Reddicks.**

NOMINATIONS: To be Lieutenant General: Charles Q. **Brown Jr. To be Brigadier General:** James J. **Burks.**

CHANGES: Maj. Gen. Howard B. **Baker Sr.,** from Dir., Log., AFMC, Wright-Patterson AFB, Ohio, to Vice Cmdr., AFMC, Wright-Patterson AFB, Ohio … Brig. Gen. Sam C. **Barrett,** from Dir., Central Command Deployment & Distributions Ops. Ctr., CENTCOM, Southwest Asia, to Cmdr., Joint Enabling Capablities Command, TRANSCOM, Norfolk, Va. ... Brig. Gen. David B. **Been,** from Dep. Dir., Global Ops., Jt. Staff, Pentagon, to Dir., Spec. Prgms., USD for Acq., Tech., & Log., OSD, Pentagon … Maj. Gen. Charles Q. **Brown Jr.,** from Dir., Ops., Strat. Deterrence & Nuclear Integration, USAFE, Ramstein AB, Germany, to Cmdr., AFCENT, ACC, Al Udeid, Qatar … Lt. Gen. Andrew E. **Busch,** from Vice Cmdr., AFMC, Wright-Patterson AFB, Ohio, to Dir., Defense Log. Agency, Ft. Belvoir, Va. … Brig. Gen. Michael A. **Fantini,** from Cmdr., Kandahar Airfield, Intl. Security Assistance Force, CENTCOM, Kandahar, Afghanistan, to Principal Dir., Middle East Policy, Office of USD for Policy, OSD, Pentagon … Brig. Gen. Mark K. **Johnson,** from Cmdr., Defense Log. Agency-Aviation, Defense Log. Agency, Richmond, Va., to Cmdr., Oklahoma City ALC, AFMC, Tinker AFB, Okla. … Brig. Gen. Brian M. **Killough,** from Dir., Warfighter Sys. Integration, Office of the Chief Info. Dominance & CIO, OSAF, Pentagon, to Dep. Dir., Ops., Office of Security Cooperation-Iraq, CENTCOM, Baghdad, Iraq … Brig. Gen. Donald E. **Kirkland,** from Cmdr., Oklahoma City ALC, AFMC, Tinker AFB, Okla., to Dir., Log., AFMC, Wright-Patterson AFB, Ohio … Brig. Gen. Charles L. **Moore Jr.,** from Dep. Chief, Office of Security Cooperation-Iraq, CENTCOM, Baghdad, Iraq, to Dep. Dir., Global Ops., Jt. Staff, Pentagon … Lt. Gen. Mark C. **Nowland,** from C/S, SOUTHCOM, Miami, to Cmdr., 12th AF (Air Forces Southern), ACC, Davis-Monthan AFB, Ariz. … Maj. Gen. Michael T. **Plehn,** from Principal Dir. for Middle East Policy, Office of USD for Policy, OSD, Pentagon, to C/S, SOUTHCOM, Miami ... Maj. Gen. (sel.) Jacqueline D. **Von Ovost,** from Dep. Dir., Political-Mil. Affairs, Europe, Jt. Staff, Pentagon, to Vice Dir., Jt. Staff, Pentagon.

COMMAND CHIEF CHANGE: CMSgt. William C. **Markham,** from Command Chief, Combined Jt. Spec. Ops. Air Component, 1st Expeditionary SOW, Afghanistan, to Command Chief, AF Spec. Ops. Air Warfare Center, Hurlburt Field, Fla.

SENIOR EXECUTIVE SERVICE RETIREMENT: Barbara J. **Barger.**

SES CHANGES: Lynne E. **Baldrighi,** to Principal Dep. Dir., AF Studies, Analyses & Assessments, USAF, Pentagon … Darwyn O. **Banks,** to Tech. Dir., Comm. Sys. Directorate, Natl. Recon Office, AFSPC, Chantilly, Va. … Susan E. **Hirst,** to Dep. Dir., Capability & Resource Integration, CYBERCOM, STRATCOM, Ft. Meade, Md. ■

Index to Advertisers

The KC-46 is slated to enter the Air Force's inventory in 2016, pending the results of operational test and evaluation.

KC-46s will replace the Air Force's oldest KC-135 tankers.

Silver Constellation

MSgt. Thomas Case, a tactical air control party airman with the 18th Air Support Operations Group at Pope Field, N.C., was awarded a second Silver Star for heroism in Afghanistan during a ceremony at Pope on Nov. 13.

"Master Sergeant Case answered his nation's call and defended his country with his life. He is the embodiment of our legacy of valor and will always be part of our proud heritage," said Maj. Gen. H. D. Polumbo Jr., 9th Air Force commander, presenting the medal.

Case accompanied a team of Army rangers into the mountains of Afghanistan on a mission to destroy enemy camps in June 2009. During the ensuing firefight, Case frequently exposed himself to enemy fire to ensure he knew the enemy's position to call in air strikes and could see where the friendly munitions were hitting.

He called in gunship support danger-close to his position, exposed himself to protect his ground force commander, and climbed a steep incline to fend off insurgents at close range and under direct fire.

Requiem for Roland Wright

The Utah Air National Guard christened its longtime operating location east of Salt Lake City Airport the Roland Wright Air National Guard Base in honor of the state's first Air Guard chief of staff.

Building on Anti-Sexual-Assault Success

With recent survey results showing Air Force anti-sexual assault education and victim response efforts paying off, the "next push that we're taking on now is prevention," service Vice Chief of Staff, Gen. Larry O. Spencer told *Air Force Magazine.*

"We've done a lot to educate people, we've done a lot to make certain our victims are cared for ... but in an ideal world, the crime would never happen," Spencer said in an interview, Dec. 8.

In January, Air Force leaders are hosting a four-and-a-half day Sexual Assault Prevention Summit to hammer out new measures the service can implement to preempt sexual assault before it happens, he announced. "We plan to end the conference with the list of things we're going to do and move out on them immediately," Spencer explained.

Though the results of the study were overall positive, the issue of retaliation—professional or personal—against victims, troubled him.

"The number of folks that reported that there is some retaliation involved and associated with reporting was disturbing to me personally," Spencer said. Everything from peer-gossip to supervisors taking professional revenge fell under the survey's definition of "retaliation," Spencer said, so he went back to the study's authors to "get a little more detail."

Anecdotally, airmen said the problem is "not so much my commander or my first sergeant," but midlevel bosses, who may happen to be friends of the accused, taking it out on victims, Spencer recounted. The issue appears to be a defensewide, and Air Force officials are "already moving" on ways to increase midlevel supervisor education and accountability, in line with DOD efforts, he said.

—Aaron M. U. Church

Photo by John Studwell/AmericaSpace

Where No Man Has Gone ... Yet: *A United Launch Alliance Delta IV rocket successfully launched the Orion spacecraft into space from Cape Canaveral AFS, Fla. Orion is designed to take humans farther into space than they have ever gone before and will serve as an exploration vehicle. The spacecraft will sustain the crew during space travel and provide safe re-entry from deep space return velocities. The unmanned Dec. 5 flight test evaluated launch and high-speed re-entry systems such as avionics, attitude control, parachutes, and the spacecraft's heat shield.*

Hagel Announces Nuclear Overhaul

Defense Secretary Chuck Hagel unveiled an enterprisewide action plan for investment, improvement, and reform to address systemic problems identified across the nation's nuclear deterrent force.

"Our nuclear enterprise is foundational to America's national security, and our attention must reflect that," Hagel said in a Nov. 14 Pentagon briefing. DOD will work to add 10 percent to the nuclear budget each of the next five years, with an emphasis on actions that improve the security and sustainment of the current force, ensure that modernization of the force remains on track, and enhance the morale of the force, said Hagel.

Currently, DOD spends between $15 billion and $16 billion a year on the nuclear mission. An internal and an independent external review of the nuclear force made more than 100 recommendations for the additional investment, he said.

The reviews found that nuclear forces are meeting demands, but changes must be made to address issues that could undermine the safety, security, and effectiveness of the force.

—Marc V. Schanz

"Roland Wright is truly a giant, and it's only fitting that this air base, where he so faithfully served our state and our nation, be named in his honor," said Army Maj. Gen. Jefferson Burton, adjutant general of Utah's National Guard, in a news release.

Wright logged 200 hours as a P-51 pilot in Europe during World War II and joined the nascent Utah Air Guard as one of the 191st Fighter Squadron's first pilots in 1946, according to the press release. He served as a squadron and group commander and eventually Utah's chief of staff for air from 1969 to 1972, in addition to flying combat missions in Vietnam.

"He was an aviation pioneer here in Utah, providing tremendous leadership," said Burton. Wright, now 95, who retired as a brigadier general in 1976, was at the ceremony, Nov. 18, reported the *Salt Lake Tribune.* ✪

Innovating for Airpower

By Autumn A. Arnett, Associate Editor

The future of airpower, according to Air Force officials and top scholars at a November airpower symposium hosted by RAND Corp. and the Air Force Association's Mitchell Institute for Aerospace Studies, is entirely reliant on the minds of future airmen. Officials said that in the strategies USAF is using to achieve desired outcomes, there must be a fundamental shift away from being married to processes, and the service must foster an environment in which new ideas are truly welcome through the ranks.

As the Air Force continues to shrink to its smallest size ever, it will become even more urgent for airmen to find new ways to solve old problems and ensure "we aren't designing future tools the same way we did in the past," said Lt. Gen. Steven Kwast, commander of Air University at Maxwell AFB, Ala.

In the past, innovation and creativity have been stifled by process "and, I'm going to use the 'b word,' bureaucracy," said Maj. Gen. David Allvin, director of strategy, concepts, and assessments on the Air Staff. "Especially with this competition for the human mind, the real idea of agility is this idea of breaking the rigid processes and paradigms of the industrial era," Allvin said. There's no such thing as an agile fighting force when the system in place is stuck in the last century, he said.

The key to breaking the mold, Kwast said, is creating "a culture of airmen who know how to learn and know how to think" about problems differently. For the Air Force, "the problem may not be that we've suboptimized or that our tools are not as relevant, ... but rather [a need] to take a look at how we, as an organization, learn," he added.

"The battlespace for the 21st century is the human mind, not some particular

chunk of territory or seas," added retired Lt. Gen. David A. Deptula, dean of the Mitchell Institute, at the Nov. 21 event at RAND headquarters in Santa Monica, Calif. Deptula noted the "concepts of the last century will simply be eclipsed in the information age," and all airmen must be empowered to think critically about the best way to solve current and future challenges.

When considering airpower strategy and its place in the broader national security environment, the focus is too often on equipment and technical ability and not enough on building a culture of critical thinking and innovation, officials believe. Innovation is what the Air Force does best and is the service's "core competency," Deptula said, adding that "a concerted focus on further developing our air and space force would serve us well"—particularly by developing new capabilities in areas such as space.

But with tightening budgets, even Air Force space advocates concede that developing a space force could be a hard sell to those looking to cut spending—and demanding to see the applicability of every dollar to the immediate US national security objectives.

"Space assets are a very efficient way and a very effective way to deliver" global reach, global power, and global vigilance, said Lt. Gen. Samuel A. Greaves, commander of Space and Missile Systems Center at Los Angeles AFB, Calif. But further developing the capabilities in the space arena is not a universally accepted priority. Since 2012, the SMC investment budget has decreased by nearly $2 billion, according to Gen. John E. Hyten, head of Air Force Space Command.

Remarkably, despite the declining funding, Space Command didn't stop doing a thing, Hyten said. "All the satellites are coming off the line; all the rockets are going up and working." Thanks to the flexibility of contractors and other partnerships, AFSPC has managed to continue business as usual. But that's also a problem, because business has changed, Hyten said.

Those with decision-making ability "have grown up in the same world that I've grow up in," he continued, and the perspectives and ideas of younger airmen have not been able to penetrate the ranks and influence the way the Air Force does business yet. The Air Force has to find a way to change this.

Incorporating new ideas and finding a place to bring inquisitiveness in the space arena, one that is ever-changing as knowledge of space changes, is critical. Hyten said all of the other major commands have undergone significant organizational changes in the recent decade. But the command has to adapt to think differently "about the world that we're in and not the world we were in before."

Photo by Diane Baldwin

At an AFA-RAND event, top officials touted the criticality of ideas.

Retired Lt. Gen. David Deptula (l), dean of the Mitchell Institute for Aerospace Studies, and Gen. Lori Robinson, commander of Pacific Air Forces, were two of the panel speakers at the Mitchell-RAND event in Santa Monica, Calif.

FREE UP THE THINKERS

This thinking could apply to the allocation of resources—for instance, the current US satellite aggregation "has put us into a bind where we have very fat, juicy targets and everybody knows where they are," Hyten said. However, equating resilience with disaggregation "is fundamentally wrong," he said.

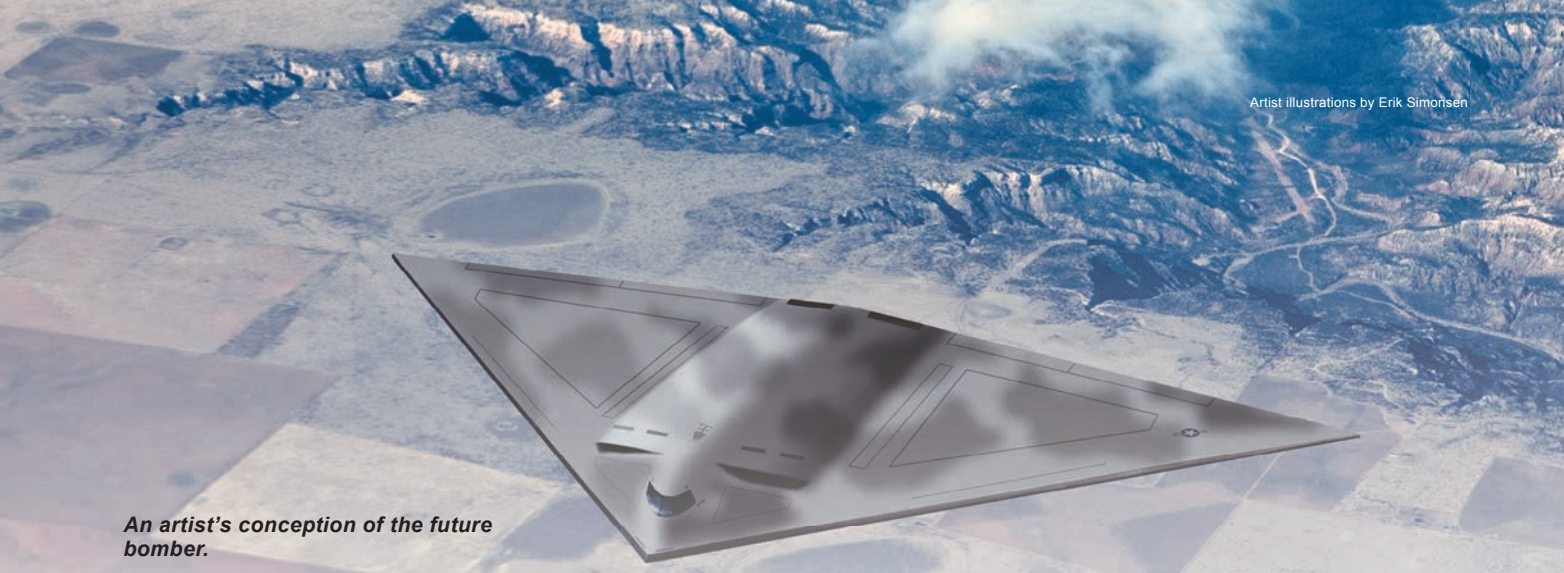
It is also critical to realize that the Air Force does not have to operate separately in air, space, and cyberspace. In fact, working cooperatively with other services, industry, and other nations can help strengthen the capacity of the Air Force and free up airmen caught in circular tasks to operate more efficiently. Essential services like email, SharePoint tools, and data storage are things "industry does 100 times better than we ever will," Hyten said.

"Why do we have thousands of airmen operating email?" Hyten asked. If services like IT were outsourced to industry—which Hyten argued has invested more into ensuring capability and security than the Air Force can—then airmen would be free to think more about cyber concerns. These include fighting network threats, doing missions inside of the network, learning how to anticipate attacks, and thinking proactively about moving forward in the cyber environment. Instead, they're stuck on help desks troubleshooting email issues.

Cloud computing also presents opportunities for USAF. "If we move to the cloud, we'll have a resilient, better defended system and be able to reallocate limited manpower to developing systems," Greaves said.

The issue of self-containment—relying entirely on USAF capabilities to avoid creating codependencies, which create redundancies—is bigger than just wasted time and resources on mundane IT tasks. The US has some major "security issues" that are inhibiting military collaboration with even friendly nations and allies, said Pacific Air Forces Commander Gen. Lori J. Robinson.

The US and USAF have to think differently "about security and some of the things that we hold near and dear to our heart, because if we can't do that part, then I don't see us being able to begin working together" with Pacific allies, Robinson said.



Artist illustrations by Erik Simonsen

An artist's conception of the future bomber.

In addition, USAF has to be smarter about communicating with partners to maximize and strengthen capabilities in the region. That means finding "a better way to be interdependent, not all [buying] the same thing, not all [having] the same stuff, but [complementing] each other with capability and capacity, so that when heaven forbid something happens in the region, that we all are working together, whether it's across service lines or across capability with our partners and our allies," Robinson said.

This is a fight that may not go over well in Congress, as Air Force leadership battles against members holding fast to the way things were or seeking ways to slash costs. But political gridlock on Capitol Hill is a persistent issue and one USAF must be prepared for.

Consistently late authorization and appropriation bills, shutdowns, and lots of crisis management—instead of proactive thinking—are contributing to what former Air Force Secretary Michael B. Donley called an impossible environment in Congress. Donley, who was the longest-serving SECAF, lamented that there do not "seem to be enough votes to reverse the budget gaps, but [there are] enough votes to block the base closures … that are recommended to deal with the budget gaps."

RADICAL CHANGES NEEDED

Greaves said Air Force leaders will have to be prepared to "answer the question: 'Why change now?'" when Congress asks. But if the Air Force is to continue to offer the world's best capabilities in the future, there must be "radical changes in design and infrastructure," Greaves said.

Left unchecked, parochialism can cause real damage to the nation. For example, USAF should work to develop and buy the best equipment money can buy. There are cases in which reliance on foreign products can become problematic, such as in the case of Russia's RD-180 rocket engine, but in other cases a foreign product may simply be the best option.

"We've got to get over our … political reluctance to buy other people's stuff," said RAND senior analyst David Ochmanek. "If we can convey to our partners on the Hill the seriousness of the challenges we operationally face," particularly in the Pacific, it will help the Air Force to overcome natural parochialism instincts encountered when you talk about co-development and purchasing overseas, he said.

Just as important as facilitating a collaborative work environment across borders, the Air Force is being smarter about finding ways to increase collaboration with local communities. This work pulls in both Congress and industry, working on ways to balance efficiency with effectiveness and to leverage technological advances.

"My fear as the Air Force Test Center commander is that I'll have the research

An artist's conception of the F-XX advanced fighter.

lab come to me and say we need you to test this and I say, 'Man, that's really cool. Can you come back in four, five years?'" Maj. Gen. Arnold W. Bunch Jr. said. Staying on the cutting edge of research and innovation is crucial for the service, and this is where the congressional and industry partnerships and support become so vital.

"It's not enough to talk about the technology, but how the technology integrates," said former Air Force Chief Scientist Mark J. Lewis. "There are areas that we need some duplicative technologies to enhance the capability of workload, but when that is not the case, [USAF should be] working to eliminate redundancy," added Bunch.

In this environment, "integration and practicality, consistency" are key, said Lewis, director of the Science and Technology Policy Institute at the Institute for Defense Analyses. As the Air Force is working and focusing on one technology, it has to be ever-thinking about the next generation of weapons and systems. "The speed at which information is out there to the whole rest of the world is remarkable," Lewis said, and the US is beginning to lag behind.

"It's really embarrassing when you celebrate your 10th anniversary" of the F-35 program "and you'll celebrate your 20th anniversary before IOC," said retired Lt. Gen. George K. Muellner, former AFA chairman of the board.

If anyone can pull the nation back up to its world-leading innovation past, it is airmen, said Donald B. Rice, Air Force Secretary under President George H. W. Bush. "The United States Air Force has been the best sponsor of independent analytical research of any organization anywhere on the planet," Rice said, and national security has been better for it.

"In the last decade really, every time a committee to Congress—and it doesn't matter whether it's one chaired by a Democrat or one chaired by a Republican—comes up with a question that they want answered, they designate the work to [RAND's Project Air Force]. And that is at least as much a testament to the Air Force as it is to RAND," Rice said.

"If we could use airpower in the way it is meant to be used, and not just in the way that civilian leadership decides to use it, it could be much better," said Paula Thornhill, director of the strategy and doctrine program at RAND's Project Air Force. ✪

An artist's concept of a SpaceX rocket launching a USAF payload.

L-r: Space command boss Gen. John Hyten, AFA Chairman of the Board Scott Van Cleef, AFA Vice Chairman for Field Operations David Dietsch, and Vice Chairman for Aerospace Education Jerry White were among the many senior USAF and AFA leaders to attend the airpower symposium co-hosted by the Mitchell Institute for Aerospace Studies and RAND Corp.

CRAF: TO THE FUTURE

By John A. Tirpak, Editorial Director

The commercial-military airlift complex is up for dramatic change.

An Atlas Air 747 is offloaded at Bagram AB, Afghanistan, in the summer of 2012. The Air Force depended on commercial carriers to provide as much as half the airlift needed to sustain the flow of people and cargo to and from the US Central Command area of responsibility over the past 13 years.

Staff photo by John A. Tirpak

At major US air bases in Southwest Asia and at waypoints around the world, Boeing 747s and other commercial jets share the ramp with Air Force C-5s, C-17s, and C-130s. These commercial carriers have at times borne as much as 50 percent of the cargo and passengers moving between the US and its forward wartime locations. Called the Department of Defense's Civil Reserve Air Fleet (CRAF), they have claimed as much as $3.5 billion in annual contracts from US Transportation Command. But as the furious pace of operations subsided, and a firm date for the withdrawal of combat forces from Afghanistan drew near, TRANSCOM and Air Mobility Command recognized that their relationship with the private air carriers had to change.

Military airlift needs "have been [in] a gradual decline," said Merle Lyman, AMC's Commercial Airlift Division chief, in an interview. Because US forces have been pulling back from war zones in Asia and the Middle East—first from Iraq and now from Afghanistan—"airlift requirements naturally followed that trend," he explained. The forecast requirements beyond the planned 2014 Afghanistan withdrawal date "reflect that it's falling off a cliff" and "beyond that time are lower than what we've seen in decades."

Gen. Paul J. Selva summarized the situation at his March 2014 confirmation hearing to be head of TRANSCOM. He explained that the National Airlift Policy, governing CRAF, was last updated in 1987, and the airline and air cargo industry has evolved considerably since then.

"We have ... 28 separate carriers that provide passenger and cargo services," Selva said in his testimony, "each with their own business plan and … motivation for how they run their businesses." He said a study was underway "to get at the 'eaches' of how the industry runs and get at the broad macroeconomics of how the industry is going to evolve over time."

Not only were US airlift requirements winding down—and US military strategy changing—but the number of commercial carriers was also shrinking, largely due to mergers and changing market conditions.

AMC and TRANSCOM were working with the industry executives, he reported, "to come to some agreement on what a contract mechanism might look like to incentivize their volunteer service" in the CRAF. The study would be the first look at this fundamental enabler of national military strategy since Operation Desert Storm in 1991.

That study has since been concluded, and a CRAF restructuring is now in hand. Government and industry partners seem satisfied CRAF can endure for the foreseeable future, even if the forecast airlift demand changes unexpectedly.

The Defense Department and its partners in the Civil Reserve Air Fleet have worked together formally for airlift since 1951. The CRAF came into being because the US realized it might have to suddenly move massive amounts of ground and air forces overseas, far outstripping the speed and capacity of its military transportation resources.

A three-stage mobilization plan emerged for the government to "draft" commercial aircraft in times of national emergency. The CRAF was refined over the years: To get the airlines and cargo companies to volunteer to be mobilized—and to outfit their aircraft with hard decks and other improvements needed to make them militarily useful—the government offered incentives.

AIRCRAFT RESERVISTS

In exchange for participation in the CRAF, commercial carriers enjoyed first dibs on peacetime government air transport and air travel contracts. Today, only carriers participating in CRAF can compete for government air travel business. (Those carriers technically ineligible for CRAF because their aircraft are not militarily suitable may still compete for government travel contracts. Such aircraft tend to be smaller, regional types.)

Not unlike human reservists, if "activated," CRAF aircraft must be ready to go within 48 hours and serve as long as a crisis persists—that is, until the Secretary of Defense orders an activation concluded. The number of aircraft called up is proportional to the size of the contingency: Stage 1 is for a regional crisis, a Stage 2 activation signals a major theater war, and Stage 3 represents a national mobilization for world war. At the beginning of 2014, CRAF comprised more than two dozen carriers and 552 commercial aircraft.

The CRAF has only been officially activated twice. A Stage 2 activation took place for Operation Desert Shield and Desert Storm in 1990-92, and a Stage 1 activation was ordered for Operation Iraqi Freedom in 2003. However, since 2001, private carriers have seen a big upward trend in government contracts,

at levels approaching that of Stage 3, even though it was never declared. To the degree possible, contract aircraft fly to airfields considered relatively safe, but activated CRAF aircraft may be sent anywhere.

Because the US military depends so heavily on CRAF, and because so many carriers depend on US government business, the Congressional Research Service dubbed the relationship "symbiotic" in a 2006 study of the program. In exchange for getting to buy only as much additional airlift as it needs, the government gives preference and steady work to those who commit to the program.

The government doesn't want to be the sole source of revenue for any company, however, and sets limits on how much of a carrier's overall business can be government contract work. That's because TRANSCOM and AMC want those carriers to be viable during downtimes, so they'll be available and can be called on for the next contingency.

At the height of the Iraq and Afghanistan conflicts, the industry was changing, Lyman said.

"If you look back eight, 10 years ago, we had basically seven major carriers. Now, through mergers, we're down to basically three passenger and two cargo, once the US Airways and American merger is complete," he said. For major domestic scheduled passenger carriers, that leaves United Airlines, American Airlines, and Delta Air Lines, and for cargo, FedEx and United Parcel Service. The others that Selva mentioned are a mix of US-flagged charter companies.

USAF photo by Maj. James Hutton

This Boeing 767, reconfigured to serve the aeromedical evacuation mission, was used for extensive training at Scott AFB, Ill.

The passenger airlines get the bulk of General Services Administration's City Pairs business—essentially all government official flying travel booked through airlines. At the same time, some of the business for certain companies—notably commercial passenger charters—has dried up.

LESS EXCESS

"The commercial charter passenger market is 10 percent of what it was in the '90s," Lyman said. He explained that travel agents used to "sell vacation packages, and they would charter an airplane" and fill it up with bookings for destinations like Cancun or Rome. Now, "the major carriers have … moved into those markets with scheduled service," eliminating much of the charter passenger business. Lyman said three of six remaining passenger charter companies exited the market just in the last three years. Consequently, the remainder become more dependent on CRAF work, a situation that has been allowed to continue in light of military need.

The major carriers have also changed their business models, Lyman said.

"I wouldn't say they have fewer airplanes. They have fewer spare aircraft. They have right-sized their fleets to match the business levels they can support," he said. That means "there is less excess capacity out there" that the US government can tap.

The airplanes also tend to be, on average, larger, and thanks to a push by AMC and TRANSCOM, they are more fuel efficient, thus expanding the amount of available cargo throughput and reducing fuel demand. Not coincidentally, this has made the carriers more efficient and productive.

At his confirmation hearing, Selva said there was yet another facet of the commercial business affecting the supply and demand for commercial air transport.

"With the introduction of large aircraft with large cargo bays below the passenger decks, we now see commercial passenger carriers re-entering the charter cargo market," Selva stated. "That has changed the dynamic of our Civil

Photo by Rick Maupin

Army Col. Kirby Watson (r) speaks with Gen. Paul Selva (l), head of TRANSCOM, at MacDill AFB, Fla. Selva announced the restructuring of CRAF during his confirmation hearing in March.

Reserve Air Fleet partners. We have to understand the impact of that change in the economy on their capacity to be with us in crisis."

The character of AMC's organic fleet has also changed. Compared to 1990, when CRAF activation was at its pre-9/11 zenith, AMC's aircraft are more numerous, more reliable, and larger, because of the introduction of the capacious C-17 and the re-engined and upgraded C-5M. In fact, the C-17 fleet is larger than the Air Force asked Congress to provide. With the wind down in Afghanistan, more of the organic fleet is available for cargo and passenger work.

National strategy has shifted, as well. "The old strategy was to support two major theater wars," Lyman explained. "The new strategy is to 'defeat and deny,' they call it, so it's full engagement in one war while we deny forward movement in another theater." Because of the change, "there is potential for the number of aircraft required in the CRAF program to go down, but … we don't know the answer to that, yet."

The CRAF study wound up being an 18-month affair—an attempt to get ahead of the shifting market and requirements and establish a CRAF operating model that would be "good" for the foreseeable future and adaptable to any strategic changes dictated by an upcoming mobility requirements study.

"We dissected key parts of the CRAF program, looked at it in intricate detail, and then proposed recommendations for the TRANSCOM commander and AMC commander approval that would restructure the program with a focus on maintaining readiness," Lyman said. The goal was to have the commercial element "ready to respond to the next contingency, which includes humanitarian assistance, if needed. And so we've done that."

The results of the study generated a package of 22 proposed recommendations to change the structure and timing of the CRAF. These were meant to keep the program attractive to industry and ensure the commercial partners would still be available when the nation called. At the same time, the recommendations had to adjust to reduced budgets and transport demands. The package was approved in mid-2014 by Selva, then head of AMC and now TRANSCOM chief, and Gen. William M. Fraser III, now retired, the TRANSCOM commander at the time.

Congress does not need to approve the changes. "I don't believe any legislative changes are required to the National Airlift Policy," Selva said in testimony.

"It's all within the authority of the TRANSCOM commander," Lyman said, "however, we briefed congressional staffers and we have briefed Headquarters, Air Force. So everyone in our chain of command is well-aware of the results of the CRAF study." The carriers were kept involved with the refinement of the CRAF program and their input was solicited. Now that the changes are final, "the carriers have not fired back with a lot of resistance," Lyman said, although whether they are "satisfied" with the changes "is in the eye of the beholder."

Most of the 22 changes in the CRAF agreement are highly technical and have to do with how many aircraft carriers must volunteer for CRAF duty; changes in the reliability standards, utilization rates (affecting how the carriers get paid), and response time; elimination of the aeromedical evacuation segment; establishing modern metrics for the pre-

An An-124 on the flight line at MCAS Miramar, Calif., in 2012.

USMC photo by Cpl. Jamean Berry

With a Little Help From Our (Former?) Friends

US Transportation Command needed to hire the services of Russian-flown Antonov An-124 airlifters, similar in size to the C-5 Galaxy, to help deploy outsize equipment to Iraq and Afghanistan over the last 13 years. This was especially so during the aggressive program to rapidly deploy mine-resistant, ambush-protected (MRAP) vehicles—so heavy only one or two could be carried at a time by even the largest transports.

Hiring these aircraft was not done through the Civil Reserve Air Fleet, but the companies involved did have to partner with CRAF participants, according to Sandra Halama, TRANSCOM's Contract Airlift Division chief.

"We charter them just as we do US-flagged carriers," Halama said in an interview. "We charter the plane," rather than lease it. "But it's a subcontracted arrangement through a CRAF carrier. So all awards to those foreign companies are made through the CRAF contract and their CRAF sponsor."

The CRAF sponsor—a US-flagged carrier—acts on behalf of companies like Volga-Dnepr that provide the big Antonovs or Ilyushin Il-76s. The US carriers receive "some kind of benefit" from acting as middlemen. However, those charters don't count toward the US-flagged carrier's entitlement to GSA City Pairs contracts or other cargo awards, Halama said.

Russian aircraft are chartered "only when we absolutely need to go to them," she said, because of the Fly America Act. "We always go to our CRAF carriers first." Russian aircraft are hired for outsize requirements too large to fit in a US-flagged carrier's aircraft, when C-17s are not available, or when "it's going to a location that we would not normally send a US-flagged carrier. So it's kind of a path of last resort."

The use of Russian-flagged aircraft has gone down "dramatically" over the last 18 months to two years, said Merle Lyman, chief of AMC's Commercial Airlift Division.

dictability and flow of cargo; and creating new ways for carriers to comment and communicate with TRANSCOM.

The new structure also eliminates the "60/40 rule." It demanded that 60 percent of a carrier's business be other than DOD work. It was viewed as paternalistic, and according to the study, "carriers expressed … a view that carriers should be responsible for … making their own business decisions."

More aircraft were added to Stage 1, to increase the TRANSCOM commander's flexibility to use it as a "surge capability for short-term requirements." It will be able to deliver two brigades of people and equipment within seven days, or support a major humanitarian assistance/disaster relief operation. Stage 2 and 3 remained as they were, "sized to satisfy mobility study requirements."

Rules changed, too, about how much credit would be given for GSA contracts based on CRAF participation. Under the old system, preference was based on participation in all three CRAF stages. Now, "the entitlement will be based on the aircraft placed into Stage 1," Lyman said.

However, all participants will simply be asked to contribute one airplane to Stage 1. Organic lift is sufficient to handle the bulk of the requirement, and there is more capacity available before the commercial carriers need to be called on. There will also be at least seven days' notice of activation, and seven days' notice of deactivation, to help the carriers better plan the use of their assets.

Some metrics were also adjusted. CRAF participants had been graded on their on-time performance over a three-month period. However, according to the study, "future business levels will be insufficient for a carrier to accumulate enough missions" in a 90-day period to meet reliability performance standards, so the metric has changed to four months or 15 cargo or 20 passenger missions.

DOD photo

Marines board an aircraft owned by Federal Express and chartered by Military Airlift Command during Operation Desert Storm.

AIRLIFT DEMANDS LINGER

The structural changes were meant to provide surge capacity on short notice, provide meaningful incentives, make CRAF scalable to future requirements, allow it to weather the "ebbs and flows" of the commercial market, improve internal management of CRAF, and pursue efficiencies "in planning, scheduling, and execution."

Although the CRAF changes go into effect with the signing of Fiscal Year 2016 contracts—in negotiation this past fall—some of the conditions have, perhaps predictably, changed.

Sandra Halama, chief of the TRANSCOM's Contract Airlift Division, said the airlift demand for supporting operations in Southwest Asia didn't decline quite as fast as expected. Some of that was due to the retrograde, or the return of people and equipment to the US, as Afghanistan operations wound down. (However, the bulk of retrograde shipments went by sea, or by air to seaports for surface travel the remainder of the distance.)

Now, "it's a combination of factors of current events and unexpected occurrences that we need commercial airlift to support," Halama said. She did not specifically say so, but a sudden surge of requirements to support operations against ISIS terrorists in Syria and Iraq required substantial movements of aircraft support gear and personnel from the US to Mideast bases.

"It's not anything that could have been forecasted," she said. The demands on airlift this past fall were "ad hoc, … so they would not be in that forecast that was originally provided."

Lyman said the point of the restructuring, overall, was "we are focused on maintaining readiness. And it's not just maintaining the readiness of the CRAF and the organic fleet. It's readiness of the enterprise to answer the next call." He said, "We are postured very well to support the interests of this nation with a ready air mobility fleet, which includes our CRAF partners." ✪

DOD photo by SSgt. Steve McGill

Military vehicles are unloaded from a Pan Am airliner, a CRAF aircraft in 1986. The jet was transporting the vehicles for a bilateral exercise, Team Spirit, with South Korea.

Keeper File

keeper@afa.org

The Blind Saw the Light

It is no exaggeration to say that the event that occurred in a remote area of New Mexico just before dawn on July 16, 1945, was not only unprecedented and world-changing but also indescribable. The event, code-named "Trinity," was the first detonation of an atomic weapon, marking the culmination of the Manhattan Project headed by Army Maj. Gen. Leslie Richard Groves. Two days after the historic blast, Groves set about trying to capture, in print, the indescribable. He produced a top secret memorandum for the then-Secretary of War, Henry L. Stimson, detailing the event he had witnessed. What he produced is a classic of Cold War history—the effort of a straightforward military man to comprehend the incomprehensible. In so doing, he immortalized an unidentified blind woman who also was present at the creation.

"Subject: The Test"

Maj. Gen. Leslie Richard Groves
Top Secret Memorandum
to Secretary of War Henry Stimson
Washington, D.C.
July 18, 1945

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

At 0530, 16 July 1945, in a remote section of the Alamogordo AB, N.M., the first full-scale test was made of the implosion type atomic fission bomb. For the first time in history there was a nuclear explosion.

And what an explosion! ...

The test was successful beyond the most optimistic expectations of anyone. Based on the data which it has been possible to work up to date, I estimate the energy generated to be in excess of the equivalent of 15,000 to 20,000 tons of TNT; and this is a conservative estimate. Data based on measurements which we have not yet been able to reconcile would make the energy release several times the conservative figure.

There were tremendous blast effects. For a brief period there was a lighting effect within a radius of 20 miles equal to several suns in midday; a huge ball of fire was formed which lasted for several seconds. This ball mushroomed and rose to a height of over 10,000 feet before it dimmed. The light from the explosion was seen clearly at Albuquerque, Santa Fe, Silver City, El Paso, and other points generally to about 180 miles away. The sound was heard to the same distance in a few instances but generally to about 100 miles. Only a few windows were broken although one was some 125 miles away.

A massive cloud was formed which surged and billowed upward with tremendous power, reaching the substratosphere at an elevation of 41,000 feet, 36,000 feet above the ground, in about five minutes, breaking without interruption through a temperature inversion at 17,000 feet which most of the scientists thought would stop it.

Two supplementary explosions occurred in the cloud shortly after the main explosion. The cloud contained several thousand tons of dust picked up from the ground and a considerable amount of iron in the gaseous form. Our present thought is that this iron ignited when it mixed with the oxygen in the air to cause these supplementary explosions. Huge concentrations of highly radioactive materials resulted from the fission and were contained in this cloud.

A crater from which all vegetation had vanished, with a diameter of 1,200 feet and a slight slope toward the center, was formed. In the center was a shallow bowl 130 feet in diameter and six feet in depth. The material within the crater was deeply pulverized dirt. The material within the outer circle is greenish and can be distinctly seen from as much as five miles away. The steel from the tower was evaporated. One thousand, five hundred feet away there was a four-inch iron pipe 16 feet high set in concrete and strongly guyed. It disappeared completely.

One-half mile from the explosion there was a massive steel test cylinder weighing 220 tons. The base of the cylinder was solidly encased in concrete. Surrounding the cylinder was a strong steel tower 70 feet high, firmly anchored to concrete foundations. This tower is comparable to a steel building bay that would be found in [a] typical 15- or 20-story skyscraper or in warehouse construction. Forty tons of steel were used to fabricate the tower which was 70 feet high, the height of a six-story building. The cross bracing was much stronger than that normally used in ordinary steel construction. The absence of the solid walls of a building gave the blast a much less effective surface to push against. The blast tore the tower from its foundation, twisted it, ripped it apart, and left it flat on the ground.

The effects on the tower indicate that, at that distance, unshielded permanent steel and masonry buildings would have been destroyed. I no longer consider the Pentagon a safe shelter from such a bomb. Enclosed are a sketch showing the tower before the explosion and a telephotograph showing what it looked like afterwards. None of us had expected it to be damaged.

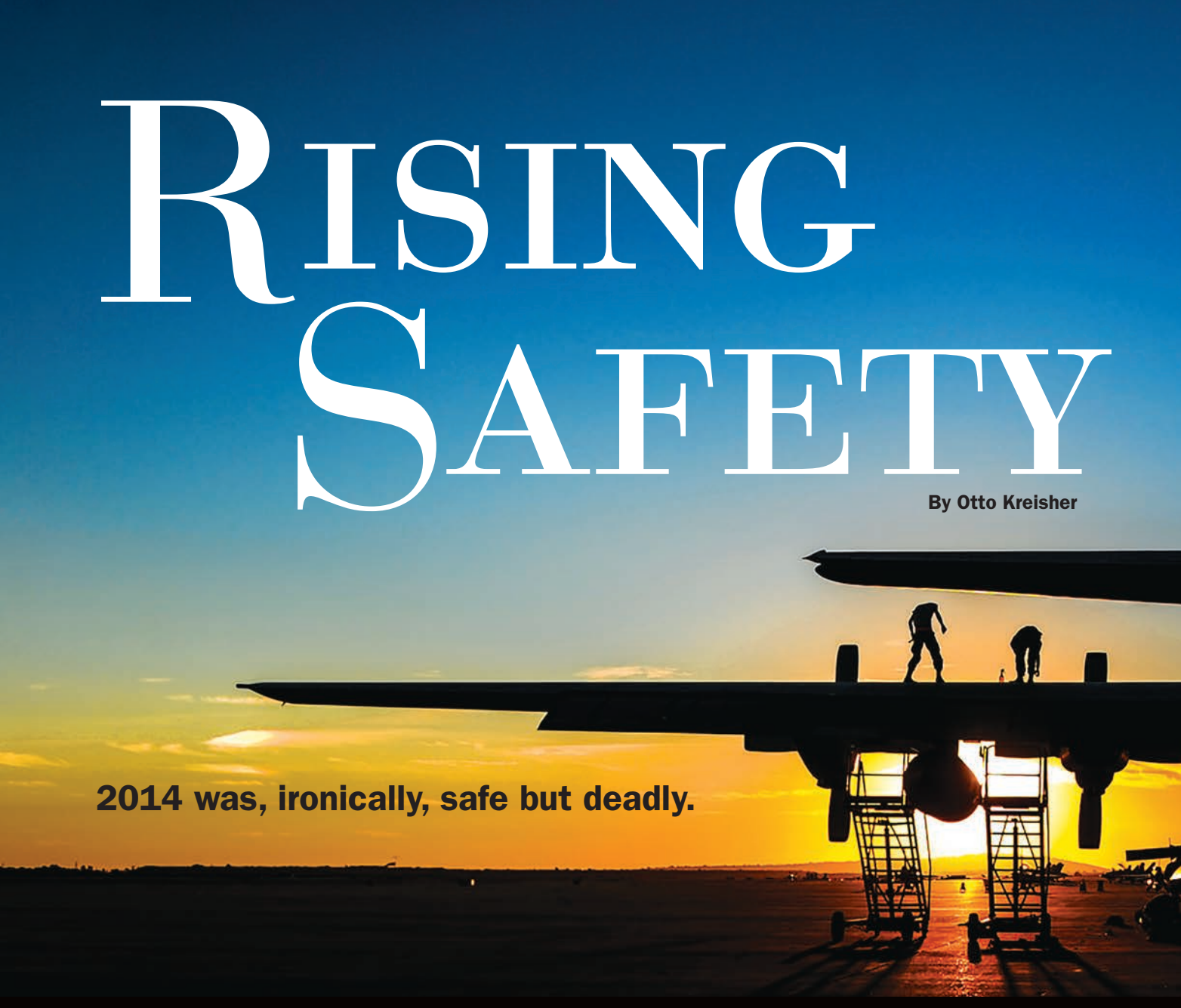
The cloud traveled to a great height first in the form of a ball, then mushroomed, then changed into a long trailing chimney-shaped column and finally was sent in several directions by the variable winds at the different elevations. It deposited its dust and radioactive materials over a wide area. ...

Just before 1100 the news stories from all over the state started to flow into the Albuquerque Associated Press. I then directed the issuance by the commanding officer, Alamogordo Air Base, of a news release as shown on the enclosure. With the assistance of the Office of Censorship we were able to limit the news stories to the approved release supplemented in the local papers by brief stories from the many eyewitnesses not connected with our project. One of these was a blind woman who saw the light. ✪

Photo by Jack W. Arby

Rising Safety

By Otto Kreisher



2014 was, ironically, safe but deadly.

The Air Force called Fiscal 2014 its best ever in flight safety, with the fewest aircraft lost to in-flight accidents. This record, which spanned from Oct. 1, 2013, to Sept. 30, 2014, came in spite of flying the oldest aircraft in the service's history and two-plus decades of near-continuous combat. A high number of fatalities dimmed the achievement, however.

Although there were 24 Class A, or major aviation mishaps, in Fiscal 2014—including aviation ground accidents—only two manned aircraft were destroyed. (A Class A mishap results in a fatality, a permanent or total disability, or $2 million or more in damage.)

Yet, 10 airmen died: four in the crash of an HH-60G Pave Hawk in England, one in an F-15C Eagle that crashed in Virginia, one in an incident that caused no aircraft damage, and four who died when a contractor-flown DHC-8-202 Prospector crashed in Colombia during a nighttime drug interdiction mission in October 2013.

Overall, that was a sharp drop from the 35 Class A aviation mishaps in Fiscal 2013—with 19 manned aircraft lost—and well below the 10-year average of 21.7 Class A mishaps. But the loss of life was only one below the 11 airmen who died in Fiscal 2013 and higher than the average of 7.7 fatalities over the last 10 years.

Was the record low number of air mishaps due to the service flying far less last year—because of groundings and flying hour cuts compelled by the budget sequester? USAF's initial announcement conspicuously lacked the Class A mishap rate that measures accidents per 100,000 flying hours.

However, in response to a query, the Air Force Safety Center said the preliminary mishap rate, as of

USAF maintainers work on an AC-130U Spooky gunship at MCAS Miramar, Calif., in November 2014 as part of an emergency deployment readiness exercise.

USAF photo by SrA. Christopher Callaway

Sept. 29 (with two days left in the fiscal year), was .44 per 100,000 hours. That compares favorably to a 1.13 rate in Fiscal 2013 and an average over the previous 10 years of 1.09.

The final mishap rate was to be released in early November, a spokesman said. Air Force safety chief Maj. Gen. Kurt F. Neubauer said the current state of Air Force safety is "excellent." But he added, "I think we can always do better."

Aviation "is an inherently dangerous business, but we can get our numbers even lower when airmen increase their focus on accomplishing the mission safely," he said.

Air Force Chief of Staff Gen. Mark A. Welsh III echoed that view in a statement welcoming the announcement of the 2014 safety record. "Our commitment to safety has been part of the Air Force fabric from Day One. Our goal is always to keep getting better at it."

In what may be a preview of the future, half the Class A aviation mishaps last year involved remotely piloted aircraft. The 12 RPA mishaps in Fiscal 2014 matched the 2013 total.

Last year also had the fewest on-the-job ground mishaps, with three airmen fatally injured in work-related incidents. The number of airmen killed in off-duty accidents also was down from recent years, although the 42 fatalities, most from motor vehicle crashes, are still far higher than Air Force safety officials are willing to accept.

"The most dangerous thing an airman does is get in his vehicle," and ground safety staffs from the Secretary's office to the wings "are actively engaged with airmen through training and awareness campaigns to mitigate that threat," Neubauer told *Air Force Magazine*.

USAF photo by SSgt. Antoinette Gibson

SSgt. Robert Eady inspects X-ray images of foreign object damage discovered in an aircraft. Even tiny bits of debris can lead to disaster if introduced to an engine during flight.

Unfortunately, this fiscal year has started off poorly. An F-15D was destroyed in a crash near RAF Lakenheath, UK, two F-16s went down in separate accidents, a third was damaged in a midair collision over Kansas, and an MQ-9 Reaper was damaged in a hard landing in Niger, all in the first six weeks of the fiscal year. Three pilots escaped major injuries, and another was killed.

In off-duty incidents, however, four airmen and an Air Force contract employee at Kadena AB, Japan, were killed. The number of off-duty vehicle accidents in October was not available.

Neubauer said Fiscal 2014 "saw the fewest aviation mishaps in the history of the Air Force, which is a huge accomplishment by our airmen. We feel the low numbers came from leadership involvement, a proactive stance to risk management, and attention to detail at all levels."

Mark Gunzinger, a retired Air Force colonel and command pilot who is now a national security analyst with the Center for Strategic and Budgetary Assessments, noted, "If you don't fly, the chances are you're not going to have an accident in an aircraft." On the other hand, "not flying for a period of time increases the chance of an accident when you do get to fly. So the fact that the accident rate was down, much lower, is a testament to the effort of the Air Force leadership to keep their people flying safely and to get the most critical training events accomplished."

The Air Force's mishap rate compares favorably to the other services' aviation safety records.

The Navy reported a Fiscal 2014 Class A mishap rate of 1.69, with 14 accidents. That was a jump from the previous year's rate of .48 and four mishaps, and higher than the 10-year average of .88.

The Marine Corps' rate for Fiscal 2014, with fewer total flight hours than the Navy, was 1.94, with five mishaps. It was an improvement over the Fiscal 2013 rate of 3.20 and eight mishaps and better than the 10-year average of 2.09.

The two naval services reported a total of six killed in air accidents in Fiscal 2014.

In Army aviation, where most flying hours are accrued in helicopters, the reported Class A rate was 1.49, with 16 flight or flight-related mishaps and five deaths. That was an increase over Fiscal 2013's rate of .81 with nine mishaps, but down from the previous year's eight deaths.

The Army operates a large number of remotely piloted aircraft of all sizes and reported 38 total mishaps involving RPAs, including seven Class As.

WHAT OF THE OLD FLEET?

There is growing concern about whether the geriatric Air Force fleet—at an average age of 26.2—now the oldest in its history—could affect flight safety.

"Airplanes are falling apart," Welsh told the Air Force Association's Air & Space Conference in September. Citing a B-1B fire caused by a broken oil flange and the grounding of half the F-16Ds for cracked canopy sills, Welsh said, too many accidents "are happening because our fleets are too old."

Neubauer, however, did not see the aging force as a safety issue. "The same airworthiness standards are applied to our entire fleet," he said. "All our aircraft run through a rigorous inspection and maintenance process to ensure we're executing the mission as safely as possible."

He also credited the maintenance airmen as "the best in the world at keeping aircrew safety and mission focus at the forefront."

Gunzinger, who flew the Cold War-vintage B-52 Stratofortress, endorsed that view, while conceding there is a valid concern "that we're now operating not

USAF photo by A1C Ryan Callaghan

SSgt. Michael Griggs checks a safety wire in an A-10C engine bay at Moody AFB, Ga. Aircraft are sent through phase inspections every 500 and 1,000 flight hours for in-depth examination.

ANG photo by MSgt. Marvin Preston

Maj. Gen. Kurt Neubauer, Air Force safety chief, addresses an executive safety summit last May. Neubauer believes USAF safety is excellent, but could always improve.

just the oldest but the smallest combat air force that the USAF ever operated. That will, more than likely, lead to mishaps, broken equipment, and so forth, … which is exactly why the Air Force is pushing so hard to modernize its force."

But the low accident rate was "a credit to how well the Air Force maintains its older equipment," he said.

The safety chief said he sees "no evidence" that the budget cuts from sequestration have had an impact on aircrew safety. "Their focus on doing the job right, when issues like sequestration are looming over them, is a tribute to their professionalism," he said.

He also discounted any effect from continuing combat, saying, "Combat missions are where all our safety training pays off. … As contingencies arise around the globe, we're involved with commanders to ensure the mission is accomplished."

In addition to his role as safety chief, Neubauer is commander of the Air Force Safety Center at Kirtland AFB, N.M. There he is responsible for developing, executing, and evaluating Air Force programs for aviation, ground, weapons, space, and systems mishap prevention and nuclear surety programs. He also directs research in safety awareness and mishap prevention, oversees mishap investigations, evaluates corrective actions, and ensures implementation.

In information provided to *Air Force Magazine,* center officials said, "The growing use of proactive safety data and the AF-wide adoption of the Safety Management System were key to the FY14 safety success."

The center officials emphasized the importance of the "voluntary reporting systems," including the Aviation Safety Action Program, in which airmen "voluntarily reported hazards and errors while completing the mission." ASAP reporting increased 38 percent in Fiscal 2014, the officials said, aided by reports from eight additional aircraft types, or "mission design series (MDS)."

Reports from those added MDS communities "is evidence more airmen want to share lessons learned," they said.

The use of the ASAP program, flight data analysis, Military Flight Operations Quality Assurance, a peer-to-peer cockpit observation program, the Line Operations Safety Audit, and "a concerted effort by Air Force senior leadership to focus on appropriate risk acceptance at the right levels led to the lowest loss rate in Air Force manned aviation."

DATA DRIVEN DECISIONS

Reflecting the growing role of RPAs, the center reported progress in standardizing RPA safety processes to match that of manned aviation. That requires consideration of variables such as the RPAs' ability to fly up to 24 hours, using "a fleet of controllers instead of one," and the controllers' need to "work through problems, such as weather and mechanical issues, from 2,000 to 3,000 miles away."

The center's information stressed the value of involving everyone, from Headquarters Air Force level down, and a "leadership focus on discipline and compliance" to demonstrate support for safety programs.

In Fiscal 2014, more than 57,000 airmen gave safety feedback directly to their commanders, and the center provided 427 one-on-one safety interviews with commanders. The airmen's opinions were analyzed in detail and every written comment was reviewed and provided to the writer's commander.

Neubauer cited the value of the Air Force Safety Automated System, the service's sole mishap reporting system, in providing "data in an unprecedented way for mishap reduction in 2014." Air Force actions on safety in 2014 "were based on AFSAS data, including thousands of queries and automated reports that revealed new insights and perspective into the 15,387 mishap reports and their findings, recommendations, and

USAF photo by A1C David Bernal Del Agua

Oklahoma Air National Guard members prepare an F-16 vertical stabilizer for transport after a crash near Moline, Kan.

USAF photo by A1C Preston Webb

Maintainers push a KC-135 tanker engine into place at RAF Mildenhall, UK. Inspecting these mammoth engines is difficult—they each weigh some 5,000 pounds.

associated data. Data-driven decisions [are] the key."

The AFSAS is an example of how the service "is capitalizing on technology to transform safety in the 21st century," the Safety Center said. "For example, aviation risk management processes are maturing, proactive hazard identification protects the reduced number of more costly assets, and more people are connected electronically so everyone will soon be able to report a hazard electronically."

To cover all aspects of Air Force safety, the center has several divisions in addition to the aviation component. Those include the Weapons Safety Division, setting policy for nuclear surety and safety for the development and use of all nuclear, conventional, and directed energy systems; a Space Safety Division, responsible for the assured safe access to space through oversight of launch, range, orbital, and end-of-life programs; a Human Factors Division with experts on operations, medicine, physiology, psychology, and behavioral science, all focused on the human element in mishap prevention; and the Analysis and Integration Division, responsible for the AFSAS.

A key component is the Ground Safety Division, managing on- and off-duty safety programs. This covers operations, occupational, sports, recreation, and traffic activities. "It oversees integration of Air Force safety inspections and policy, in conjunction with the Air Force inspector general, as well as integration of risk management processes in on- and off-duty activities," the center's website explains.

Ground safety programs obviously are important because they involve far more personnel than aviation.

Neubauer said the ground safety staffs "have made extensive efforts" in the on-duty area to reduce injuries due to falls and vehicles backing up. All the major commands participated in a review of and emphasis on the hazards of falling, last year, and a new emphasis on job safety training was initiated to address "the inherent hazards in backing government and specialty vehicles."

"Risk management advisors at every level are responsible to commanders to monitor RM processes required by majcom- or wing-level policy," he said. "Risk management, when applied to every activity, increases alertness, mitigates hazards, and prevents mishaps."

Those efforts apparently contributed to a drop from seven on-duty fatalities in Fiscal 2013 to three last year, the lowest in 10 years. The drop in off-duty fatalities was not as great, down from 47 to 42.

Two of the on-duty deaths were in combat support and training activities and the third was in a government vehicle accident.

Of the 42 off-duty ground fatalities, 29 involved private motor vehicles, the leading cause of off-duty deaths, including 15 in four-wheel vehicles and 13 in motorcycles.

The Army and Marine Corps have attributed a recent jump in off-duty deaths to risky behavior by troops recently returned from combat, a fact supported by a 2012 study by the United Services Automobile Association, the insurer for many military members. Many of those fatalities were in motorcycle accidents.

Neubauer said that study showed the Air Force had the lowest increase in such incidents, and "our own mishap analysis also shows little correlation between deployments and an increased number of accidents compared to the general population."

"When returning from deployment, airmen attend Airmen Resiliency Training, which covers post-deployment and reintegration focused on home and family, work, and substance abuse," the safety chief said.

The Air Force also operated a motorcycle safety program that trained 9,160 airmen over the last three years, 3,370 last year alone.

Bill Parsons, the Air Force chief of ground safety, attributed a drop from 34 off-duty vehicle fatalities in 2013 to 28 last year to that training, "increased commander involvement," and other ground safety efforts. "But we must redouble our efforts. One life lost is one too many," Parson said in an Air Force news release.

In October, the Ground Safety office announced the "Quest for Zero" campaign, to focus on risk management and on-duty safety. "The campaign is designed for every airman, in all career fields, to raise awareness of the hazards they face every day, at work and at home," the Safety Center said in its announcement. ✪

Otto Kreisher is a Washington, D.C.-based military affairs reporter and regular contributor to Air Force Magazine. *From August to November 2014, he also served as this magazine's senior correspondent. His most recent feature article was "Air Base Defense" in the July 2014 issue.*

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Back In Black.

By Aaron M. U. Church, Associate Editor

With fewer permanent American installations overseas, national military strategy now puts greater emphasis on frequent engagement with friendly and allied nations, usually in the form of short-term joint military exercises. The approach has been summed up as "places instead of bases."

Remarkably, although the US and Australia have been fast friends and military partners for decades, joint exercises on Australian soil have been few and far between. Air Force bombers have visited Australia, but extended deployments of USAF fighters "Down Under" have been a rarity.

Members of the District of Columbia and New Jersey Air National Guard deployed with their F-16s to Australia last summer, developing lessons and tools that will pave the way for what are expected to be more frequent positioning and operations at bare-base locations. They also got a chance to see how the Royal Australian Air Force manages to defend its far-flung territories with relatively small forces.

"Around April, which is a little behind the normal planning time line, we were asked to move our forces to Australia to provide support for two international exercises: Pitch Black 2014 and Tri-Sling," said Lt. Col. Valentine Arbogast, deployed commander of D.C.'s 121st Expeditionary Fighter Squadron.

"It's the first time an Air National Guard fighter unit has participated in any Australian exercise," he said.

The two Air Guard units were already on tap to deploy to South Korea as part of what's called a theater security package to augment Pacific Air Forces assets in the region. They deployed to Kunsan AB, South Korea, in May—a routine type of deployment—and the pop-up call came to go on to Australia from Kunsan.

The New Jersey ANG's 177th Fighter Wing, based in Atlantic City, led the first half of the TSP at Kunsan, augmented by personnel from D.C., while D.C'.s 113th Wing would take the lead for the last two months of the rotation.

And so, in July, additional D.C. Air Guardsmen at JB Andrews, Md., made a middle-of-the-night departure aboard a chartered Boeing 767—destination

District of Columbia and New Jersey Air National Guardsmen pause for a group photo after the conclusion of Exercises Pitch Black and Tri-Sling at RAAF Tindal in Australia's Northern Territory.

How do F-16 units get from Washington, D.C., New Jersey—and South Korea—to Australia?

USAF composite image by SMSgt. Mike Davis and A1C Aaron M. U. Church

Darwin, Australia. It marked the first time in a decade a USAF fighter squadron would visit Australia.

MORE TRIPS ON THE HORIZON

Pitch Black is the RAAF's largest air combat exercise. It's held every two years from the bases RAAF Darwin and RAAF Tindal in the country's Northern Territory.

Even as Pitch Black '14 was underway, Defense Secretary Chuck Hagel was signing a new force posture agreement with Australian officials to make Air Force rotations to Northern Territory a routine occurrence. Not only is Australia a key ally in America's Pacific strategy, but the country's northern region boasts large swaths of unrestricted training airspace and some of the best flying weather in the Pacific. This year's exercise drew 110 aircraft and more than 2,300 personnel from Australia, France, New Zealand, Singapore, Thailand, the United Arab Emirates, and the US.

Tri-Sling, previously known as the bilateral US-Singaporean exercise Commando Sling, usually takes place in Singapore. The wargame—renamed to reflect the third participant—made its debut on Australian soil and piggybacked on Pitch Black.

Most Pitch Black participants bedded down at Darwin, near the north-central tip of Australia. It's about as far from Sydney as Montana is from Washington, D.C.

Singaporean F-15SGs, Thai JAS-39 Gripens, UAE F-16s, Australian F-18A/B Hornets and E/F Super Hornets, and an array of support aircraft flew in from the port city. The USAF contingent, however, was stationed some 200 miles south into the Outback at Tindal, whose night sky, free of any city skyglow, gave Pitch Black its name.

Because Tindal was a new location lacking a USAF host unit, on-the-ground preparations began with a series of scouting expeditions months in advance. A site survey team gathered information on everything from where vehicles, food, and supplies could be procured to the natural hazards and security threats unit members might face. Unit intelligence, logistics, and security personnel checked out quartering arrangements, usable ramp space, host-nation security, and numerous

other variables to tailor the deployment package.

RAAF Tindal was constructed as a bare base, lacking a permanent flying unit, but capable of supporting exercises and periodic deployments of air units. In the late 1980s, half the base was built up as the permanent home of F-18A/Bs belonging to RAAF's 75 Squadron. The other half remained a bare base comprising aircraft dispersal shelters, an operations bunker, a handful of administrative trailers, and limited housing.

As a result, the D.C. Guard had to bring in practically everything it needed, from aircraft tow bars to a containerized, secure debriefing facility airlifted into Tindal ahead of the F-16s' arrival.

Until the D.C. ANG's deployment, only a couple of B-52s, as part of a continuous bomber rotation to Guam, had been to nearby Darwin. The D.C. F-16s were opening a new operating location and building valuable lessons for the units that will follow.

The D.C. Guard's advanced echelon touched down a week or so ahead of the main body, making certain that lodging, transportation, and basic amenities were ready and waiting when unit personnel arrived. An entire fleet of vehicles had to be rented just to support flight line operations, shuttle personnel across the expansive base, and provide command support on the ground. The F-16s themselves require a substantial amount of specialized ground support gear, so a small maintenance team flies ahead of the deploying jets each time they are ferried.

An En-route Support Package-Advanced (ESTA) team packs the minimum required spares, support equipment, and personnel onto a single C-17 and flies ahead to the destination or a divert airfield, if needed. The "ESTA bird" unloaded at Tindal a day before the first wave of F-16 arrivals, and the team quickly staged the tools and equipment needed to bring the aircraft in.

The team walked the taxiways and shelters, checking for infrastructure hazards or shortfalls—such as a lack of fire suppression equipment—and coordinated solutions with the Aussie host. The crew chiefs gauged that with artful taxiing and close coordination between crews, two F-16s could safely be parked, launched, and recovered from each shelter. With this in mind, shelters on one-half of the taxiways—laid out in unique figure-eights—were marked for flight operations, leaving the other half for use as makeshift back-shops for engine, fuel system, or deep maintenance needs.

USAF photo

Staff photos by Aaron M. U. Church

Here: D.C. Air Guardsmen board a charter flight for an early morning departure from JB Andrews, Md., en route to Darwin, Australia, on July 26. Top: An F-16 belonging to the New Jersey ANG takes off from Kunsan AB, South Korea. Right: A C-17 airlifter on the tarmac at JB Pearl Harbor-Hickam, Hawaii. Globemasters from several Pacific Air Forces bases, including Hickam, supported the theater security package's movement from South Korea to Australia.

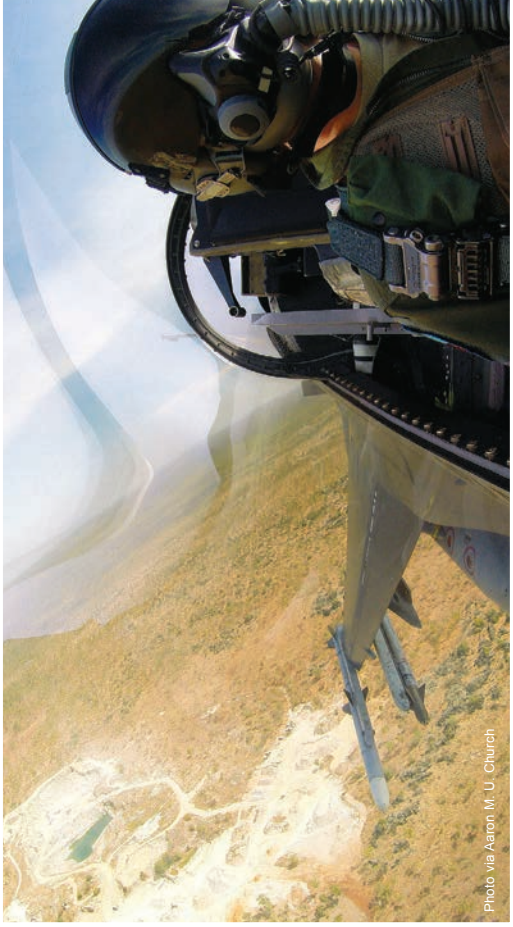
The main body of personnel arrived in the early morning hours of the next day—a mere nine days before exercise flying kicked off. Their chartered Atlas Air 767 stopped at JB Pearl Harbor-Hickam, Hawaii, just long enough to refuel, delivering the contingent to Darwin Airport about 30 hours after leaving Andrews. Customs requirements dictated that incoming cargo and personnel pass through the port-of-entry at Darwin, instead of proceeding directly to Tindal. That tacked onto the journey a four-hour, 200-mile road trip south to RAAF Tindal.

The first package of six F-16s leaving Kunsan got airborne later the same morning, rendezvousing with tankers several times on the way over the open ocean to Australia. Since RAAF Tindal's eucalyptus-forested maze of taxiways was unfamiliar to the incoming pilots, the ESTA team provided a truck to escort each F-16 to the next empty shelter as they landed.

The jets carried the wheel chocks, grounding cables, and basic recovery equipment they needed in travel pods on wing pylons. Crew chiefs opened the pods with the engines running, retrieved the equipment, ran through their checks, and cleared the pilots for engine shutdown.

FIVE FULL C-17S

With half the fighters safely at Tindal, maintenance personnel inspected the spartan operational and technical facilities and then designated spots for incoming cargo. A centrally located aircraft shelter was chosen as an ad hoc supply section, aerospace ground



Above: An F-16C pilot banks over the Australian Outback on takeoff from RAAF Tindal for an Exercise Tri-Sling sortie. Above right: D.C. ANG crew chief A1C Aaron Church prepares an F-16 for engine start during Exercise Pitch Black. Church is also an* Air Force Magazine *associate editor.

equipment garage, and dispersal point for air freight. Cargo followed quickly on the heels of the main body, allowing just enough time to get people in place and ready to unload containers, pallets, and vehicles from the incoming airlifters.

It took five fully loaded C-17s to airlift everything but the weapons needed to sustain a squadron-sized F-16 detachment for two months. (To avoid shipping live ordnance, the F-16s only simulated ground-attack missions during the exercises.)

Australia has strict customs standards and aggressively controls anything crossing its borders. Everything loaded onto the C-17s at Kunsan or Andrews had to be pressure-washed and sanitized to remove potentially invasive organic matter or contaminants. Although the Air Force cooperated closely with the Australian Department of Defense, the civil border agency still subjected military cargo to standard scrutiny. All inbound cargo—tankers included—stopped for inspection in Darwin and was usually quarantined for several days, causing unforeseen delays for cargo into Tindal.

Once aircraft got airborne from Darwin, Tindal was a short hop away, so airmen volunteers were kept on short-notice standby to receive and unload cargo whenever the C-17s were released from Darwin. The first cargo "chalk" was only held up a day or two, and as soon as each arriving C-17 taxied in, everyone from admin to crew chiefs pitched in as aerial porters to quickly get the airlifters emptied and underway before the crew's mandatory rest period began. RAAF air-movements personnel operated unloading equipment, and forklifts whizzed back and forth towing ground equipment and pallets from the cargo apron to the fighter staging area.

Meanwhile, another challenge brewed in the Pacific Ocean. As the last C-17s were unloaded, and just as the second wave of F-16s was scheduled to take off from Kunsan, the strongest tropical storm of the season churned through the Sea of Japan. Typhoon Halong began building into a Category 5 storm directly along the fighters' planned route to Australia. Even without diverting to avoid weather, each jet needed to refuel several times en route, given the roughly 3,500 miles from Korea to northern Australia.

The F-16's two 370-gallon external tanks gave it about 90 minutes' flying time between refuelings, and KC-135s from Kadena AB, Japan, were scheduled to escort the package. As the storm closed in on Okinawa, the tanker mission was scrubbed. The longer the jets sat in Korea, the greater the chance they, too, would be forced to wait out the storm.

The fighters were initially slated to arrive early enough to allow several days' maintenance and prep ahead of Pitch Black. As PACAF shuffled tankers, the F-16s' departure slipped from early in the week, to Friday, then to Sunday. Sorties to acquaint pilots with the airspace were planned for the following Monday, and Pitch Black would begin in earnest later that week.

By the time the jets took off from Korea, the rumor on the ground at Tindal was that they might have to turn around due to the storm or tanker problems. Four of the six F-16s made it aloft and managed to join up with a tanker, now coming from Hawaii. It was rough flying for the pilots skirting around the storms—made rougher by the challenge of keeping contact with the KC-135's jostling air refueling boom.

Two F-16s returned to Kunsan with maintenance issues and were caught behind the typhoon, ultimately missing all but a few days of Pitch Black.

Minutes before the F-16 four-ship roared over RAAF Tindal, there was still a chance they would have to divert to Darwin due to fuel, requiring a ground team there. They made it to Tindal, however, and after touchdown the weary pilots were met with cold Aussie beers on the flight line, while maintainers gave the aircraft a thorough pre-/postflight inspection ahead of Pitch Black familiarization flights the next day.

As the jets in the exercise launched on Monday, Aug. 4, 10 of the 12 ANG F-16s were in place, ready to begin the training. For the first sortie, four F-16s taxied out and queued up with Australian F-18s from visiting 77 Squadron, which shuffled places with the home unit to enjoy Tindal's wide-open airspace.

After the typhoon dissipated in the South Pacific, the last two F-16s touched down on Australian soil Aug. 18. Planners were able to organize available aircraft to meet the flying schedule despite weather and logistical challenges, and within less than two weeks of arriving, Air National Guardsmen were flying a full exercise flying schedule Down Under. ✪

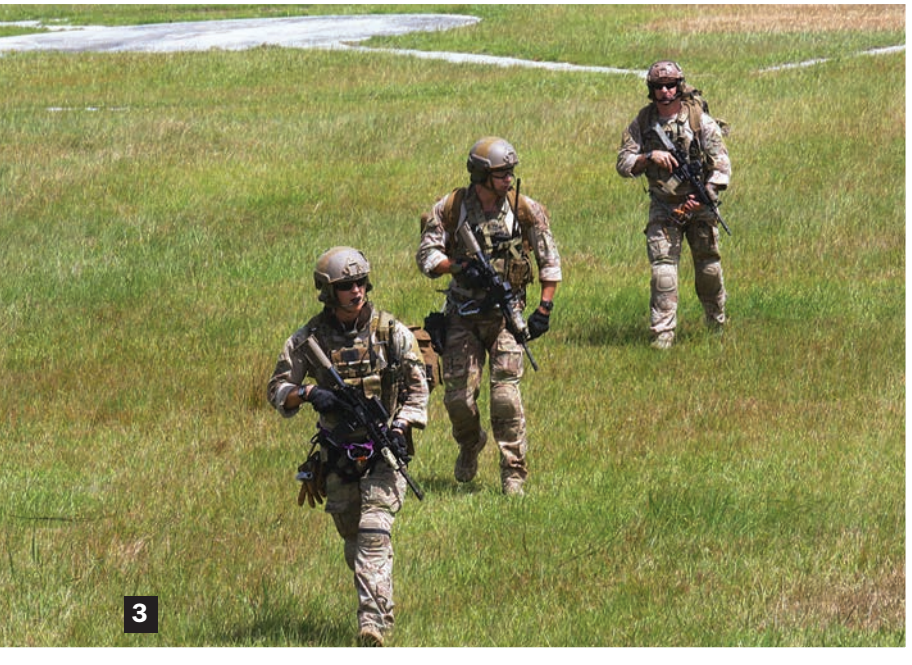
Hawg Heaven

Photography by Rick Llinares

At Moody AFB, Ga., airmen hone CAS and CSAR to perfection.

Moody AFB, Ga., in Valdosta near the Florida border, is one of the Air Force's most diverse bases, hosting fighter and rescue units. The 23rd Wing comprises A-10 Warthogs, HC-130J Combat King and HC-130N/P King refueling aircraft, and HH-60 Pave Hawk combat search and rescue helicopters. The pairing of fighters and helos is deliberate: A-10s often protect CSAR forces on a rescue or recovery operation, and the units have opportunities to practice this essential coordination by being based with each other. Most of the Moody aircraft are seasoned vets with years of hard wear, and USAF is either thinking of or actively moving toward retiring them, but members of Congress so far remain unconvinced—particularly about the A-10.

Here, a pair of 74th Fighter Squadron A-10Cs pull a hard turn, while the lead aircraft pops flares. The A-10 can carry a wide variety of stores, and these Warthogs carry a typically varied payload, including air-to-air Sidewinder missiles, air-to-ground Maverick missiles, BDU-33 practice bombs, rocket pods, and a Litening targeting pod.



|1| Over the Grand Bay Bombing and Gunnery Range, SSgt. Jay Bossy fires a .50-caliber machine gun from the gunnery window of an HH-60G Pave Hawk assigned to the 41st Rescue Squadron. |2| Security forces SrA. Randall Williams (left) and A1C Taylor Cyr stand guard in front of an HC-130J, the newest type. |3| Pararescuemen—often called PJs, for short—simulate the rescue of a downed airman on the range.

|1| *On the Moody flight line, SSgt. Mario Ortiz Jr., A1C Cameron Miller, A1C Alex Trillana, and A1C Wesley Yeary (l-r) discuss maintenance of an HC-130J of the 71st Rescue Squadron. The tankers extend the range of rescue helicopters into and out of the battle zone.* *|2|* *A four-ship of A-10Cs of the 74th Fighter Squadron line up for takeoff. The shark mouth and "FT" tail code—seen in photo 3—are reminders of the unit's heritage from World War II as part of the "Flying Tigers" 23rd Fighter Group.* *|3|* *A Pave Hawk hovers above the runway as an A-10 taxis past.* *|4|* *A1C Joseph Wilson and SSgt. Randy Jones of the 41st Aircrew Flight Equipment Unit preflight gear for an HH-60 crew, including insulated flight suits and radio headsets.* *|5|* *SrA. D. Martin gets ready to hook an air conditioner to a 71st Rescue Squadron HC-130J prior to an engine run.*

|1| A-10Cs of the 74th FS pop flares and bank hard, revealing the "false canopy" painted on the aircraft's underside to confuse enemies about the aircraft's attitude. |2| In the A-10's "teeth" is its unique weapon—a 30 mm cannon designed to shred armored vehicles. The thunderous roar of the A-10's gun is often enough to send enemies fleeing. |3| SSgt. Jean Vega Guilbe (left) watches for bad guys after his Pave Hawk sets down during an exercise at Grand Bay. At right is Capt. John Tucciarone. |4| Ortiz removes intake covers from an HC-130J in preparation for a mission.

I1I *A pararescueman is hoisted by a 41st Rescue Squadron HH-60G Pave Hawk on the Grand Bay complex. PJs must be skilled in parachuting into dangerous terrain, providing paramedic care to the injured, defending themselves and their charges with small arms, and in operating equipment aboard the Pave Hawk. Many USAF decorations for valor during the wars in Afghanistan and Iraq have gone to pararescuemen, whose motto is "That Others May Live."* ***I2I*** *A menacing brace of A-10s line up for the camera. Designed for Cold War battle against hordes of Soviet tanks, A-10s have been involved in almost every US conflict since Desert Storm in 1991, sometimes surviving heavy battle damage.* ***I3I*** *TSgt. Ryan Goedde inspects and preps a .50-caliber gun on a 41st Rescue Squadron Pave Hawk. The corrugated tube directs casings away from sensitive gear on the aircraft.* ***I4I*** *A crew chief carries safety pins pulled before an HC-130J mission.*

I1I TSgt. Mike Shepherd (left) and A1C Sterling Vaughan work on an A-10C engine on the Moody flight line. I2I Capt. Eric LaPrade prepares to taxi an A-10 to takeoff. The A-10C got several substantial upgrades in recent years. The "C" indicates this aircraft received a digital upgrade that allows more sensors and weapons to be carried. A number of A-10s have also been rewinged. I3I SrA. William Bennett (left) and MSgt. Jeff Craig repair the engine on a Pave Hawk of the 347th Rescue Group. I4I Three pararescuemen take up defensive positions on the Grand Bay range after fast-roping from a Pave Hawk. Downed airmen are treated with suspicion and must give correct challenge words before getting a lift back to safety, to prevent imposters from coming aboard the aircraft.

I1I *Bossy (left) and Vega Guilbe sit in the back of a Pave Hawk. The cramped quarters of the HH-60 has long been suboptimum for rescue work, and USAF has tried to replace the type a couple of times, once with a much larger CH-47 derivative. The next CSAR platform will be only moderately larger.* ***I2I*** *An A-10C strikes a fearsome pose, sporting Maverick missiles. Though the A-10 is officially the Thunderbolt II, the moniker "Warthog" has been proudly borne by A-10 pilots and crews for decades.* ***I3I*** *A Pave Hawk crew shows off the specialties of the talent onboard: pararescuemen, pilots, and a gunner.* ***I4I*** *A-10s of the 74th FS release flares as they break away. A-10s are back in action in Iraq, conducting strike and close air support missions against ISIS targets. If the combined rescue team must go into action, they'll be well-prepared from their time in Georgia.* ✪

USAF Missile Defense—From the Sea

By Dan Taylor

USNS *Howard O. Lorenzen* (T-AGM 25) looks like a Navy ship. It is outfitted with Pentagon-furnished equipment and sensors, is sailed by Navy Military Sealift Command personnel, and is named after a Naval Research Laboratory engineer. It is however, an Air Force vessel.

Lorenzen reached initial operational capability in March 2014, not long after its predecessor, USNS *Observation Island,* was decommissioned after nearly 60 years at sea. In a world of proliferating missile threats, the missile defense mission is one of growing importance to the Air Force.

The vessel itself is not what's important, but what it carries is: an incredibly powerful radar, known as the Cobra King. It replaces the Cobra Judy radar that was hosted on *Observation Island.* Built by Raytheon, which declines comment about it, the radar defines the purpose of the program: ballistic missile treaty verification.

There's not much the Air Force will say about it, either. Service spokeswoman Vicki Stein said the service is "limited on what we can provide," but noted that Cobra King's mission originates from the Strategic Arms Reduction Treaty signed in 1991 between the United States and the Soviet Union after the fall of the Berlin Wall.

Officially, Cobra King's purpose is to monitor former Soviet missile testing for START verification purposes. Its secondary mission is to support domestic missile testing. Basically, Cobra King is an ever-vigilant watchdog, keeping an eye on ballistic missile tests around the world, by both allies and hostile nations, and on US tests.

Historically, missile tracking and telemetry has been an Air Force mission. Cobra King is part of the Air Force's broader Cobra family of radars—one that happens to be at sea. Air Force officials won't say exactly where and how Cobra King has been used, but with growing concerns about missile programs in North Korea, Iran, and other countries, the Pentagon places a high priority on having powerful missile-detecting assets in its arsenal.

Cobra Judy was involved in the high-profile shootdown of a defunct satellite that was expected to plummet to Earth in 2008. The US satellite, launched two years before, malfunctioned shortly after deployment, and the US opted to destroy it at high altitude rather than risk an unpredictable impact on the Earth. Observers noted, however, that the satellite's destruction was also a not-so-subtle demonstration that the US could shoot down a satellite. The "clean" mission, which left no orbital debris, was a strong riposte to China, which had demonstrated an anti-satellite capability of its own in 2007. That event left a large and dangerous debris field in orbit.

LONG TIME COMING

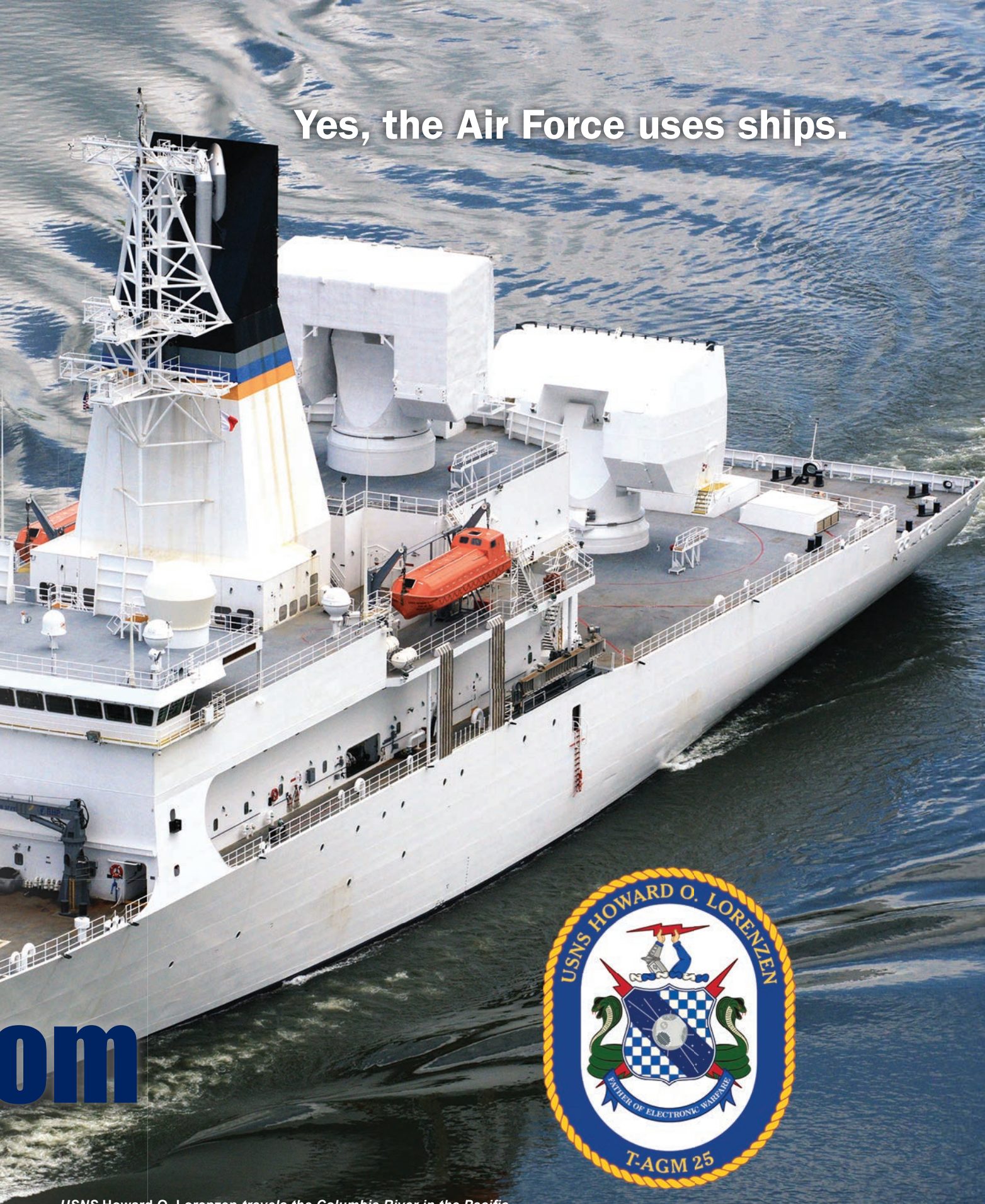
The power of Cobra King is visible to the naked eye. At more than 200 tons, it's a big radar, just like the Cobra Judy. It's so big, it needs the 534-foot *Lorenzen* to carry it around the world.

The arrival of the radar has been a long time coming. The contract for *Lorenzen* was first awarded back in 2006 to VT Halter Marine, the ship was delivered in January 2012, and it finally became operational last year. It underwent contract trials off the coast of California in late 2013. The trials "exercised all aspects of the vessel and its systems, including main propulsion, damage control, supply, deck, navigation, habitability, electrical systems, and operation," according to an Air Force statement. The estimated cost of the Cobra King project is $1.74 billion.

The most recent contract award on the program was $9.8 million to Raytheon in February 2013, which covered an alternative architecture study in support of the Cobra King program.

The history of Cobra King stretches back to 1952, when Cobra Judy's host vessel, *Observation Island,* was laid down as a Mariner-class high-speed cargo ship with the designation EAG-154. It was called *Empire State Mariner* back then. In 1956, the ship was transferred to the Navy along with three other Mariners. It underwent a conversion to the first naval ship with a fully integrated fleet ballistic missile (FBM) system. In 1958, she was recommissioned as *Observation Island.* The Navy didn't make many engineering changes to the ship itself, but did make extensive alterations within the superstructure and hold areas to allow for the installation of the FBM system. After that, it conducted dummy missile launches and communications tests in the Atlantic. In 1959, *Observation Island* conducted the first at-sea launch of a Polaris submarine-launched ballistic missile and continued to support Polaris flights into the 1960s. President John F.

Yes, the Air Force uses ships.



USNS* Howard O. Lorenzen *travels the Columbia River in the Pacific Northwest on the way to the Pacific Ocean.

Oregon Military Department of Public Affairs photo by SSgt. Jason van Mourik


Military Sealift Command photo


USAF photo


DOD photo by Sgt. Robert S. Thompson

Left: USNS* Observation Island *conducts a Polaris missile test off Cape Canaveral, Fla. Top:* Observation Island *during a Cobra Judy exercise in 1981, after modifications to equip it with a phased-array radar turret. Above: Cobra Dane, a phased-array radar system specially constructed to detect ballistic missile testing on a Russian Siberian peninsula, in 1977.

Kennedy observed a Polaris launch aboard *Observation Island* just six days before his assassination.

The vessel was sidelined in the early 1970s until the Navy reacquired the vessel in 1977 and transferred it to Military Sealift Command with the designation T-AGM-23. It wasn't until the early 1980s that Raytheon was tasked with developing Cobra Judy. In 1985, the company installed an X-band radar to complement the S-band phased array system on board. The upgrade was intended to improve the system's ability to gather data on a ballistic missile's terminal phase, creating the dual-band radar the Air Force prefers today.

DOUBLE THE CAPABILITY

The dual-band capability and its mobility are what make Cobra King such an asset to the Air Force. Actually, the Pentagon has bigger radars than Cobra King, even at sea: the massive Sea-Based X-band Radar (SBX-1) is built on a 50,000-ton drilling rig. But SBX-1 lacks those two key abilities.

Due to the fact that Cobra King is based on a ship, it can move fairly quickly to any part of the world, responding to crises as they emerge, whereas SBX-1 must be towed—slowly—to an operating location. SBX-1 also only has an X-band radar, used for tracking multiple targets over a wide field. S-band, on the other hand, narrows down data collection to specific individual objects. The radars work very closely together.

The Air Force spokeswoman said S-band radar is specifically used to search and acquire the target, and then hand it off to the X-band, which provides high-resolution target characterization.

Cobra King will differ from the Cobra Judy in that it will both be more complex and easier to maintain.

"Cobra Judy required highly skilled engineers and technicians who could troubleshoot and repair faults to the component level," Stein said. "This required test equipment tools and skill sets. Even though Cobra King is significantly more complex, it is easier to maintain because it was designated with 'BIT' (built-in test) to facilitate the rapid troubleshooting, repair, and return to service of the radar."

In addition, operators and technicians can troubleshoot and replace components themselves, and spares are stored on the ship for nearly all components.

According to a chart provided by the Air Force, there are other key differences between the platforms. For example, if the Cobra Judy's S-band radar failed, the mission failed. However, with Cobra King, the X-band radar can continue to collect data even if the S-band radar isn't functioning. Also, Cobra Judy only provided standard definition, versus Cobra King's high definition. Cobra King can also track well over a thousand targets using both bands, versus only about 100 for Cobra Judy, and it can collect terabytes of data instead of only gigabytes.

There are also important differences between the vessels themselves. *Observation Island* relied on steam turbines, but *Lorenzen* uses modern diesel-electric engines. *Lorenzen* also requires a smaller crew: some 60 Navy personnel instead of 100. And at a lower operating cost, *Lorenzen* provides operational availability of more than 75 percent against an aver-

USAF photo

Cobra Ball—an extensively modified C-135B—is a measurement and signals intelligence collector designed to work in conjunction with Cobra Dane and Cobra Judy as they monitored Soviet ballistic missile testing.

age of 70 percent for *Observation Island,* according to the Air Force.

A UNIQUE PARTNERSHIP

The Air Force doesn't actually have any sailors, so the operation of *Lorenzen* necessitates a unique relationship between the Air Force and Military Sealift Command. According to the Air Force spokeswoman, Military Sealift Command has responsibility for operating and maintaining the ship, so an Air Force captain onboard can focus on operating the radar itself.

"The ship's captain is responsible for the health and welfare of the crew as well as navigation and maintenance of the ship," she said. "The mission crew is led by an Air Force captain who manages the mission and ensures the smooth operation of the mission systems." The captain is the only Air Force member onboard.

Eric Wertheim, an author and columnist for the US Naval Institute specializing in Navy and Air Force issues, said Cobra Judy "played a really important role in national security" by "[helping] with the collection of this high-resolution, accurate data that's needed for ballistic missile defense, treaty verification, and decision-making by leadership."

Now that the baton has been passed to Cobra King, the upgraded system will allow the Pentagon to develop "algorithms that would be required in case a shoot-down might be needed, and make sure countries we sign treaties with, or potential adversaries, that we understand their capabilities," Wertheim said.

The platform could be protected if necessary. It operates alone much of the time, though it may require support craft depending on how long it's at sea and if it travels close to hostile countries—not common in peacetime operations, said Wertheim.

The fact that MSC and the Air Force operate the vessel together is a "great example of jointness," he said. "It's really seamless."

MSC operates the vessel mostly at the behest of the Air Force, doing Air Force-sponsored missions.

"It's kind of a unique environment where one is responsible for making sure the ship is kept in shape, and the other making sure the systems are operating," Wertheim noted. "So the MSC is working to operate and navigate the vessel, and then they have military technicians and contractors maintain the radar." The naval personnel are essentially ensuring the ship can perform its Air Force mission.

SENSORS IN HIGH DEMAND

Tom Karako, a missile defense expert and visiting fellow at the Center for Strategic and International Studies, said the fact that the radar is dual-band indicates that its strategic use will primarily be ballistic missile tracking and discrimination. This means Cobra King will provide a mobile sea-based capability that fits in with a much larger suite of radars the Air Force and Missile Defense Agency operate.

Cobra King itself is part of the larger "Cobra" suite of sensors and radars.

- Cobra Dane is a ground-based passive electronically scanned array located at an air station in Alaska. It was built in the 1970s and feeds data to the North American Aerospace Defense Command (NORAD) in Colorado.
- Cobra Ball is an air-based asset, a measurement and signals intelligence collector installed in an RC-135S aircraft. Its job is to observe ballistic missile flights at long range.
- Cobra Eye was also an air-based asset, installed on an RC-135X aircraft, and it was tasked with tracking intercontinental ballistic missile re-entry vehicles before the aircraft was later converted into another Cobra Ball.

Karako said that in missile defense, while the interceptor missiles themselves get most of the attention, sensors like Cobra King and other suites are of the utmost importance to the Air Force. This is especially true in light of the 2002 decision by the George W. Bush Administration to withdraw from the 1972 Anti-Ballistic Missile Treaty in order to protect against ballistic missile threats.

"We've seen an unprecedented upgrade in our historical radars, as well as an expansion of them," Karako said. "That quiet expansion of these radars and their improvements has been an unsung chapter of expansion of BMD capabilities."

Karako said while the development of better interceptors is certainly part of that effort, it's the power of the sensors themselves that has really provided a big boost in capability to the Pentagon.

"You see the MDA talking about long-range discrimination radar [LRDR] going to be put up in Alaska by 2020, and they're very keyed up on that specifically for discrimination [between missile targets], dealing with both current and next generation missile threats," he said.

Karako continued, "It's all about discrimination, whether it's something much smaller and more mobile like [Cobra King] that collects data and compiles it on a smaller scale, or something more powerful like SBX and LRDR."

The strategic usefulness of Cobra King and assets that complement it hinges on the sensors and radars, whether it's SBX, LRDR, Cobra King, or another suite of radars—especially as demand continues to outstrip supply.

"This network of evolving radar capabilities is going to be in high demand," Karako said. "The demand for missile defense assets is far exceeding the supply, and that goes for interceptors and it goes for radars, whether for the Air Force or for MDA. There continues to be a growing demand for extremely high resolution sensors, and I think this dual-band capability speaks to what it's going to be doing as part of that larger picture." ✪

Dan Taylor is a journalist, with seven years of experience covering the Pentagon, and an analyst specializing in defense acquisition and weapons programs. This is his first article for Air Force Magazine.

The assumption in the 1960s was that the use of herbicides in Vietnam did not pose a significant danger.

The UC-123K tactical transport known as "Patches" got its name the hard way. The aircraft was held together nose to tail with repairs to the battle damage inflicted by almost 600 hits from enemy ground gunners in Vietnam.

When its flying days were over, Patches was retired to the US Air Force Museum in Dayton, Ohio, as a memorial to the airmen who flew the dangerous "Ranch Hand" missions from 1962 to 1970.

Ranch Hand used herbicides to defoliate the vegetation in Vietnam, where the jungle provided concealment and cover for Viet Cong insurgents. It began as a peripheral notion in 1961 on a White House list of "techniques and gadgets" that might be tried in lieu of all-out combat and expanded from there.

At its peak in 1969, Ranch Hand employed only 25 spray planes, but the results and consequences went far beyond anything the White House ever imagined. Local commanders and ground forces swore by Ranch Hand, which stripped bare the enemy ambushes and hiding places. It was part of a broader operation named "Trail Dust," which included spraying from backpacks, trucks, and riverboats, but the main operation was Ranch Hand.

The propeller-driven C-123 had long since been declared obsolescent but it found new purpose in Vietnam. In 1968, auxiliary jet engines were mounted under the wings, making takeoffs less hazardous for the heavily loaded Ranch Hand aircraft. The enhanced model was designated UC-123K.

The spraying was done from treetop level and was especially risky with the original equipment, which dispensed no more than one-and-a-half gallons of herbicide per acre, half the amount necessary for defoliation. Before the Ranch Hand crews got better sprayers that pumped three gallons an acre, they had to fly a second mission against each target. The ground gunners knew this and were waiting for them. With the improved system it took four minutes to empty the 1,000-gallon tank and cover an area 16 kilometers (10 miles) long and 80 meters (260 feet) wide.

About 10 percent of the Ranch Hand sorties destroyed crops supporting the Viet Cong—a priority for the South Vietnamese government—but the vast majority of them were flown to expose the enemy's strongholds and travel routes. Even critics of the program concede that this saved many thousands of American and allied lives.

The Ranch Hand achievements are seldom remembered today, eclipsed by the enormous controversy about Agent

The Lingering Story of Agent Orange

By John T. Correll

USAF photo

"Patches," the most famous Ranch Hand aircraft, early in the operation when it was still an unmodified C-123B.

Orange, the principal defoliant used in Vietnam. It is widely agreed now that the herbicides—deemed safe to humans in the 1960s—might cause cancer and other ailments. By an act of Congress in 1991, a deadly health risk is presumed for those exposed to Agent Orange.

Among other revelations, the most famous of all Ranch Hand airplanes, Patches, was found to be "highly contaminated" with Agent Orange residues and had to undergo an extensive cleanup before it could be put on display at the Air Force Museum.

A RAINBOW OF DEFOLIANTS

The herbicides came in 55-gallon drums marked with colored bands four inches wide. The defoliants were named for the color of the bands: Agents Blue, Green, Pink, Purple, White, and the most famous of all, Agent Orange, referred to simply as "Orange" by the Ranch Handers.

The active ingredients were the same as weed killers used for years in the United States on farms, along highways and power lines, and in popular lawn care products sold to homeowners. The compound 2,4-D destroyed broad-leaf weeds and 2,4,5-T worked on brush and hardwoods. However, unlike the commercial products which cut the weed killers with inert thinners, the military herbicides were sprayed full strength.

In the early part of the war, the preferred herbicide was Agent Purple, a patented product of the Dow Chemical Co., consisting of half 2,4-D and half 2,4,5-T. Dow could not produce enough to meet the demand but was wary about permitting others to make up the difference on license. In 1964, Ranch Hand began replacing Purple with Agent Orange, the same mixture without patent complications.

There were some complaints about the defoliation program, but these came mostly from ecologists and opponents of the war in general. Industry and the Pentagon defended the chemicals as safe. A government-sponsored survey by the independent Midwest Research Institute in 1967 found no reason for alarm. Little attention was given to scattered instances of skin rashes among plant workers, farmers, loggers, and other handlers.

Warning signals went off with the release in October 1969 of a National Institutes of Health study reporting laboratory experiments in which high concentrations of 2,4,5-T led to birth defects in mice.


USAF photo

Above left: A four-ship formation flies a defoliation spray run over Vietnam. Above: Barrels of Agent Orange herbicide, displaying the distinctive orange bands, at Johnston Atoll in the Pacific, a storage and disposal site.

The basic problem was not the weed-killing ingredients themselves; it was the "dioxins," a kind of impurity created in small amounts as byproducts in the manufacturing process. Dioxins are everywhere—in diesel exhaust, in Styrofoam cups and Formica tabletops, in smoke from trash fires—and toxic in extreme doses. Production of 2,4,5-T generated a poisonous dioxin abbreviated as TCDD.

In response to the NIH study, the Department of Defense prohibited the use of Agent Orange around population centers. In April 1970, the departments of the Interior, Agriculture, and Health, Education, and Welfare suspended the uncontrolled use of 2,4,5-T in the United States and the DOD—over the objections of the Joint Chiefs of Staff—temporarily halted the use of Agent Orange in Vietnam. The temporary halt was never lifted, and when supplies of other herbicides, chiefly Agent White, ran out, the Ranch Hand operation came to an end.

A SPARK IN CHICAGO

As it turned out, the interdepartmental restrictions on 2,4,5-T in April 1970 did not amount to that much. They did not affect use for control of weeds and bush on range, pasture land, forest, or rights of way on nonagricultural land. Nor did they apply to products for sale to homeowners. The Agriculture Department and the Environmental Protection Agency saw no "imminent hazard" from 2,4,5-T.

To some extent, this reflected the political power of the chemical and agricultural industries but, at the same time, the scientific evidence about 2,4,5-T was ambiguous.

The Agent Orange controversy as it exists today began in Chicago in 1978. Maude de Victor, a benefits counselor in the local Veterans Administration office, put together a file on 57 cases of Vietnam veterans whose problems she believed to be related to chemicals in Vietnam. She shared her suspicions with a TV news producer whose documentary, "Agent Orange: The Deadly Fog," was broadcast by WBBM, the CBS affiliate in Chicago, in March 1978.

Within weeks, VA got 500 claims for exposure to Agent Orange, 300 of them from Chicago and the other 200 from Arkansas, where veterans picked up the message and repeated it.

The issue soon went national, focusing largely on Army ground troops who said they had been exposed to the herbicides. Some of the news accounts exaggerated the circumstances, depicting the jungle as "dripping" or "drenched" with herbicides, hardly possible with a maximum dispersal rate of three gallons per acre, which works out to less than a teaspoon per square foot.

Nevertheless, there was enough substance for the issue to gain traction in Congress and in public opinion. Politicians made speeches and President Jimmy Carter formed an Agent Orange Inter-Agency Working Group that was eventually elevated to cabinet council status.

In 1979, the Environmental Protection Agency stopped most use of 2,4,5-T, declaring it unavoidably contaminated by dioxins. The EPA action came just before the annual spraying season, when seven million pounds of 2,4,5-T were to have been spread on forests, pastures, and along power lines and highways.

A number of newly formed veterans groups took up the charge, notably the Vietnam Veterans of America, a mainstream offshoot of the Vietnam Veterans Against the War. In 1979, lawyers representing the veterans filed a class action lawsuit against Dow and six other Agent Orange manufacturers.

The case never went to trial, settled instead in 1984 when the companies agreed to establish a $180 million fund for Vietnam veterans and their families. The chemical companies did not acknowledge any fault, but the net effect was a significant blemish on the image of the industry.

In 1983, Dow abandoned the effort to have 2,4,5-T declared safe. Production

US government photo

had stopped after the EPA ban in 1979, but this decision also ended sales from inventory, which had continued.

In 1984, Congress adopted the Dioxin Standards Act, which required VA to develop regulations for disability compensation to veterans exposed to Agent Orange. It stipulated that claimants should be given the benefit of the doubt in resolving the determination of claims.

SIFTING THE EVIDENCE

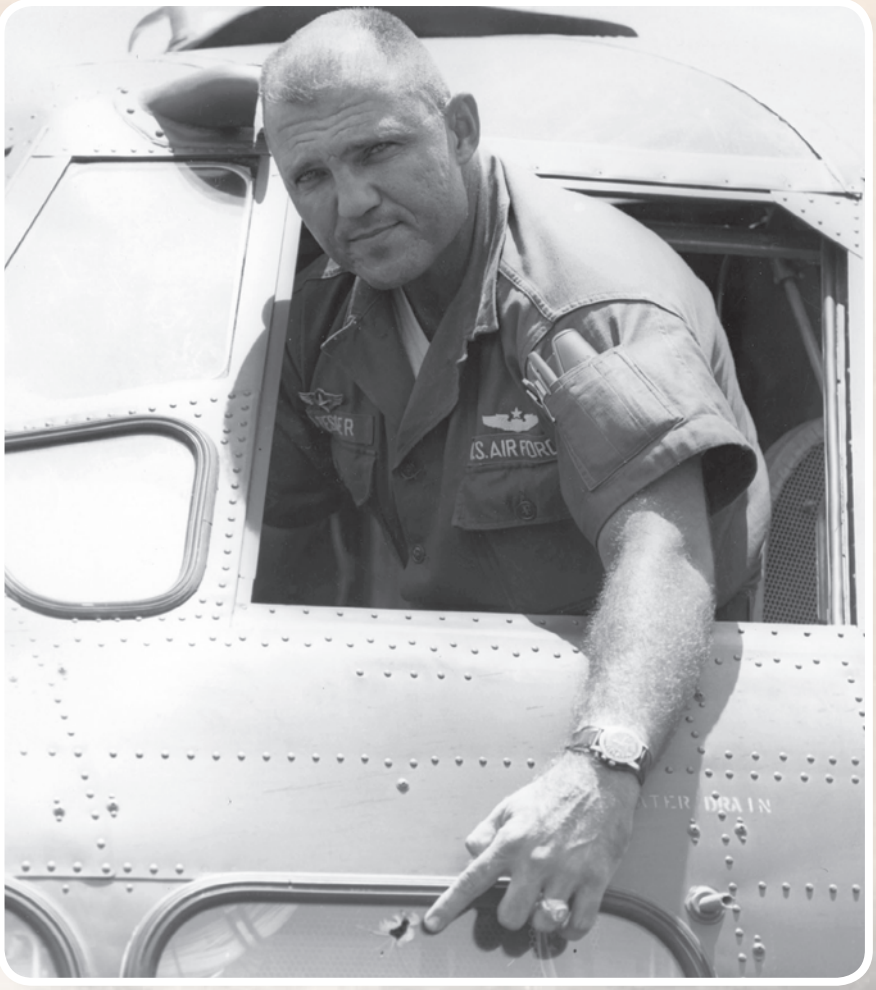
The evidence against 2,4,5-T and dioxins was mounting but the data came either from laboratory experiments or situations in which civilians were exposed to herbicides other than Agent Orange in places other than Vietnam. Beginning in the 1980s, two large-scale government efforts sought to determine specifically the effects on US veterans.

The best such assessment was the Air Force Health Study, conducted between 1982 and 2003. With the help of the Ranch Hand Vietnam Association, the Air Force gained the volunteer participation of 1,150 former Ranch Handers, nearly all of the survivors from the total of 1,269 pilots, navigators, flight mechanics, and ground personnel who served with the organization in Vietnam (77 of the Ranch Handers were already deceased, 27 of them killed in action).

These men, in close daily contact with the herbicides for the length of their tours, had greater exposure to Agent Orange than anyone else. They took rigorous physical examinations at regular intervals over the course of 20 years, and their health was compared with a control group of 1,300 airmen who flew similar aircraft (C-130s) in Southeast Asia at the same time but who did not handle herbicides.

The Ranch Handers had dioxin levels much higher than the control group or the general US population, but except for a statistical association with diabetes—for which other causes could not be ruled out—there was nothing different or unusual about their health.

Retired Col. Ralph C. Dresser, commander of Ranch Hand from 1965 to 1966, is among those skeptical of the dangers attributed to Agent Orange. The Ranch Handers had been assured that the herbicides could be used without harm to humans or animals. "To make this point as Ranch Hand commander, I would dip my fingers into an open Orange barrel and rub the substance on my lips and tongue," Dresser says. "While it tasted like hell, I have suffered no ill effects and I am 84 years old."



USAF photo

Maj. Ralph Dresser points to a bullet hole perilously close to the pilot's seat after a C-123 mission. Dresser, as Ranch Hand commander, reassured his men of the safety of Agent Orange by rubbing it on his lips and tongue. He insists he has suffered no ill effects to this day.

The limitation of the Air Force study was that it included only airmen. That gap was supposed to be closed by the congressionally mandated Vietnam Experience Study, conducted from 1983 to 1987 by the Centers for Disease Control on contract to VA.

CDC interviewed and examined thousands of Army Vietnam veterans and for comparison, a large control group who did not serve there. The results were muddled. The study was unable to distinguish those exposed to herbicides from those who were not, in part because the CDC scientists did not understand troop movement data and other military matters and stubbornly refused military help in interpreting the information.

The study was canceled as impossible to complete in October 1987. Congressional Democrats charged that it was designed to fail and had been obstructed by political interference.

The most vehement critic was retired Navy Adm. Elmo R. Zumwalt Jr., former chief of naval operations, who had ordered the extensive spraying of Agent Orange when he was commander from 1968 to 1970 of the "brown water" naval forces patrolling the Vietnam coasts, harbors, and rivers. One of his swift boat commanders was his son, Elmo R. Zumwalt III, who died of cancer at age 42 in 1988. Zumwalt was convinced that the cause was Agent Orange.

In 1989, Zumwalt was appointed special assistant on Agent Orange issues to his friend, Edward J. Derwinski, the secretary of Veterans Affairs. Testifying in that capacity in 1990, Zumwalt told Congress that the CDC study and the Air Force study were "absolutely without merit."

Zumwalt said, "The sad truth that emerges from my work is not only that there is credible evidence linking certain cancers and other illnesses with Agent Orange, but that government and industry officials credited with examining such linkage intentionally manipulated or withheld compelling information of the adverse health effects associated with exposure to the toxic contaminants contained in Agent Orange."

Naval Historical Center photo

Adm. Elmo Zumwalt, the 19th Chief of Naval Operations. While commanding "brown water" naval forces on Vietnam waterways, he ordered spraying of Agent Orange. One of his fast boat commanders was his son, Elmo III, who died of cancer at age 42. Zumwalt blamed Agent Orange and became an implacable critic.

PRINCIPLE OF PRESUMPTION

For more than 10 years, Congress had been asking questions about Agent Orange and not getting many answers. Patience was running out and the ire on Capitol Hill was bipartisan.

In February 1991, the Agent Orange Act passed the Senate by a thumping vote of 99-0 and the House by 412-0. The law said that any veteran of military, naval, or air service in Vietnam would be "presumed to have been exposed" to a herbicide containing dioxins and that there would be a "presumption of service connection" if the veteran contracted a disease specified in the act. Three such medical conditions were listed: non-Hodgkins lymphoma, soft tissue sarcoma, and chloracne.

The law further assigned primary responsibility for Agent Orange to VA—redesignated in 1989 as the Department of Veterans Affairs but keeping its old initials—and named the National Academy of Sciences to review and evaluate "available scientific evidence" and advise VA. If warranted, VA could add to the list of diseases.

That stood the controversy on its head. Questions about exposure to Agent Orange and its effects were no longer relevant. All that mattered was which veterans and which diseases qualified for the presumption.

The recognized authority for establishing connections between veterans' illnesses and Agent Orange became the Institute of Medicine (IOM), the health arm of the National Academy of Sciences. IOM did not conduct its own research, relying instead on studies done by others. So far, IOM has made nine biennial reports, the most recent one released in December 2013.

The original list of three presumptive diseases has now grown to 14. Of these, six are types of cancer, including prostate cancer, which VA acknowledges to be "one of the most common cancers among men."

In 2010, VA secretary retired Army Gen. Eric K. Shinseki said some members of Congress had objected to the addition of diseases that occur frequently in the general population but that the law did not allow him to exclude an ailment from presumption based on how common it is. Nevertheless, VA did not add high blood pressure of 140/90 or above, which was included in the IOM 2006 update, or stroke, which was in the 2013 report.

Of the 14 conditions on the VA presumptive list, IOM says that five meet a standard of "sufficient evidence of an association" and nine provide "limited/suggestive evidence of an association." IOM says that in none of the 14 instances is the evidence strong enough to definitively rule out other explanations for the findings.

"Brown water" sailors who operated on Vietnam's internal waterways are included in the VA presumption but "blue water veterans" who served offshore are not. There is a continuing challenge, with some support in Congress, to extend coverage and benefits to those who served in the "territorial seas" within 12 miles of the Vietnam coast. IOM says there were several "plausible routes" for Agent Orange exposure to reach that far, including spread of the spray by drifting winds.

MORE EXPOSURES EXPOSED

In recent years, the Agent Orange issue has transcended Vietnam. The "significant use" of herbicides around US bases in Thailand was disclosed by a Freedom of Information Act case in 2010. This spraying was done by ground units to eliminate vegetation for security purposes. VA now awards compensation on a case-by-case basis to those whose duty was at or near the perimeter of these bases.

VA also presumes the exposure of veterans who served between 1968 and 1971 in areas near the Demilitarized Zone in South Korea, where South Korean soldiers sprayed Agent Orange and other herbicides.

However, the most dramatic new challenge involves the old Ranch Hand airplanes, which were configured back to standard C-123s when the Vietnam War ended and were flown by US Air Force Reserve units in the United States for 10 years. These crews are now exhibiting

DOD photo by Erin A. Kirk-Cuomo

Retired Army Gen. Eric Shinseki as VA chief added significantly to the list of medical conditions for which a link to Agent Orange is presumed.

the same illnesses attributed elsewhere to Agent Orange. Some of the aircraft —including Patches, which had to be decontaminated before going on display at the Air Force Museum—were found to be carrying residues of Agent Orange.

"In 2010, the Air Force destroyed 18 of the Vietnam-era aircraft in part because of concerns about potential liability for Agent Orange, according to Air Force memos documenting the destruction," Steve Vogel of the *Washington Post* reported in August 2013.

The aircraft were shredded at Hill AFB, Utah, and the aluminum remains were destroyed at a furnace in Michigan heated to nearly 1,400 degrees to be sure the dioxin residues were gone.

A hazardous waste manager at Hill said that "Ben and Jerry's ice cream has more dioxin than these aircraft," but Vogel obtained several Air Force documents that indicated deeper complications.

Vogel quoted a memo in which a consultant advised recycling or disposing of the aircraft "as soon as possible to avoid further risk from media publicity, litigation, and liability for presumptive compensation." Another memo said, "Smelting is necessary for these aircraft so the Air Force will no longer be liable for 'presumptive compensation' claims to anyone who ever worked around this 'Agent Orange' metal."

In 2013, VA reversed its denial of an Agent Orange-related claim by a pilot who had flown Patches, often eating and sleeping on the aircraft, and who had since developed cancer. Subsequently, VA considered C-123 contamination claims on a case-by-case basis, but took the position that post-Vietnam exposures to these aircraft "were unlikely to have put aircrew or passengers at risk." The effects differ from direct contact with Agent Orange in liquid or spray form. "In the dry form—for example, adhered to a surface—Agent Orange residue cannot be inhaled or absorbed through the skin and would be difficult to ingest," VA said.

A finding by the Institute of Medicine on the C-123 contamination residues was expected but had not been announced as this article went to press in December. If IOM reports a connection between the contamination and the Reservists' medical problems, VA must then make a determination about the status of the claimants.

The 14 Presumptives

The Department of Veterans Affairs recognizes 14 illnesses presumed to be connected to exposure to Agent Orange or other herbicides in the cases of qualifying veterans. Not listed are several birth defect conditions recognized by VA as presumptive for children of veterans.

- AL amyloidosis
- Chronic B-cell leukemias
- Chloracne
- Diabetes mellitus Type 2
- Hodgkins lymphoma
- Ischemic heart disease
- Multiple myeloma
- Non-Hodgkins lymphoma
- Parkinson's disease
- Peripheral neuropathy
- Porphyria cutanea tarda
- Prostate cancer
- Respiratory cancers
- Soft tissue sarcomas

THE PREVAILING CONCLUSION

The controversy, such as it is, rolls on. There is no doubt that the veterans have the health problems specified. However, the extent to which their illnesses were caused by exposure to Agent Orange as opposed to other causes cannot be determined. In a broader sense, the principle of presumption makes the question of little or no importance.

"It's safe to assume that dioxin isn't responsible for all of the lung cancer, ischemic heart disease, diabetes, and other ailments common to aging populations that now afflict Vietnam veterans," says Peter Sills, an attorney who helped represent the Vietnam Veterans of America in the class action lawsuit. "But the government's insistent, unsupportable attempts to prove that herbicides haven't harmed its soldiers have made it impossible to tell which of these illnesses are service-related. In avoiding its responsibilities, the government has found itself under a far greater obligation than it would have faced if the job had been done correctly in the first place."

Reports abound of Vietnamese civilians with birth defects and various illnesses said to be caused by exposure to herbicides. However, there is no data to distinguish between the possible effects of Agent Orange and other explanations for health problems in rural Vietnam in the 1960s, and the US government has not acknowledged any responsibility.

The overwhelming consensus of the medical-scientific community is that the Agent Orange dioxins cause cancer and other diseases and was responsible for these conditions among Vietnam veterans. The news media is almost universal in subscribing to the case against Agent Orange and public opinion is not far behind.

Nobody, including VA, has an accurate handle on the scope of Agent Orange claims, but new cases in the past five years alone number in the hundreds of thousands with retroactive benefit payments to veterans and their survivors reaching well into the billions of dollars.

The end of the Agent Orange story is not yet in sight. ✪

John T. Correll was editor in chief of Air Force Magazine *for 18 years and is now a contributor. His most recent article, "The Third Musketeer," appeared in the December 2014 issue.*

Jimmy Stewart's Air Force

By Rebecca Grant

The famous actor's wartime service was at a deadly time for Eighth Air Force.

Jimmy Stewart at Moffett Field, Calif., shortly after he was drafted in 1941. Stewart failed his first air forces physical due to his slight build, but passed a subsequent one.

A B-24 from the 453rd Bomb Group over Karlsruhe, Germany, Sept. 5, 1944. Jimmy Stewart was then the group operations officer.

USAF photo

Two graying war veterans, out of a job, took a radio-controlled model airplane into the hills above Los Angeles to pass the time. The two had been friends since long before the war. Once they'd built a model of a Martin bomber in a small apartment they'd shared back in New York City, before they'd come west to Hollywood. Now with time on their hands they were indulging in boyish pursuits again, both trying to re-establish themselves in a profession where they'd been immensely successful before World War II. The date was 1948, and the good friends were Henry Fonda and Jimmy Stewart.

Every biography of Stewart, movie star, mentions that he served in the Army Air Forces from 1941 to 1945 and flew at least 20 missions in the European Theater of Operations.

What's rarely captured is that Stewart did more than leave a Hollywood career; he forged a new one as a combat leader in Eighth Air Force at its most crucial hour—the battle to defeat the Luftwaffe and clear the skies of France for the invasion of Normandy.

Two accomplishments stand out in Stewart's wartime career. First, Stewart commanded the 703rd Bomb Squadron, a unit of B-24s that deployed to England where he guided them through their first combat missions from December 1943 to March 1944. He was then promoted to operations officer of the 453rd Bomb Group, attacking targets deep in Germany and flying support missions on D-Day.

It wasn't an easy path. Stewart was 32 when he was drafted into the Army. He failed the first physical because he was underweight for the air forces. Skinny was a ticket to the infantry. He passed a second physical and enlisted in March 1941 with hopes of becoming a combat pilot.

Then there was the matter of his fame. Stewart had just won the Best Actor Oscar for his role in "The Philadelphia Story." From 1936 to 1940 he appeared in 26 films with nearly all of Hollywood's biggest stars, male and female. He dated Norma Shearer, Ginger Rogers, and Olivia de Havilland, to name a few. In 1938 he starred in "You Can't Take It With You," winner of the Academy Award for Best Picture, and in 1939 came the box office smash, "Mr. Smith Goes to Washington." In a time before television, approximately half of all Americans saw at least one movie a week. Stewart was a white-hot star.

THE LIBERATOR

None of this counted for anything in the Army Air Forces. What did count was that Stewart had a pilot's license, and 200 hours of flight time before he was inducted. As a corporal, he built up flying time at his own expense, then earned a commission and his wings. The Army put him to work as an instructor for his first two years in uniform starting at Mather Field, Calif., and culminating with six months as a B-17 instructor pilot in Boise, Idaho, and later Sioux City, Iowa.

Then came his big chance. The expansion of the heavy bomber groups called for men with experience. "At Sioux City I was finally given command of a squadron," he later said. Stewart got a hasty check-out in the B-24 Liberator and took command of the 703rd Bomb Squadron in August 1943.

Waist Gunner Sam Mastrogiacomo was an original member of the 445th Bomb Group and told oral historian Aaron Elson how on a flight one day, word spread that the instructor pilot checking out the pilot up front was Jimmy Stewart. "So one by one we'd go up, we'd have an excuse to go up in the cockpit through the bomb bay and look at Jimmy Stewart," Mastrogiacomo said in a 2005 interview.

In November the 703rd deployed to RAF Tibenham, UK, 120 miles north of London. The 703rd was one of four 12-aircraft squadrons constituting the 445th Bomb Group.

The basic fighting unit of Eighth Air Force (VIII Bomber Command until February 1944) was the group. Aircraft from a group's four squadrons assembled into the formations where needed. The 389th, 445th, and later, the 453rd bomb groups made up the 2nd Combat Bomb Wing under the command of Brig. Gen. Edward J. Timberlake. The 2nd was one of four wings in the 2nd Air Division. All flew B-24s.

Stewart and his crews arrived in the thick of the air war. Deep raids into Germany by Eighth Air Force had started in May 1943. But they were relatively small formations of rarely more than 200 bombers. Loss rates were 20 percent per month through October 1943.

Just weeks before Stewart arrived, bomber attacks of October 1943's so-called "Black Week" claimed more than 1,500 air crew and 148 bombers, nearly 13 percent of Eighth Air Force's strength, recorded historian R. Cargill Hall in *Case Studies in Strategic Bombardment.*

"The cornered wolf fights hardest," Commanding Gen. Henry H. "Hap" Arnold wrote to Maj. Gen. Ira C. Eaker, commander of VIII Bomber Command.

Defeating the German Luftwaffe was the problem. The Luftwaffe pilots who rose to meet the bomber formations were a lethal and experienced force. German fighter pilots attacked bombers head-on and devoured stragglers. Long-range escorts were only just becoming available. "Neither Eaker nor Arnold knew that the Luftwaffe in the west was now stronger than ever, or that German fighter production continued to grow," summed up Hall.

"My dear Jim boy," Stewart's father, Alexander, a World War I veteran, wrote to him in November 1943. "Soon after you read this you will be on your way to the worst sort of danger."

TO BREMEN AND BACK

Stewart flew his first combat mission on Dec. 13, 1943, as part of an attack on submarine pens at Kiel, Germany. He was the copilot, with 1st Lt. Leo W. Cook in the left seat of ship No. 512, according to the mission reports declassified in 1998. The 703rd Bomb Squadron contributed four B-24s that day, all armed with 500-pound bombs. Three of the 703rd's

Stewart was flying high in 1938 with films such as "You Can't Take it With You." His career hit a lull when he left the service, but bounced back with performances in such movies as "Harvey" in 1950 and "Strategic Air Command" with June Allyson in 1955.

B-24s, including Stewart's, flew the rear echelon of the lead squadron.

Stewart took off from RAF Tibenham at 8:36 a.m. and headed straight over the North Sea. Clouds socked in the target. According to the flak officer, the anti-aircraft fire that day was no more than moderate and extremely inaccurate. With the clouds, the formations saw only a handful of fighters. The 445th Bomb Group flew a four-minute radar targeting run at 23,000 feet with bomb release on signal from the lead bombardier.

The 703rd made it home safely from Kiel, but Stewart's squadron lost a B-24 in a Dec. 30 mission. It ditched in the English Channel off Beachy Head, UK, with four dead, four rescued, and two taken POW. Another B-24 from the 445th crashed on landing at Tibenham.

However, the missions of December were giving the group the vital combat experience necessary for survival. They needed it. For 1944, the Eighth planned relentless attacks on German airfields, aircraft industry sites, and fuel plants under its new commander, Lt. Gen. Jimmy Doolittle.

Stewart flew a mission to Bremen on Dec. 16 then led the 445th Group on a mission to strike a plant complex manufacturing synthetic oil and gasoline additives at Ludwigshafen on Jan. 7.

Trouble began on the way home. Stewart's formation joined with the 389th Bomb Group. But the lead ship of the 389th was pulling both groups 30 degrees off course. Stewart radioed the lead B-24 on VHF but no correction was made. Stewart kept his bombers with the errant leader. Near Paris, German fighters attacked the two formations. First to go down was the lead off-course B-24 of the 389th. Fortunately, all of the 703rd made it back to Tibenham.

Col. Milton W. Arnold, in command of the 389th Bomb Group, wrote to Stewart's boss at the 445th Bomb Group, Col. Robert H. Terrill. "The good judgment of Captain Stewart, your group leader, in maintaining an excellent group formation, yet making every attempt to hold his position in the combat wing formation, is to be commended," the colonel praised.

"By risking his neck to protect an erring teammate, he had probably saved the 389th from annihilation," concluded Col. Beirne Lay Jr., a fellow bomber pilot who wrote up Stewart's achievements in the *Saturday Evening Post* in December 1945. Missions to Bonnière, France, and Frankfurt followed.

Eighth Air Force was making progress but had not won air superiority. "It was, however, only in the spring of 1944, in March to be specific, that the deterioration in quality of the German pilots first became really apparent," noted World War II historians Wesley F. Craven and James L. Cate. Until then the German air force always had enough experienced pilots to give attackers "stiff battles, not to say a few resounding defeats."

The answer, in part, was "Big Week." From Feb. 20-25, 1944, weather cleared, and the Mighty Eighth made its major push against Germany's aviation targets. Stewart flew the first mission as deputy leader of the 2nd Combat Bomb Wing's B-24s as they headed for Brunswick, Germany. Weather at home and over the targets for this first mission was so uncertain that Doolittle nearly called it off.

At Tibenham crews hedged by briefing for two options: an instrument approach, or an alternate visual approach, where Stewart would lead. "When the target was reached, it became apparent that visual bombing was possible and Major Stewart smoothly assumed the lead position" despite aggressive fighter attacks and heavy flak. So said the Distinguished Flying Cross citation signed by Doolittle himself.

For the DFC, the standard was "heroism in flight evidencing voluntary action in face of great danger above and beyond line of duty. Achievement in flight must evidence exceptional and outstanding accomplishment," stated the US War Department regulation of October 1943.

One of the 703rd's toughest missions was to the Messerschmitt plant near Gotha, Germany, in the dreaded Schweinfurt industrial area on Feb. 24, 1944. Stewart didn't fly that day; he planned, waited, and listened for his B-24s to return.

But only one B-24 from Stewart's 703rd appeared in the pattern at Tibenham that afternoon.

The mission had turned into a two-hour running battle between German fighters and Eighth Air Force bombers trying to reach home. The 445th took the worst losses of the day with 13 aircraft shot down, while their sister 389th lost seven. Of the 445th's 12 surviving B-24s, eight with battle damage touched down at other airfields.

First in was a B-24 named *Dixie Dudrop* with a veteran crew commanded by pilot Lt. Ralph Stimmel and copilot Lt. Milton Souza. "We were the first crew into the debriefing room," navigator Hal Turell recalled in his account written for the 445th Bomb Group website. "The ship we were flying was incredibly shot up," Turell said. "We were still in shock and in disbelief that we had lived. Our squadron commander Jimmy Stewart (yes, the actor) listened intently to us."

Stewart himself was on the schedule for a mission over the same route the next day, although to a different target. The grim dinner in the near-empty combat mess hall that evening caused Stewart to think that his "number was up," as Lay wrote in his article. Nevertheless, the mission successfully attacked Nuremberg on Feb. 25.

Next came another mission to Brunswick with a tough pair of decisions. Stewart took off leading the 2nd Combat Bomb Wing's groups in heavy overcast and mist. B-24s climbed at 900 feet per minute, and groups took as long as an hour to form up on brightly painted B-24s before turning toward occupied Europe. On this day, the weather left some wings formed at high altitude and others in the soup. Without coherent formations, the bombers would be sitting ducks. Stewart radioed an abort to the wing and turned them for Tibenham. Moments later, Eighth Air Force headquarters called off the entire 1,000-bomber mission, justifying his decision to turn back.

Stewart was leading the same formation to Brunswick on the next mission, March 15. Flak was heavy. Weather obscured the primary target, forcing Stewart's group to conduct radar bombing on its secondary target. Approach accuracy was critical. Then Stewart's navigator reported the radar scope had failed. Could Stewart turn the group and set up another pass at the target?

USAF photo

Stewart confers with a crew member in front of a B-24 during his service in the European Theater.

It was more agonizing minutes over the target and exposure to heavy flak, but Stewart did it.

Wednesday, March 22, 1944, saw Stewart's last mission as commander of the 703rd. The B-24s were assigned to bomb Heinkel aviation industry plants at Oranienburg and Basdorf, but cloud cover forced them to their secondary target: Berlin. The mission with 474 B-17s and 214 B-24s was a success. More than 800 fighters provided escort up to and over the skies of Berlin. Just five of the B-24s went down, none from the 445th. Eighth Air Force now had control of the skies nearly in its grasp.

HELPING THE 453RD

However, another group in the 2nd Combat Bomb Wing was not holding up well. On March 30, 1944, Stewart transferred to a new assignment as group operations officer for the 453rd.

This unit was the last of the 2nd CBW's groups to arrive in theater in January 1944. The 453rd plunged into combat on Feb. 5 with a mission against airfields in France—airfields stuffed with German fighters.

Over the next seven weeks the 453rd flew 23 missions, including the Big Week push. Their group commander was killed.

Deaths in a crew forced survivors to join others to make a composite crew. For example, a pilot and his bombardier might be driven out to a strange aircraft with unfamiliar crews on the morning of the mission. The shuffle of faces ate into morale. "The 453rd Bomb Group was struggling to find its way; combat initiation had been challenging," wrote Stuart J. Wright in his book about the 453rd, *An Emotional Gauntlet.*

On March 18, group commander Col. Joseph A. Miller was shot down over Friedrichshafen and taken prisoner. On March 27, the B-24 *Cabin In The Sky* took direct flak on a mission to bomb the Luftwaffe training airfield in Pau, France. The bomber crashed into the Bay of Biscay in full view of the returning formations. None survived, and the 453rd's operations officer was among those killed.

Lt. Col. Ramsay D. Potts, age 27, took over command of the 453rd. Potts had flown some of the first missions

Gen. Curtis LeMay (l), head of Strategic Air Command, and Stewart at an Air Force Association event in 1955.

with the Eighth as a lieutenant in 1942 and survived Ploesti in August 1943. The young economics teacher from Tennessee was an instant hit with his crews. In a 1999 interview, described in Wright's book, Potts recalled that he "asked for a new operations officer, somebody from outside." The obvious choices were the eight group commanders from other groups in the wing. Potts said, "Lo and behold, they sent an officer from another group—a guy named Jimmy Stewart."

Crews in the 453rd were surprised but not overawed by having an actor in their midst. Some were downright cynical. According to Wright, they'd heard how movie star Clark Gable "flew five missions, got an air medal, and was sent home to sell war bonds," said 732nd Bomb Squadron pilot Bob Bieck. Their lost ops officer had been an experienced pilot "and we did not exactly jump for joy to have a celebrity take his place," Bieck recounted.

Stewart did not cozy up to them. "He was always friendly, approachable, and unassuming and was very well-liked," wrote Wright, "but he was not close to anyone" except Potts and Capt. Andrew S. Low Jr., the assistant group operations officer, with whom he shared quarters.

"He simply did his work as the group operations officer just like any other major was supposed to do," recalled Bieck.

And there was plenty to do. Stewart and his assistant Low spent the dusk to dawn hours generating operations orders after targets came down from headquarters. Stewart also continued to fly missions as did other group and wing leadership.

Yet he had a quiet charm that was effective with subordinates and superiors, Wright stated in his book. "Major Stewart did impart a sense of camaraderie by just being there and I believe that many of us wanted to perform better just because he was there," said Sgt. Robert Victor, a radio operator with the 453rd at RAF Old Buckenham, UK.

GREATER THAN THE MOVIES

For his young boss Potts, Stewart was of clear value. "We hit it off very well, even though he was eight years older than I was," Potts said, according to Wright. Stewart was "100 percent as a pilot," in the opinion of Potts, "and he also had a tremendous rapport with the men—that languid, humorous way he had of settling them down in some pretty stressful situations."

Potts appreciated how Stewart grasped the view that aircrew lives were important and "that meant they better fly close formation ... if they expected to return to base," as Potts put it. It was a message Potts and Stewart preached continually. "He impressed them with living as well as winning, and more than that, an officer can't do," said Potts.

However, Stewart was no angel. As author Starr Smith recounts in the book *Jimmy Stewart, Bomber Pilot,* one day in April 1944, Stewart and Low took a B-24 up by themselves to "shoot some landings" at "Old Buc" and perhaps, blow off some steam. They did their takeoff and landing practice with a few chandelles thrown in and might have gotten away with it until they fell prey to a familiar, irresistible urge: buzzing the tower back at Tibenham, 10 miles away.

Potts was furious when he confronted them in the combat mess at Old Buckenham. "The more I struggled for words (the colonel did not give me much opportunity to speak), the more I realized that what we had thought was a grand idea some three hours earlier now seemed pretty dumb," Stewart wrote in a reunion magazine decades later. He was later chewed out by the wing's commanding general and his old group commander and as penance forced to write a memo reminding airmen about regulations on minimum aircrew requirements and altitude safety.

In June 1944, Stewart was promoted to lieutenant colonel. He served as the 453rd's chief planner for the four missions flown on June 6, 1944, as B-24s supported D-Day, and he was again awarded the DFC.

Stewart was next assigned as chief of staff for the 2nd Combat Bomb Wing, working directly for Timberlake. Here Stewart contributed to a statistic only airmen could fully appreciate. The 2nd Combat Bomb Wing ranked first out of the four wings of the Second Air Division in bombing accuracy from August 1944 through May 1945. Stewart was, by then, a colonel.

His movie contract with MGM expired while he was in uniform. He made only two movies until 1948 and his first—a dark, artsy 1946 film titled "It's a Wonderful Life" flopped at the box office—only becoming a Christmas classic in subsequent years.

Eventually radio, a stint on Broadway in "Harvey" (a play about an imaginary rabbit), and finally, Westerns and director Alfred Hitchcock opened up a stellar third act for Stewart.

Stewart remained in the Air Force Reserve until 1968 and retired as a brigadier general. With Jimmy Doolittle, he helped found the Air Force Association after his wartime service. President Reagan promoted him on the retired list to major general in 1985.

Of World War II, Stewart later said: "I think that whole military experience that I had is something that I think about almost every day and one of the great experiences of my life. Greater than being in the movies." ✪

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A British airman prepares to drop a bomb from the rear cockpit of an airship gondola during World War I. The development of precision guided munitions has greatly reduced civilian casualties caused by airpower.

UK government photo

Sanctuary from Above

By Phillip S. Meilinger

Gil Elliot, a historian and expert on war casualties, once stated that "technology" killed 46 million noncombatants during the wars of the 20th century. Of these, 24 million were killed by small arms, 18 million by artillery and naval gunfire, three million as a result of "demographic violence," and less than two million due to air attack. In short, the number of civilians killed by air attack amounted to five percent of the total.

Moreover, since World War II, civilian casualty statistics have declined dramatically. Conflicts of the past three decades have demonstrated a capability to fight effectively with airpower while limiting risk to civilians.

Why is it, then, that airpower is still commonly singled out for criticism as an indiscriminate and reckless way to wage war?

The increasing use of precision weapons and improvements in intelligence-gathering tools has made it easier to discriminate between military and civilian targets and to strike only the military. Modern air warfare is an increasingly efficient, effective, and humane tool of foreign policy.

World War I saw strategic bombing conducted by all major belligerents, but it claimed only a small number of noncombatants—1,413 dead in Britain, 740 in Germany, and perhaps a few thousand more throughout the rest of Europe.

Nearly 15 million died in the war overall. This carnage had a profound impact on survivors, but by the start of World War II, there were still no universally recognized laws regarding air warfare.

Military commanders applied existing rules regarding war on land and sea. Armies could legally bombard a defended fortress containing civilians, and there were numerous examples of this over the previous century. Using these precedents, airmen reasoned that when Allied bombers flew over German-occupied Europe and were shot at by tens of thousands of anti-aircraft guns and intercepted by hundreds of enemy fighters, all of Nazi-occupied Europe was, in effect, a "defended fortress."

International law also permitted navies to shell undefended fortresses and cities in order to destroy the military stores and facilities they contained. Because navies could not occupy a port as could an army, sailors were given wider latitude in shelling civil-

A 2,000-pound inert laser guided bomb precisely hits its target after being dropped from an altitude of some 4,000 feet during testing in the 1970s.

ians. Aircraft, like ships, could not occupy a city, so were the permissive rules of sea warfare more applicable to air warfare?

Doctrinally, air leaders in Britain and the US rejected the bombing of cities. Both the Royal Air Force and the US Army Air Forces entered World War II stressing precision bombing of enemy industrial centers. The RAF operations manual stated that the civilian populace was not a legitimate target and area bombing was rejected.

In August 1939, the British Chief of the Air Staff messaged Bomber Command that "we should not initiate air action against other than purely military objectives in the narrowest sense of the word, i.e., navy, army, and air forces and establishments, and that as far as possible we should confine it to objectives on which attack will not involve loss of civil life."

War's realities would soon put these idealistic goals to the test.

Bombing doctrine in the US was similar. Officers at the Air Corps Tactical School believed that a country's economy was complex but fragile. Key nodes within that economy, such as the transportation system or specific factories manufacturing crucial industrial components, were disproportionately vital. If this industrial web were disrupted, the entire system might collapse. The doctrine the AAF took into the war made no mention of targeting population centers.

World War II proved to be far different than predicted. The fall of France in June 1940 left Britain alone against Germany, which soon began its blitz against British cities. For its part, RAF operations quickly demonstrated that prewar doctrine was unrealistic. British bombers were too small, too slow, too vulnerable, and too few. German fighters and anti-aircraft guns decimated the attackers, so Bomber Command retreated to the safety of the night, something for which it was neither trained nor equipped. Worse, bad weather affected navigation, target acquisition, and bombing accuracy. Although Britain's intent was precision bombing, in practice it became area bombing.

Airpower is probably the most discriminate weapon that exists.

By early 1942 the RAF's night offensive was targeting German cities, partly due to poor bombing accuracy and partly in retaliation for attacks on British cities by the Luftwaffe. The German raid on Coventry in November 1940 was a turning point: Prime Minister Winston Churchill then directed the RAF to aim for city centers on missions over Germany. Air Marshal Arthur Harris, who took over Bomber Command in February 1942, agreed with the concept of area attacks dictated by his civilian superiors.

US air doctrine also evolved during the war. AAF losses in daylight strikes were severe: On the Schweinfurt mission of Oct. 14, 1943, 60 B-17s and more than 600 crewmen were lost—more than 20 percent of the attacking force.

Nonetheless, American air leaders clung to daylight precision bombing doctrine. An invasion of France offered no hope of success before mid-1944, and something had to be done in the meantime to take the war into Germany and relieve pressure on the Soviets.

The Pacific air campaign also posed problems for the AAF. Bombing accuracy was worse than in Europe because of the greater distances involved and the 200 mph jet stream at 35,000 feet, where the B-29s generally flew. In addition, Allied intelligence concerning Japan's economy was inadequate and precision targets were simply not available. Area bombing that could be done at night and at low altitude—with less risk to the attackers—was necessary.

Japan was a tenacious opponent: More than 20,000 Americans died at Iwo Jima and Okinawa, as did nearly 150,000 Japanese defenders. Moreover, on Okinawa more than 160,000 civilians died—caught in the crossfire between the opposing armies. The planned invasions of the home islands would have cost millions of American and Japanese lives.

Air attacks, culminating in the two atomic strikes, most likely left fewer dead in Japan than would have been killed by a bloody land campaign, a naval blockade, and disease and starvation in the civilian population.

Perhaps 40 million civilians died during World War II, but even if Elliot's maximum of two million dead due to air attack is used, it means that 95 percent of the civilians killed in World War II were claimed by starvation, disease, genocide, and the traditional means of land and sea warfare.

The plight of civilians under air attack improved after 1945, although many noncombatants died in both the Korean and Vietnam Wars. Statistics for the Korean War are unreliable, but Guenter Lewy, a political scientist, provides plausible figures for Vietnam, arguing that 25 percent of Vietnamese civilian deaths were caused by air attacks—the other 75 percent, more than 440,000 people, were killed by ground or naval action.

THE DAWN OF PRECISION

Since Vietnam, the number of civilian casualties has dropped dramatically in conflicts involving the US.

File photos

World War II saw enormous collateral damage. Top: US soldiers train a 155 mm howitzer artillery gun on the town of Cherbourg, France, during an advance. Such weapons were powerful, but indiscriminate. Bottom: The French town of Montebourg after being subjected to artillery fire and bombing.

In the 1991 Gulf War, Greenpeace estimated that 5,000 Iraqi civilians were killed by air, but other researchers put the figure at less than 1,000. Although thousands of tons of bombs were dropped, damage to the civilian population was minor, amazing some Western observers.

Milton Viorst, an American journalist, wrote: "Oddly, it seemed, there was no Second World War-style urban destruction, despite the tons of explosives that had fallen. Instead, with meticulous care—one might almost call it artistry—American aircraft had taken out telecommunications facilities, transportation links, key government offices, and, most painful of all, electrical generating plants."

In 1995 NATO intervened to halt fighting in Bosnia. According to Serbian President Slobodan Milosevic, 25 civilians died during NATO's three-week air campaign. To stop the ethnic cleansing by the Serbs in Kosovo, in 1999 NATO launched a 78-day air campaign after which Milosevic capitulated. Despite the duration and intensity of this air campaign, Human Rights Watch estimated that fewer than 500 civilians were killed.

Statistics for the wars in Afghanistan and Iraq run anywhere from 500 to 1,300 dead in Afghanistan through 2002, and from 3,000 to 7,000 dead during the first six months of the Iraq campaign, the major, traditional combat portions of the wars in those countries. Human Rights Watch states that "the ground war caused the vast majority of deaths," noting for example that at al Hillah, a city in central Iraq, ground-launched cluster munitions caused 90 percent of all civilian casualties.

Another account of civilian casualties is provided by Iraq Body Count, an online database of violent civilian deaths since the 2003 invasion. The site determined that around 85,000 Iraqi civilians died as a result of the war up through 2008. Of these, about 9,500 were the result of air strikes—11.3 percent of the total. Significantly, not only did the number of civilian deaths decrease after 2005, but the percentage of deaths attributable to air attack also decreased—to 2.6 percent.

In other words, more than 97 percent of the estimated 60,922 Iraqi civilians killed after 2005 were the victims of ground warfare.

PRECISE AGAINST ISIS

Joint Chiefs of Staff Chairman Gen. Martin E. Dempsey testified before Congress last fall that in Iraq today, "The thing that will cause the Sunni population to actually take heart and actually reject [ISIS] is if we are very careful not to create circumstances of civilian casualties. … We have got to be very, very deliberate and very precise in our air campaign."

The remarkable drop in casualties due to air warfare has become the norm and the expectation. It is largely the result of precision guided munitions, cautious rules of engagement, and advanced communications networks and sensors.

Although PGMs were used in the Vietnam War, Desert Storm was the first conflict in which they played a major role. Cockpit videos that tracked laser bombs showed the world memorable film clips of bombs flying down airshafts and through bunker doors. Following Desert Storm, PGM use increased in Kosovo, Afghanistan, and Iraq. The types of PGMs also expanded and were improved for greater accuracy and flexibility. The GPS-aided Joint Direct Attack Munition, which can bomb through clouds or sandstorms, made its debut over Kosovo. Since then, a laser guided JDAM had been developed permitting precision strike against moving targets. This dual-seeker weapon was first employed in Iraq in August 2008. The standard figure given for JDAM accuracy is five meters, or 16 feet, but those employing the weapons say accuracy is far better than advertised.

Yet PGMs are only as good as the intelligence used to guide them. To address this issue, sensors have grown both in number and resolution capability. Space-based cameras and radar produce resolutions of a few feet. Airborne sensors have a similar performance, and spotters on the ground have GPS range finders and laser designators to mark targets.

The impact of PGMs has been profound. One precision weapon is equivalent to hundreds of unguided bombs in the effects that it achieves—neutralizing the target. Besides lowering the risk to the attacking aircrew, PGMs dramatically reduce collateral damage.

A difficulty arises when attacking mobile targets, where identification is key.

On April 14, 1999, near Djakovica, Kosovo, NATO pilots attacked what intelligence sources had identified as a military convoy. It is now known that the convoy

also contained refugees—the Serbs had illegally commingled military and civilian vehicles. As a result, several dozen civilians were killed in air strikes.

Could this accident have been avoided if aircraft had flown at a lower altitude to allow better identification? Perhaps. But there is a tradeoff in such instances: If flying lower increases the risk to aircrews, at what point does the danger of misidentifying a target override the risk of losing a plane and its crew? If friendly losses meant the shattering of the Alliance—a major consideration, according to the NATO commander, Gen. Wesley Clark—were they preferable to Milosevic continuing his atrocities unchecked?

TROOPS IN CONTACT

A major problem for air planners concerns the military commander's need to protect the lives of his forces and not put them at undue risk, while simultaneously limiting noncombatant casualties. Terrorists and insurgents deliberately commingle military targets with civilians, aggravating this dilemma. Such illegal tactics include placing surface-to-air missile sites near hospitals and schools, installing a military communications center in the basement of a hotel, or using civilian refugees as shields, as the Serbs did in a military encampment in the woods near Korisa, and as Saddam Hussein's "Fedayeen" did south of Baghdad in 2003.

Targeting lies at the heart of this issue. Some targets are preplanned while pop-up or fleeting targets allow little time for analysis.

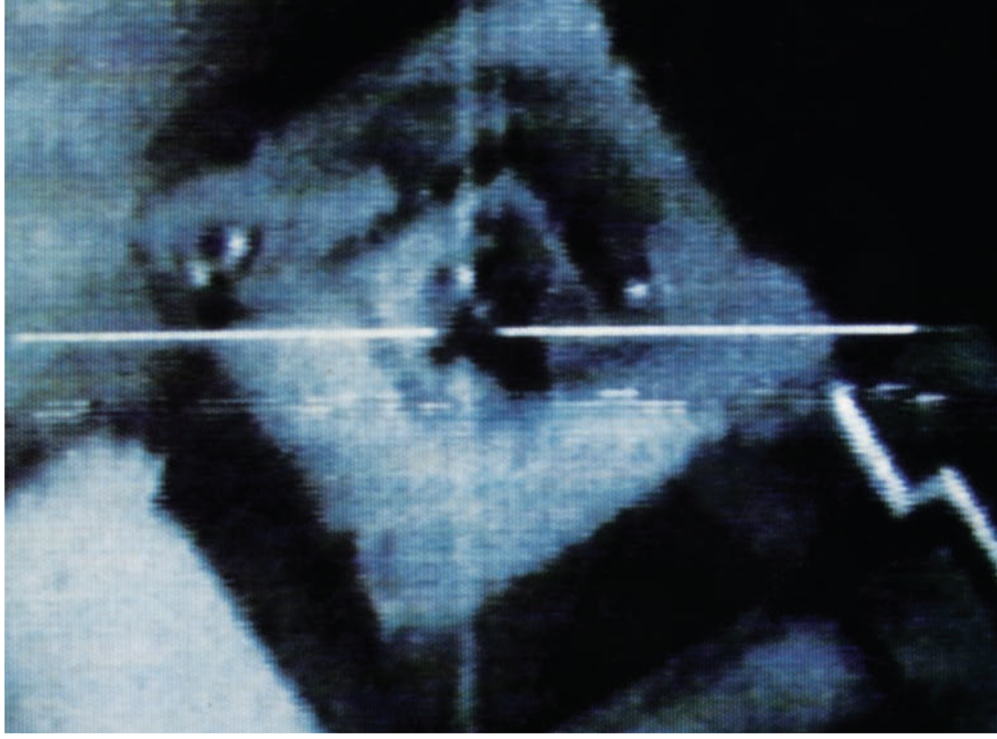
A more significant problem is when friendly troops are being attacked by enemy ground forces. This situation, termed "troops in contact," has proved thorny. Preplanned targets are vetted in advance to ensure intelligence has identified the correct target and that collateral damage will be held to a minimum. In a troops-in-contact situation these safeguards are often bypassed.

Ground forces under attack often call in air strikes to assist them. A responding aircraft will be given the location of the enemy—it may be GPS coordinates, but may simply be the location of a building where enemy fire is originating. Aircrews then try to identify the enemy and deploy weapons so as to protect friendly ground forces in trouble.

It is in this situation where most mistakes occur.

The Air Force realizes this, and its new doctrine manual on the subject stresses that "civilian casualties should be considered a critical vulnerability" and that "risk assessments" are the responsibility of the supported commander. In other words, if ground forces find themselves in trouble and demand air support, it is their responsibility to ensure they designate the correct targets to minimize collateral damage.

File photo



An F-117 hones in with precision guided weapons on a target in downtown Baghdad on Jan. 17, 1991. The target is seen through the F-117's strike camera.

Human Rights Watch studied collateral damage incidents in Afghanistan and determined that the vast majority of cases involving air-delivered weapons causing civilian casualties were troops-in-contact situations. The statistics are compelling. In the 35 air strikes that caused collateral damage during 2006 and 2007, only two occurred as a result of preplanned strikes.

Thus, over 95 percent involved troops in contact—those instances when the rigorous safeguards taken at the air operations center to avoid such mistakes needed to be bypassed. Given that there were 5,342 air strikes flown by coalition air forces that dropped "major munitions" during those two years, the number causing collateral damage was a mere two-thirds of one percent of the total. Any mistake can be tragic, but that is still a remarkably small number.

The problem is fundamental: There are friendly troops present. When ground forces are put in harm's way, it is inevitable they will be attacked and then call for help from the air. The potential for making fatal mistakes then comes into play.

The solution to lowering casualties seems apparent, and is the approach being used by the Obama Administration against ISIS today: Avoid putting in ground forces.

Civilians have always suffered the most in war, especially from the traditional forms of land and sea warfare. During the last century, the worst indiscriminate killers included unrestricted submarine warfare, landmines, blockades, sanctions, sieges, artillery barrages, starvation, and genocide.

Centuries of evidence show that blockades, sanctions, and sieges have a percolating effect: They start killing at the bottom levels of society and slowly work their way upward. Countries at war will protect whatever allows them to continue the fight. They will sacrifice the weakest segments of society so that the strong can fight on.

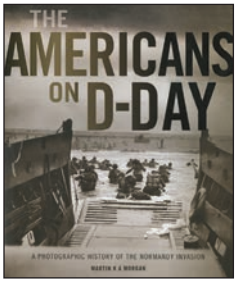
If it is the intent is to lower collateral damage to noncombatants in war, then the past century has clearly shown that airpower, in the words of Marc Garlasco, then a senior military expert at Human Rights Watch, is "probably the most discriminate weapon that exists."

Clearly, the events of the past three decades have demonstrated the discriminate and precise nature of air warfare as conducted by the US and its allies. The challenge is to fight with restraint while still achieving the desired military and political objectives. Airpower offers the greatest possibility of achieving those goals. ✪

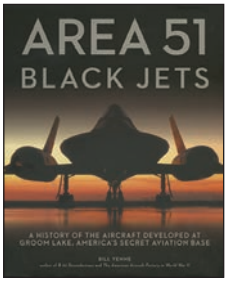
Phillip S. Meilinger is a retired Air Force pilot with 30 years of service and a doctorate in military history. His most recent article for Air Force Magazine, *"Air Interdiction," appeared in September 2014.*

Books

Compiled by Chequita Wood, Media Research Editor



The Americans on D-Day: A Photographic History of the Normandy Invasion. Martin K. A. Morgan. Zenith Press, Minneapolis (800-458-0454). 240 pages. $45.00.



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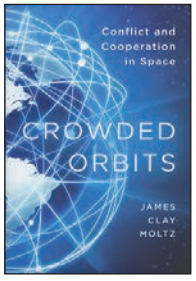
A Century of Air Power: The Changing Face of Air Warfare 1912-2012. Dave Sloggett. Casemate, Havertown, PA (610-853-9131). 198 pages. $34.95.



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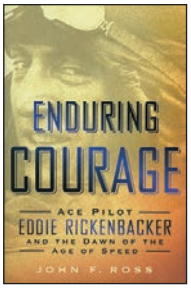

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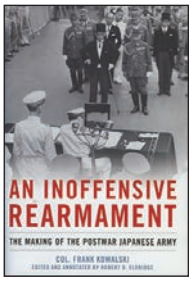

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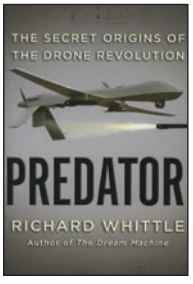

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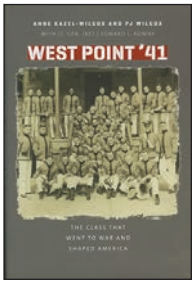
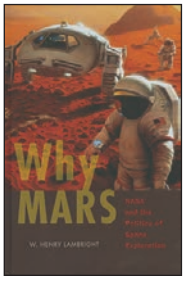


West Point '41: The Class That Went to War and Shaped America. Anne Kazel-Wilcox and P. J. Wilcox with Lt. Gen. Edward L. Rowny, USA (Ret.). University Press of New England, Lebanon, NH (800-421-1561). 352 pages. $29.95.



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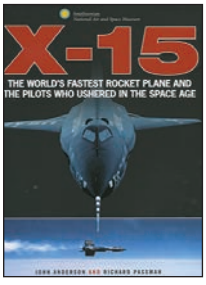

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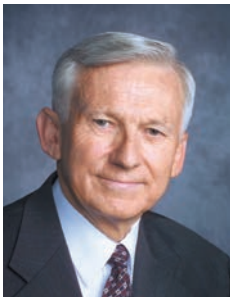

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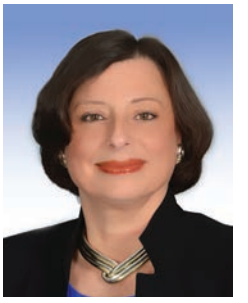

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West Point, Miss.

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Robert G. Stein
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AFA National Report

natrep@afa.org

By Frances McKenney, Assistant Managing Editor

Emerging Leaders

The Air Force Association's Emerging Leaders Program began in 2013 as a way to prepare volunteers for future AFA leadership roles. Emerging Leaders serve for a year. They participate on a national-level council, attend national leader orientations, and serve as National Convention delegates.

Emerging Leaders for 2015 are: Emilie S. Boschert, Shannon M. Farrell, Deborah A. Landry, Mike Liquori, Emily C. Shay, Christopher M. Talbot, James A. Thurber, Jeremy Trotter, Eric J. Van Der Heide, and Daniel Whalen.

Here's the third profile in AFA's second group of Emerging Leaders.

Col. Deborah A. Landry

Home State: Louisiana.

Chapter: Alamo.

Joined AFA: Life Member since 2005.

AFA Offices: Executive VP, Alamo Chapter. Formerly Membership VP, Alamo Chapter.

Military Service: 23 years Active Duty.

Occupation: Chief, Personnel Division, AETC, JBSA-Randolph, Texas.

Education: B.S., University of Louisiana-Lafayette; MBA, Georgia College and State University; Master of Military Operational Art & Science, Air University.

Q&A:

How did you first learn of AFA? Arnold Air Society. I was a squadron commander.

What are your ideas for AFA's future? We need to focus on membership and how to encourage young airmen, young company grade officers, to become members, [to know] what the benefits are. ... It's hard to encourage currently serving members to join AFA because they're pulled every which way.

Do you talk up AFA? I can't talk about it at work because I'm the boss, but outside of work? Absolutely. I join other organizations, such as the Wounded Warriors, and then I talk AFA. That's the organization that I represent [at these other events]. ... I go to the Newcomers Orientation, and I talk to everybody who walks to my station.

Photo by Marathonfoto

Despite the pouring rain, Landry finished the 2009 Marine Corps Historic Half Marathon in Fredericksburg, Va., in 1:49. Here she is at Mile 10.

Photo by Linda Aldrich

George Douglas (far right) holds his prestigious AFA Gold Life Member Card award, as his wife, Ruby Lee Douglas, receives a bouquet from Lance P. Sijan Chapter President Dave Shiller.

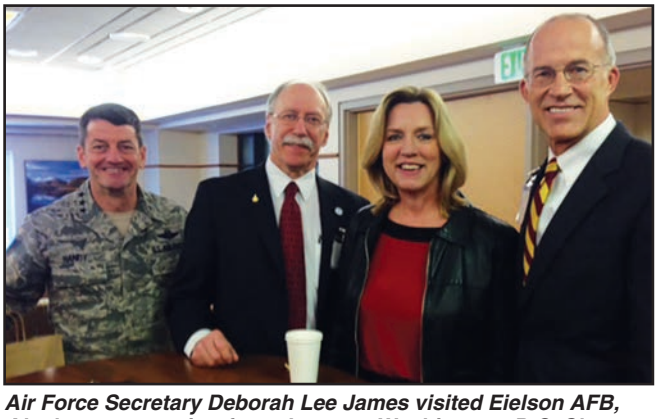
George Douglas: Pure Gold

You could call him the dean of the Air Force Association's leaders.

He's George M. Douglas of Colorado's **Lance P. Sijan Chapter.** He served as AFA Chairman of the Board and National President from 1975 to 1979 and is AFA's only top national official from that decade or earlier.

In Colorado Springs, the chapter honored Douglas with a reception where he received AFA's national-level award, the Gold Life Member Card.

Douglas is only the 21st recipient of the award, granted to AFA members whose record, production, and accomplishments on a national level have been outstanding over the years. The first award went to AFA Board Chairman and National President Gill Robb Wilson in 1957. Jimmy Doolittle received the second one in 1959.



Air Force Secretary Deborah Lee James visited Eielson AFB, Alaska, on returning from Japan to Washington, D.C. She met with (l-r) 11th Air Force Commander Lt. Gen. Russell Handy, Fairbanks Mayor Luke Hopkins, AFA Alaska Treasurer Steve Lundgren, and Fairbanks Midnight Sun Chapter members.

How to Find Mentors for CyberPatriot

"I'm an engineer by trade," said Shawn Gordon of the **Charleston Chapter** in South Carolina. He also volunteered two years ago to become the chapter coordinator for CyberPatriot, AFA's youth cyber education program.

Through these roles, Gordon has boosted the Charleston area's participation in CyberPatriot. The numbers have increased from three schools in 2012 to 13 for this season, CP-VII. Put another way, the number of Charleston area teams has leaped from four to 26.

How did Gordon do it? By rounding up volunteer mentors to provide technical support and tutoring for local CP teams. Here's his advice on how to find mentors:

- **"Reach out to professional societies within your community,"** he said. A retired Air Force major who spent 24 years in the satellite and electronic warfare arena, Gordon belongs to an alphabet-soup list of associations: AFCEA, AIAA, IEEE, Old Crows, and National Society of Black Engineers, to name a few. He tapped those organizations, along with a consortium of 15 engineering entities and local IT businesses, to find cyber professionals.
- **"In turn, get those folks to draw other people in,"** Gordon suggested. His mentors have pulled in as many as three others each. Having backup is important because a mentor could go TDY or drop out for other reasons, Gordon pointed out.
- **"Get out there early"** and line up your mentors the previous spring, he advised.

An AFA member since 1991, Gordon first approached the Charleston Chapter a couple of years ago for help on an unrelated project. While she had him on the hook, Chapter President Linda Sturgeon gave him "a tale of woe" about low membership numbers, Gordon said. He recalled thinking, "I guess that means I should step up and do something."

The something Gordon proved particularly good at is networking with industry contacts. Through them, for example, the CyberPatriot students gained a chance to compete from an unusual site: the historic, decommissioned USS *Yorktown* carrier-museum, anchored across the river from Charleston.

Just as impressively, Gordon's networking, Sturgeon said, led to Boeing sending him 10 volunteer mentors.

Photo by Charlie Watson

Stall High School AFJROTC cadets Amanda Prevatt, Chris Reyes, and Alex Denmark (l-r, seated) tackle CP-VII aboard USS* Yorktown *in November. Standing behind them: mentor Lakeithrick Harris, Shawn Gordon, cadet Delmar Deas-Drayton, and Charleston Chapter President Linda Sturgeon.

The Colorado Springs *Gazette* newspaper's website featured Douglas and this award in a video clip for its "Friday Military Salute" series. See it at: http://bit.ly/1t5HKBI.

In the interview, Douglas commented on receiving the Gold Life Member Card. "I'm very honored and flattered," he told the reporter. Then chuckling, he said, "I still wonder why."

The chapter's press release about this award highlighted Douglas' support for the military community in Colorado Springs and his focus on leadership development.

Douglas began his military career with the Army during the World War II and Korean War years. He later earned a commission through Officer Candidate School and served in the Air Force Reserve from the late 1950s to 1982, retiring as a major general.

Can You Hear Me Now?

As president of the **Gen. Carl A. "Tooey" Spaatz Chapter** in New York, David Ribbe was distributing free copies of *Air*

On Veterans Day

Ron Chromulak, a Joe Walker-Mon Valley Chapter member, waves during the Veterans Day parade in Monessen, Pa. His chapter is part of the parade host organization, the Monessen Veterans Council.

Trib Total Media photo by Jim Ference

Before the Huntsville/Madison parade in Alabama, former pilot Jim Porter and MacKay Trophy recipient Maj. Brad Powell (center) hold an AFA Medal of Merit and chapter coin, respectively, presented by Tennessee Valley Chapter President Rick Driesbach (right).

Photo by John Phillip

At right: Sarasota-Manatee Chapter member US Rep. Vern Buchanan (R-Fla.) speaks at the Manatee County Veterans Day Parade in Florida. The chapter participated in two parades.

Force Magazine at Rockland County's Veterans Service Agency.

When he got to the office of Deputy Director Susan Branam, she began chatting with him. She learned of Ribbe's Air Force background, refueling F-100s and F-102s—four years on flight lines on Active Duty and another two as a Reservist in the late 1950s and early 1960s.

As Ribbe put it, Branam considered the jet noise he'd been subjected to and told him, "You oughta have your ears checked."

She pointed him to an audiologist that the county agency works with and helped him navigate the Department of Veterans Affairs system. Ribbe, who doesn't remember having a VA disability evaluation on separation from the Air Force as a staff sergeant, now receives some compensation for service-related hearing loss. Until this point, he had assumed his hearing problems stemmed from getting older.

At New York's Gen. Carl A. "Tooey" Spaatz Chapter meeting in November are Chapter President David Ribbe and guest speaker Susan Branam, from a county veterans service agency.

Branam's know-how impressed Ribbe, who quickly invited her to address his chapter members.

The County of Rockland Veterans Service Agency describes itself as "veterans helping veterans," and Branam is a former Army captain and helicopter pilot. She spoke at the November AFA meeting, held at the US Military Academy at West Point, updating chapter members on VA benefits. According to Ribbe, she conducted "a lively question and answer period."

I Flew an Airpower Classic

AFA New Jersey's executive committee quarterly meeting spotlighted an airpower-classic bomber and two local pilots who flew it: guest speaker Thomas R. Vaucher and **Shooting Star Chapter** member Arthur L. Snyder.

Both B-29 pilots, Vaucher had enlisted in the Air Corps in 1940 and served in World War II, while Snyder's experiences with the Superfortress date to the Korean War era.

Vaucher had been part of the B-29's test team, charged with preparing it for combat use.

The bombers saw primary use in the Pacific Theater, most famously firebombing Tokyo and then bringing the war to an end with the atom bombing of Hiroshima—by the B-29 *Enola Gay* on Aug. 6, 1945—and the follow-on bombing of Nagasaki by *Bockscar* three days later.

When the Japanese surrendered on the American battleship USS *Missouri,*

Guest speaker Thomas Vaucher addresses a New Jersey AFA executive committee meeting. He's holding a copy of* This Flying Game*, a book written in 1936 by Hap Arnold and Ira Eaker. Arnold championed development of the B-29, an aircraft that Vaucher flew in World War II.

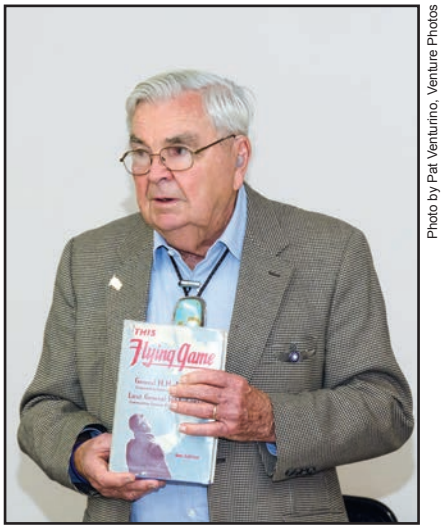


Photo by Pat Venturino, Venture Photos

anchored in Tokyo Bay on Sept. 2, 1945, Vaucher was overhead, leading a B-29 show of force just after the ceremony. This show of force consisted of hundreds of B-29s and also aircraft from the US Third Fleet.

Chapter member Snyder received a direct commission into the Air Force after graduating from college in 1950 and flew the B-26 in Korea. He flew B-29s on covert CIA missions in Indochina, reported New Jersey State President Howard Leach Jr.

This AFA meeting took place at the Army's former Camp Evans, N.J., once a trans-Atlantic wireless station, involved in World War II radar development and, later, in space communications and satellite-based hurricane tracking. ✪

Update Your Info

This is a good time to remind our readers to make sure their member profiles are current and accurate. You may do so by contacting the Membership Department at 1-800-727-3337, by email at membership@afa.org, or by writing to 1501 Lee Highway, Arlington, VA 22209-1198. You may also update this information at any time under the Members Only area of our website, www.afa.org.

Photo by Bill Ewing

At right: In Arkansas, Larry Louden (l), president of the Lewis Lyle Chapter, presents a state Teacher of the Year Award to Mike Vincent at Hot Springs High School.

At left: In Virginia, Leigh Wade Chapter volunteers helped install a wheelchair ramp for Jimmy O'Neal, husband of Teresa O'Neal (l). Lloyd Guerin, Ron Dietz, Chapter President Gary Metzinger, John Pecore, Hank Duarte (l-r), and chapter Community Partners put the project together.

Reunions

601st-615th AC&WS. April 27-May 1 at the Comfort Suites in Charleston, SC. **Contact:** Francis Gosselin (352-588-9295) (fgosselin@tampabay.rr.com).

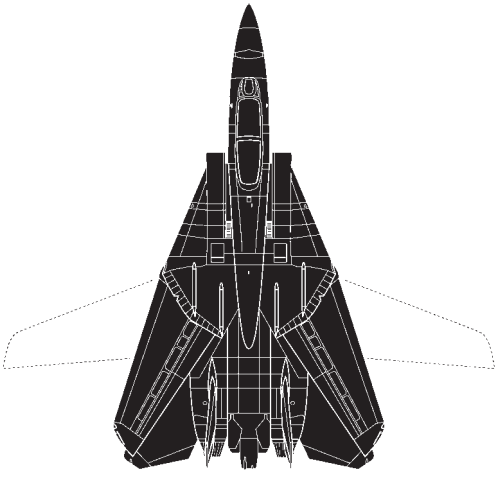
USAF Flight Check Assn. Sept. 24 to 28 at the National Shrine of Our Lady of the Snows in Belleville, IL. **Contact:** James Smith, 1 Deer Run, O'Fallon, IL 62269 (618-581-6249) (jamsmi177@aol.com).

Having a Reunion?

Email reunion notices four months ahead of time to reunions@afa.org, or mail notices to "Reunions," *Air Force Magazine,* 1501 Lee Highway, Arlington, VA 22209-1198. We reserve the right to condense notices.

Artwork by Zaur Eylanbekov

F-14 Tomcat



The F-14 Tomcat was the US Navy's frontline interceptor-fighter for more than three decades. A two-seat, supersonic, twin-engine, variable sweep-wing aircraft, the Grumman-built Tomcat starting in 1974 provided fleet air defense for carrier battle groups and, late in its long career, precision strike against ground targets. Though retired from US service, it is still active in Iran's air force.

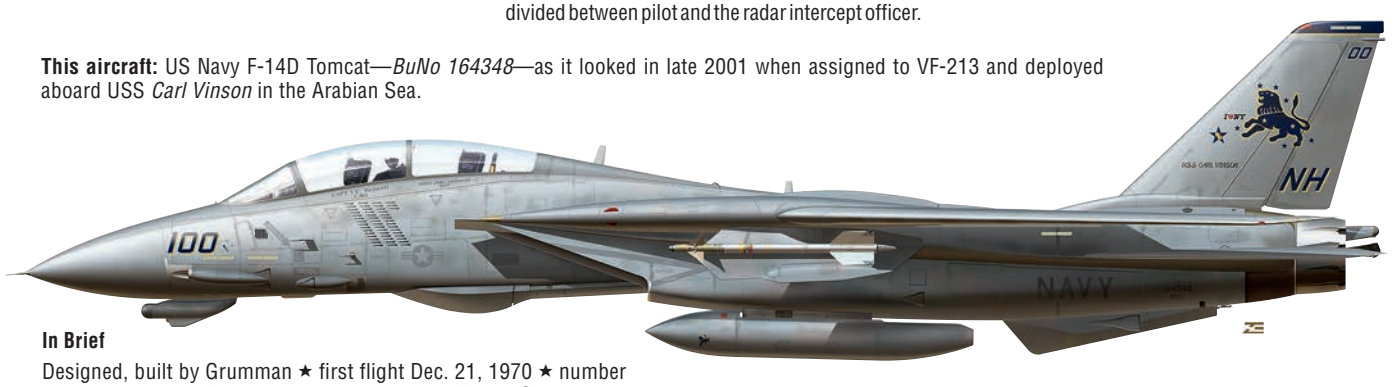
The F-14 Tomcat was designed as both air superiority fighter and a long-range interceptor, specifically to deal with the threat of long-range Soviet aviation and cruise missiles. Its variable geometry wings moved automatically during flight. For high-speed intercept, they swept back; they swung forward at lower speed. In the cockpit, tasks of navigation, target acquisition, electronic countermeasures, and weapons employment were divided between pilot and the radar intercept officer.

The Tomcat also sported a huge radar and heavy, long-range Phoenix missiles. Many disliked its original TF-30 powerplant; Secretary of the Navy John F. Lehman Jr. called it a "terrible engine" and moved to replace it.

The F-14 boasted a credible operational history, starting in the final days of the Vietnam War. The F-14 scored its first air-to-air kills in US Navy service in August 1981, when two Tomcats shot down two Libyan Su-22 fighters over the Gulf of Sidra, and followed up in the same area in 1989, when it downed two Libyan MiGs. It saw considerable action over Lebanon, Persian Gulf, Balkans, and Iraq. It was also used to great effect by Iran in its 1980-88 war with Iraq. The US supplied Iran before the fall of the Shah and rise of the hostile Islamic Republic.

—Robert S. Dudney with Walter J. Boyne

This aircraft: US Navy F-14D Tomcat—*BuNo 164348*—as it looked in late 2001 when assigned to VF-213 and deployed aboard USS *Carl Vinson* in the Arabian Sea.



In Brief

Designed, built by Grumman ★ first flight Dec. 21, 1970 ★ number built 712 ★ crew of two (pilot, radar intercept officer). **Specific to F-14D:** two General Electric F110-GE-400 turbofan engines ★ armament one 20 mm Vulcan six-barrel Gatling cannon; up to six AIM-54 and/or AIM-7, in addition to two AIM-9 air-to-air missiles ★ load, 14,599 lb of JDAM, Paveway, Mk 80, Mk 20 ordnance ★ max speed 1,544 mph ★ cruise speed 460 to 633 mph ★ max range 1,841 mi ★ weight (loaded) 61,000 lb ★ span 64 ft spread and 38 ft swept ★ length 62 ft 9 in ★ height 16 ft.

Famous Fliers

US Navy: Dale Snodgrass (Navy Fighter Pilot of the Year, 1985) Hank Kleemann and Dave Venlet (first air-to-air victory), Kara Hultgreen (first female carrier-based fighter pilot), Blake Coleman and Dave Lauderbaugh (final carrier launch), Chris Richard and Mike Petronis (final flight), Timothy Dorsey and Edmund Holland (accidentally shot down USAF RF-4). **Iran:** Jalil Zandi (ace, eight confirmed, three probable victories, Iran-Iraq War). **Test pilots:** Robert Smyth (first to fly), William Miller.

Interesting Facts

Glamorized in hit 1986 Hollywood film "Top Gun" ★ flew just 23 months after award of contract ★ launched successful AIM-54 Phoenix missile attack against test target 124 miles distant ★ able to land with wings fully swept back ★ once fired six missiles in 38 seconds, scoring four direct hits ★ became first US fighter designed to incorporate lessons of Vietnam War combat against MiG fighters ★ suffered many compressor stalls and pilot ejections during tests ★ remains largest and heaviest US fighter ever to fly from an aircraft carrier ★ named "Tomcat" in honor of Vice Adm. Thomas F. Connolly, who sold it to Congress ★ dubbed "Ali-Cat" in Imperial Iranian Air Force.

Navy photo by Photographer's Mate 3rd Class John E. Woods

At sea aboard USS* Kitty Hawk, *March 19, 2002.

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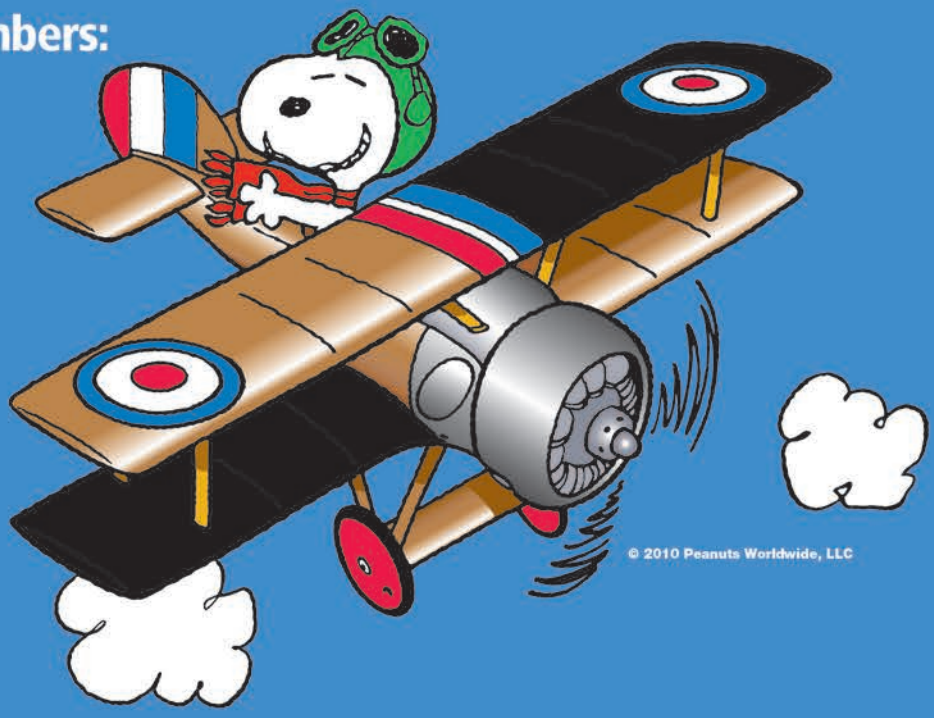

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