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AIR FORCE MAGAZINE

Johnny Alison
1912 - 2011

Cold War Scrapbook

The F-35

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About the cover: John Alison during his time in the active duty Air Force. See "Alison," p. 34.

FEATURES

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DEPARTMENTS

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Editorial

By Adam J. Hebert, Editor in Chief

The False Death of Airpower

In October 1957, five years before he wrote *Seven Days in May,* Fletcher Knebel was with *Look* magazine when he penned an influential feature, "Coming Death of the Flying Air Force." It detailed how guided missiles were on the brink of making manned combat aircraft obsolete.

"It can be heard in the corridors of the Pentagon, in our bases flung around the world, in statements of the brass and in the design rooms of industry: The flying Air Force is being grounded by the missile," Knebel wrote just a decade into USAF's official existence.

It was an early take on a notion that regularly resurfaces. One finds a similar theme in military historian Martin van Creveld's new book, *The Age of Airpower.* Van Creveld does a creditable job surveying the broad and complex history of airpower in military operations, but goes off the rails during his frequent switches from historian to commentator.

Airpower reached its peak in World War II, van Creveld argues, and "fierce debate soon developed as to who had done what, how effective the attacks had really been, and what the overall contribution of airpower to the unfolding of operations was."

His arguments are straightforward: War between nuclear armed states is unthinkable; new aircraft are operationally no more effective than old aircraft; rising cost and complexity vastly reduces inventories and makes commanders unwilling to risk aircraft in combat; space systems and drones are making manned aircraft obsolete; and airpower is not decisive in war.

The book has been well reviewed. Unfortunately, the spurious arguments have received the attention.

"Seen in retrospect airpower has now been in decline for six decades and more," van Creveld writes. Yet his examples frequently fail to support his thesis.

Consider close air support: "Less than a year before Operation Iraqi Freedom was launched, the Army Chief of Staff, Gen. Eric Shinseki, told Congress that field units normally had to wait about 25 minutes for air support," van Creveld writes. "That only represented a marginal improvement on what the RAF in Egypt had achieved in the Western Desert during the second half of 1942."

But even this careful comparison of a pre-OIF estimate to a specific time and place in the past contradicts another example. Discussing Allied air operations from France late in World War II, he notes "ground troops who asked for air support could hardly expect to receive it within less than an hour of the request being made." Twenty-five minutes would be a marked improvement, and one thing that has undeniably changed is accuracy. The Air Force today frequently delivers precision weapons against enemy positions, with much less risk of fratricide than in the past.

Critics have been predicting USAF's demise almost from the beginning.

Van Creveld also questions whether advanced technology is worth the cost. "Weapons systems regarded as too expensive and too few in number to be lost cannot be used in war," he says, which would no doubt surprise the B-2 and F-117 crews who flew into the teeth of Serbian, Iraqi, or Libyan air defenses in recent years.

Technological advances have a way of canceling each other out, he continues, as an F-15 is roughly equivalent to a MiG-29 in the same way that a P-51 Mustang was comparable to a Japanese Zero. What has changed is the cost, which has led to vastly smaller air fleets worldwide.

Yet "there is no sign that, on a one-against-one or even squadron-against-squadron basis, modern aircraft are more capable than their predecessors 60 or even 90 years ago," he says. But in his discussion of the 1991 Gulf War, the author eloquently shows what happens when a nation is on the wrong side of technology. After listing all the capabilities the US had but Iraq did not, van Creveld dismisses the victory out of hand as "a case of an elephant stamping on the worm that had provoked it." You can't have it both ways—either technology matters, or it doesn't.

Then there is the argument that satellites and drones are displacing manned aircraft. Many capabilities have migrated to space, and unmanned aerial vehicles are multiplying at the same time that combat aircraft inventories are declining. But USAF is the primary military developer and operator of these systems, and satellites and UAVs are still, in a word, airpower.

The Age of Airpower goes on to cite a litany of post-World War II examples where air forces proved critical:

- Thanks to airpower, the 1967 Six Day War was "a spectacular victory" for Israel, but allegedly "represented the swan song in an age that was already on the wane."
- Just five years later, in Vietnam, the Linebacker operations "reconfirmed the old lesson … that no large-scale conventional campaign is feasible in the teeth of enemy command of the air."
- The idea that airpower is in decline is further contradicted by Operation Desert Storm, in which Iraq's military forces were so gutted by the USAF-led air assault that land combat only took 100 hours.

Of course the Air Force is most effective in combined operations. That's not the point. Even Operation Allied Force, the US-led air-only effort to drive Serbian forces out of Kosovo in 1999 was ultimately successful. Despite a slow buildup of effort and maddening political limitations brought on by NATO concerns, "airpower did indeed prove decisive," van Creveld acknowledges.

Today's complaints about the Air Force often center on its supposed ineffectiveness in counterinsurgencies. Airpower has difficulty winning a war against enemies who hide among civilian populations and fight with hit-and-run tactics, but this is not a unique problem. Land forces and sea power have been equally hamstrung.

As we saw in Vietnam, twice in Iraq, and in a handful of larger battles in Afghanistan, if the enemy masses, they will be destroyed from the air. This will be done with far less human cost than force-on-force ground operations require.

This is America's asymmetric advantage. The Air Force can project US power quickly, accurately, and with few casualties. Despite the unending harping by its critics, airpower isn't going anywhere. ■

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A Burr in Boeing's Side

John Tirpak's article, "The Tanker Answer" *[June, p. 40],* is an interesting attempt to put together a very complex and often convoluted history of the Air Force tanker procurement. I was especially struck by EADS North America's Chairman Ralph Crosby's point about how competition worked to the advantage of the Air Force. His comments raise two issues.

To begin, his data for the lease in 2002 are widely off the mark. They include the price of the aircraft, which Ralph's staff could not have known since it has been held very close for years, plus some wild assumptions about the financing of the acquisition. The facts are that the Air Force obtained a negotiated deal for a firm fixed price of $126.5 million per aircraft in 2004 dollars for 100 aircraft, leased or bought. The Air Force paid for no development. It was to pay Boeing only after the plane arrived and passed acceptance inspection. And a lease could be converted into a buy at any time before, at, or after delivery without any penalty. The current contract for 18 planes will average about $195 million, according to press reports. This price may include some of the $4 billion to be paid to Boeing for development of the same aircraft offered in 2002 (where the firm carried all the development costs), but with some fancy options added. And the numbers ignore the fact that the US now will have to borrow all the monies to buy these aircraft, but the interest charges are not attributed to this new program. In 2002, the US was in surplus, and any leases or buys of tankers were predicated on current revenues. There is only hope that aircraft No. 19 and beyond will be less expensive.

There is a second point that needs to be made, and that is that the USAF owes Ralph Crosby a debt of gratitude. In 2002, when I met with their executives, Airbus simply was not ready for any competition. Their boom design and test were seven or eight years away. When Ralph arrived, he took a nonexistent program and drove it to one that was innovative, attractive, and almost beat the putative incumbent. Any price shaving between the first and second competitions on the part of Boeing should be attributed to Ralph's focus, drive, and unwavering commitment to succeed. He may have lost a competition to replace aging KC-135s, but he directly caused reductions in Boeing's offering, thereby saving the Air Force millions, and in my opinion, has put on the table a terrific offer for a very solid KC-10 replacement. Were the DOD a market company, it would lock in the price, and buy an option for 100-plus KC-45s from EADS with delivery at some time in the future. But even if we don't buy any of these planes soon (and a shame since competition works even better when substitutes are built concurrently), Ralph and his colleagues in EADS and his earlier partner, Northrop Grumman, have proven that any monopoly is reluctant to reduce price unless it fears a strong competitor. He deserves a genuine "Well done!" from us all.

James G. Roche,
20th Secretary of the Air Force
Annapolis, Md.

Maybe We'll Get There First

John T. Correll's article, "USAF and the UFOs," June 2011 *[p. 68],* revisited the fascinating subject of UFOs. As usual, John's articles are well-researched and well-written. I'm sure someone in Hollywood will love the article because it stimulates interest, which is good for their business. But their business is entertainment—not truth!

Unfortunately, the article doesn't explore any new ground, focusing instead on material that's been rehashed repeatedly over the past 60 years. Critics, not John, always drag out Air Force Project Blue Book, and restate the tired old thesis that the US has evidence of alien visits, about which government officials consistently lie. Can you even imagine how many people would have to be involved in such a massive cover-up, or for what reasons they would do so? It never seems to matter much that there is little believable evidence to support these themes.

Think about it. Everywhere we go we leave a mountain of debris: a flag planted on the moon, a lunar land rover still sitting there, tons of equipment left behind, exploratory probes on Mars and other planets, satellites crashed on the surface of other heavenly bodies. It would be impossible for us to deny we had been to space.

On the other hand, with more than 12,000 UFO sightings in the last 100 years, we have no credible evidence of any alien visitors to Earth. Is it possible they left nothing behind on any of their trips? Even if that were plausible, you would think that in 12,000 sightings someone with a still or video camera would capture a really good photograph or film of these visitors, instead of the blurred pictures that are occasionally published and are so easily faked.

As for me, I was the UFO focal point at Stewart AFB, N.Y., in the 1960s, and I received lots of reported sightings, which Air Force officers investigated. None of them proved to be fruitful. Even so, I believe in space travel and expect one day we will send an expeditionary shuttle to some distant planet. But like the late Carl Sagan, until I see some credible hard evidence to the contrary, I am not yet ready to believe that aliens are visiting Earth—despite what well meaning pseudo scientists and Hollywood producers claim.

Perhaps alien artifacts have altered the course of 20th century history, perhaps extraterrestrial visitors are studying our civilization from an intergalactic vantage point that obscures our ability to detect them in any detail, or perhaps entrepreneurs have just tapped into our curiosity and fertile imaginations with very profitable entertainment ventures. After all, UFOs offer an exciting theatrical premise for a television series.

One day, however, we may truly have alien visitors here, if we don't visit them on their planet first.

Lt. Col. Donald L. Gilleland,
USAF (Ret.)
Melbourne, Fla.

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LOCKHEED MARTIN

I was stationed with the 4203rd Photo Technical Squadron at Bolling Field when I first was interviewed by an officer from the Pentagon about my own ideas concerning UFOs and atomic energy. That was about 1948. Our squadron was tasked to process photography from Operations Sandstone and Dick Tracy. Anyone related to reconnaissance during that time of the new Strategic Air Command and the CIA was a target for speculation.

Dick Tracy was all of the aerial film that the Germans had exposed over the Soviet Union and captured in Berlin on orders from General Eisenhower, and Sandstone was the testing of nuclear weapons near Eniwetok Atoll. We held the future in our hands because this was material for making target charts and blowing things up. That Pentagon officer was a major who was recalled for that specific purpose: getting information about flying saucers. Who better to ask than people in the reconnaissance business? Me? I knew nothing, but had an open mind.

As a participating member in the Dick Tracy, Operation Genetrix, the U-2 program, the SR-71, Corona, lunar landings, and so on, I never once saw anything that suggested any recent extraterrestrial existence here, on the Moon, or on Mars.

MSgt. Joe D. Franklin,
USAF (Ret.)
St. Helena Island, S.C.

"USAF and the UFOs" is, in my words, another in a long line of Peter Jennings-style red-herring articles. I can tell this is simply written to try and shake the last bits of respect from all of the solid work done by many UFO researchers over the last 60 years-plus. I have followed and studied hundreds of reports on the UFO/ET field for 40-plus years, and I was heavily involved in the 2007 Saratoga,Calif., drone photo investigations, and there is one basic question that the United States Air Force has always failed to answer, and John T. Correll is right along with them. The question is: How can the Army Air Corps in 1947 announce that a flying disk had been captured near Roswell, N.M., and in the same breath, describe a large debris field on the ranch outside Roswell? So what was it? A disk or a debris field? Who determined it was a disk, and why? How could the Army Air Corps make such a blunder, unless (probably), there were two crash sites.

Cover up? How could Jesse Marcel go back to his house, then to the Army air base and say, "Yup, we have a disk," when all of the books and articles that have been written tell how he found a large debris field with Mac Brazel out on the ranch. Hmmm, sounds like "disk" to me!

I have talked to many top-name researchers, including Stanton Friedman, at many of the symposiums and lectures on the West Coast, and I have been told that USAF cannot answer that question. In fact, they were asked that question right after the 1947 Roswell announcement, and never got it correct back then. The additional multitudes added to the Roswell event are pure chaff and spin. The test dummies have been proved to already be false and happened well after the 1947 Roswell retrieval event.

USAF needs to come clean and allow, like many other countries, that yes, we know what is going on, and yes, we have data that is extraterrestrial in nature.

Why didn't Mr. Correll contact and quote investigator Richard Dolan for this article? Why no mention of the March 13, 1997, "Phoenix Lights" event? If one reads all the articles on the Phoenix Lights events, it is clearly another two location event but spun very nicely in the media.

Like Mr. Correll states, more than half the adult American population believes the government is concealing information about UFOs. Yes, count me in!

Tom Vance
Redwood City, Calif.

"USAF and the UFOs" brought back memories. As the Air Force spokesman on UFOs at the Pentagon from 1967 to 1969, I wrote the Dec. 17, 1969, news release announcing the close of Project Blue Book and the move of its records to the Air Force archives at Maxwell AFB, Ala. A few years later, while attending the University of Denver, I wrote my master's degree thesis on "The UFO Phenomenon: A Study in Public Relations."

Why Correll, a former Air Force public affairs officer, skirted the PR aspects of the UFO phenomenon is puzzling. The Air Force was its own worst enemy, for the story of the Air Force and UFOs is essentially a tale of a credibility gap wider than the Grand Canyon.

Studies conducted during 1947-1952 convinced authorities that UFOs, whatever they might be, were not of unearthly origin and did not threaten national security. What was initially an intelligence matter quickly evolved into a PR problem of the greatest magnitude. What was insane was the needless secrecy that cloaked the UFO project, compounded by the naiveté of Air Force officials in public relations skills at that time.

The basic difficulty investigating UFOs was the impossibility of explaining all sightings. The Air Force mistakenly viewed the unexplained cases as a challenge to its capability. Why should the Air Force prove that flying s aucers don't exist? A universal negative is impossible to prove. Why weren't advocates of extraterrestrial UFOs made to prove that they do exist? The late Phil Klass, whom Correll mentions (p. 70) as an avid UFO debunker, had a standing offer of $50,000 to anyone who could provide evidence to the National Academy of Sciences that UFOs were of extraterrestrial origin. Needless to say, Klass kept his money. (Klass gave me a plaque upon my retirement, which I still have. It reads: "UFOs Are Real. The Air Force Doesn't Exist!")

In the final analysis, it was the Air Force's unwillingness to be open and frank with the press and public about UFOs that caused the service more than 20 years of grief.

Col. David J. Shea,
USAF (Ret.)
Springfield, Va.

Dueling Historians

I must take issue with the statement "Five Vulcans were modified for the 1982 Falkland Islands war, where they proved highly effective," by my friend and colleague Walter J. Boyne *["Airpower Classics," June 2011, p. 80].*

During the 10-week Falklands conflict, the Royal Air Force flew three single-plane Vulcan sorties, with each aircraft carrying 21 1,000-pound bombs to attack Port Stanley airfield, and two single-plane Vulcan sorties with Shrike anti-radar missiles to attack an Argentine radar installation. Each single-plane sortie required the support of 12 Victor tankers.

According to the official US Navy report on the lessons of the Falklands, the Vulcan missions "had virtually no impact on either the Argentine surveillance radar or on Port Stanley airfield. Both the airfield and surveillance radar installation remained operating until the last day of the war."

Rather, the Royal Navy's 28 Sea Harriers and 14 RAF Harrier GR.3 aircraft—flying from two small "Harrier carriers" in the South Atlantic winter—and almost 200 helicopters of all British services won the air campaign of the Falklands. The vaunted RAF Vulcans as well as the RAF Nimrod maritime patrol aircraft were completely irrelevant. The RAF land-based aircraft that were vital were the C-130 Hercules that flew special equipment and weapons as well as people who were parachuted to the task force; those aircraft were fitted for in-flight refueling from the Victor tankers.

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Washington Watch

By John A. Tirpak, Executive Editor

Thinking ahead in the tanker business; USAF losing the MC-12?; F-35 program walking the edge ....

BOEING LOWBALLED THE TANKER

It wasn't just sour grapes when EADS North America Chairman Ralph D. Crosby Jr. claimed back in March that, on the KC-X contract, Boeing made an "extremely lowball offer in order to achieve their strategic objectives." Both the Air Force and Boeing now acknowledge this is so.

Boeing "revealed" to the Air Force on April 25—two months after the contract award—that "it proposed a ceiling price for the [engineering and manufacturing development] contract that is less than its actual projected cost to execute," an Air Force spokesman said in June.

In other words, Boeing bid less to develop and produce the initial models of the KC-46 than it will cost to do the work. Boeing broke no law or rule by bidding less than its estimated costs, the spokesman added.

"There is no legal barrier that prohibits an offeror from pursuing a below-cost proposal strategy," he noted, saying Boeing adhered to federal acquisition regulations and "met all rules stipulated" in the request for proposal.

As a result of the low bid, there was "significant savings" to the government and American taxpayer, he said.

However, under the terms of the fixed-price incentive firm contract, Boeing must absorb any overruns beyond the $4.9 billion ceiling of the deal. That figure is the maximum financial liability to the government.

The Air Force now aims to "tightly control program execution to make certain Boeing delivers what it promised during source selection and to ensure the government maintains the competitively negotiated program cost, schedule, and performance baselines," the USAF spokesman continued. This includes delivering 18 aircraft in the final production configuration by the end of 2017.

A Boeing spokesman said the company tendered an "aggressive but responsible" bid which will be good for the taxpayer and provides "value to Boeing shareholders." When asked to elaborate, he explained, "We expect to make money on the KC-46 program." Winning the program "opens additional opportunities, including potential US and international tanker sales and related services for decades to come."

At the time of the award, industry officials suggested that Boeing was taking a longer-view approach to the KC-46 than just the initial batch of 179 aircraft. After the KC-X, the Air Force plans to have a KC-Y competition to replace the remainder of its already-50-year-old KC-135 tankers, and after that, a KC-Z contest to replace the KC-10 Extender. Winning the KC-X could give Boeing the inside track in those contests, although they are probably 10 and 20 years away, respectively.

Moreover, Air Force officials have in recent years suggested that the winner of KC-X could potentially be in a favored position to win work replacing other large aircraft such as the E-3 AWACS, E-8 JSTARS, and RC-135 Rivet Joint, all of which have significant commonality with the KC-135. The KC-46 could potentially be the vanguard of a new "family" of USAF heavy aircraft, patterned on the 707/C-135 model.

There was a commercial element to Boeing's move as well. Industry officials pointed out that Boeing needed to win KC-X in order to block EADS—parent of Airbus—from gaining a production beachhead in the US. Had it won the KC-X, EADS planned to open a manufacturing capability on US soil to build its KC-45, based on the A330 airliner. Establishing such a production facility would have given Airbus an American manufacturing and service presence it currently does not enjoy.

Boeing photo-illustration

Boeing's lowball bid is a long-term strategy.

MC-12 TO THE ARMY?

The Air Force would have to give its brand-new fleet of MC-12W Liberty aircraft to the Army if a Senate Armed Services Committee plan becomes law.

Reporting on its markup of the 2012 defense authorization bill, the Senate said it was cutting nearly a half-billion dollars from the Army's budget aimed at building an aircraft very like the MC-12W, and directed instead that the Secretary of Defense "develop and implement a plan for the orderly transfer of the Air Force C-12 Liberty intelligence, surveillance, and reconnaissance (ISR) aircraft to the Army."

The House, in its version of the bill, also slashed the Army's MC-12 clone, the Enhanced Medium Altitude Reconnaissance and Surveillance System, by $524 million, which was to buy 18 aircraft in Fiscal 2012. The Army had planned to slowly phase out its aging RC-12 Guardrail aircraft—which perform a similar function—replacing it with the EMARSS.

Defense Secretary Leon E. Panetta would have to submit the transfer plan by the end of Fiscal 2013. The report didn't specify how long the Air Force would have to complete the transfer.

The MC-12W is one of the centerpieces of the Air Force's efforts to fulfill former Defense Secretary Robert M. Gates' insistence that the service do more to provide timely ISR products to ground troops. The service prided itself on bringing the MC-12 from concept to operations in record time, from a cold start in July 2008 to combat missions in Iraq in June 2009.

The aircraft is based on the Hawker Beechcraft King Air—the C-12 in military parlance—used by all the military services. The Air Force recently began bedding down the MC-12 at Beale AFB, Calif., which will host seven aircraft for training; the rest of the planned 37-aircraft fleet is expected to remain deployed overseas.

To help pay for the MC-12 and other ISR enhancements demanded by Gates, such as a large fleet of remotely piloted aircraft, the Air Force cut deeply into other accounts, e.g., retiring large numbers of fighter aircraft.

A spokeswoman for SASC Chairman Sen. Carl Levin (D-Mich.) said the move was prompted by the airland subcommittee staff, which convinced that panel that the role played by the MC-12 is "an enduring mission of the Army."

She said the SASC believes "that these aircraft could best be operated and supported in the long term within the Army force structure," and the transfer would prevent the Army from buying a duplicative capability in the form of the EMARSS.

The potential move of the MC-12 to the Army isn't a new idea; Pentagon leaders proposed it in 2009 as part of a broader swap that would give the Air Force the whole of the C-27 Spartan light cargo aircraft fleet, which at that time was to be operated by both services. As it turned out, the Air Force got the Spartans and retained the MC-12, purportedly on the strength of its combat performance.

Flying over ground forces on patrol and in convoys, or circling above buildings and battles, the MC-12 crew gives troops on the ground instant intelligence about their surroundings, threats, and what resides over the next hill or around the next corner. This is provided by sensors that can intercept enemy communication and video that can be shared with the ground troops.

The Air Force crews consist of two pilots, a sensor operator, and a cryptologist who analyzes intelligence. The airmen communicate directly with ground forces, who have been effusive in their praise.

The Senate's proposed MC-12 transfer plays out against the backdrop of a longer-term feud between USAF and the Army over how best to manage battlefield ISR. The Air Force has long sought executive agency for RPAs in a bid for efficiency and to deconflict the drones with manned aircraft. The efficiency would come from making RPAs available across the theater, as the theater commander directs.

The Army sees RPAs as tools tethered to individual units, and at the disposal of those unit commanders only; they would be idle when the unit wasn't deployed. The Army's plan for the EMARSS likewise would apportion the aircraft to ground commanders and not the joint force air component commander.

F-35 TARGETED

Unhappy with cost overages and schedule delays on the F-35 program, Congress either attempted or passed a number of efforts to modify the program this spring, in hopes of imposing fiscal discipline on the fighter.

Sen. John McCain (R-Ariz.), ranking member of the Senate Armed Services Committee, attempted to add language to the armed services authorization bill that would compel the Pentagon to terminate the project by the end of 2012 if prime contractor Lockheed Martin fails to get costs down to within 10 percent of the target price. The measure failed in committee, but by the narrowest of margins—a 13 to 13 tie—suggesting SASC patience with the F-35 is razor thin.

McCain pledged to reintroduce the measure on the Senate floor.

In F-35 hearings this spring, McCain urged Pentagon acquisition leaders to develop "alternatives" for the program, insisting that contractors perform better if there is a real threat of losing the work to someone else. Pentagon acquisition chief Ashton B. Carter replied in testimony that the Pentagon sees no viable alternative to the F-35.

However, the F-35 did not escape without some restrictions. The SASC directed the Pentagon to make the next negotiated production contract—Lot 5—a fixed-price arrangement, which would compel Lockheed to eat any overruns on the project.

However, the panel allowed that if the government demands changes to the F-35 design—a likely outcome of flight-test discoveries or the need to add additional capability—then the additional cost "should be borne by the government," the SASC said in its authorization bill report.

After promoting the fact that Lot 4 prices were lower than the Pentagon's expectations—and making much of the fact that Lot 4 was of a fixed-price type two years earlier than expected—company officials have been less willing to predict a price reduction in Lot 5. Industry officials said that if Lot 5 must follow the SASC directive, it becomes a riskier proposition and demands a "risk premium" in the price. That, and the fact that the line will be switching from mostly F-35Bs to F-35As and Cs, could increase costs, industry officials said.

McCain, in a statement he attached to the SASC bill, expressed his worry that the directive the SASC adopted would indeed "result in the contractor simply insisting on a much higher fixed price, or require that a 'risk premium' be baked into the fee structure of the next lot's contract."

SASC Chairman Levin said he didn't vote for McCain's measure because it could be viewed as changing F-35 contracts after the fact, but did say he was studying ways to keep pressure on Lockheed to meet cost targets on lots already negotiated.

Lockheed F-35 Vice President Tom Burbage told reporters at the Paris Air Show that, although Lot 4 is only about 10 percent complete, company projections show Lockheed will earn a profit on the deal. The projection was the result of a periodic "estimate to complete" the contract.

Former Defense Secretary Robert M. Gates, interviewed by Bloomberg news just before leaving his Pentagon post in June, said he saw little chance that the F-35 will be terminated.

"There is no question in my mind we have to have the airplane if we are looking out 10, 20, 30 years," he said. However, with costs going up, he thought it possible that the eventual size of the F-35 fleet—still pegged at around 2,400 aircraft for the Air Force, Navy, and Marine Corps together—could be reduced by budgetary pressures.

"Potentially," he said, Congress could seek savings by reducing "the size of the buy." However, such a tactic would mean "the price per airplane is going to go up."

Prior to his departure, Gates put the F-35B version on a two-year "probation," since the short takeoff and vertical landing variant had been the bad actor in delaying completion of development and flight testing. However, industry and Marine Corps sources have said the F-35B's problems are well-understood and fixes are already being implemented.

The Pentagon is undertaking an internal analysis of what the F-35 "should cost," and Carter said his office is working with Lockheed to reduce overhead costs and eliminate non-value-added processes to reduce prices on the fighter. ■

Air Force World

By Aaron Church, Associate Editor

Airman Dies in Afghanistan

TSgt. Daniel L. Douville, 33, of Harvey, La., died in Afghanistan June 26.

Harvey died as a result of injuries suffered from an improvised explosive device on the border of the Nad Ali district of Helmand province. At the time of his death, Harvey was assigned to the 96th Civil Engineer Squadron at Eglin Air Force Base in Florida.

F-16 Pilot Killed in Nellis Crash

Capt. Eric Ziegler, 30, an operational test and evaluation instructor pilot with the 422nd Test and Evaluation Squadron at Nellis AFB, Nev., died June 28 when his F-16C crashed in the desert near Caliente, Nev., during a training mission. Ziegler recently had been selected to attend the Air Force Weapons School at Nellis.

His F-16, which was unarmed, was participating in an air-to-air combat training mission on the Nellis range when it crashed. Helicopters and ground teams searched a wide area for two days to find the wreckage.

Panetta Takes Over

The Senate voted on June 21 to unanimously approve Leon E. Panetta to become Defense Secretary. Previously the head of the CIA, he won bipartisan support following his June 9 confirmation hearing before the Senate Armed Services Committee.

Panetta assumed his new post at the Pentagon June 30, replacing Robert M. Gates, who had led the Defense Department since December 2006. President Obama nominated Army Gen. David H. Petraeus, top US general in Afghanistan, to replace Panetta at the CIA. Petraeus received Senate confirmation on June 30.

Gates Says Goodbye

Robert M. Gates, who was first appointed Defense Secretary by President George W. Bush in 2006, received the Presidential Medal of Freedom from President Obama at a June 30 Pentagon ceremony. The day before, Gates issued a farewell message to troops.

"It has been the greatest honor of my life to serve and to lead you for the past four-and-a-half years," he wrote, continuing, "Your dedication, courage, and skill have kept America safe even while bringing the war in Iraq to a successful conclusion and, I believe, at last turning the tide in Afghanistan."

USAF photo by MSgt. Jeffrey Allen

Aggressive Withdrawal

With reservations, the nation's top military officer and the senior US general in Afghanistan have backed President Obama's plan to withdraw thousands of American troops from Afghanistan starting in July.

Both were candid, however, in assessing Obama's plan as more accelerated and potentially hazardous than the timetable they had envisioned.

"I support the President's decisions," said Adm. Michael G. Mullen, Joint Chiefs Chairman, in June testimony before the House Armed Services Committee. However, the drawdown plans "are more aggressive and incur more risk [than] I was originally prepared to accept," he added.

Army Gen. David H. Petraeus, ISAF commander, called the plan "a more aggressive formulation, if you will, in terms of the timeline, than what we had recommended." Petraeus made his remark before the Senate Select Committee on Intelligence during his confirmation hearing to become CIA director.

Like Mullen, Petraeus said, "Obviously, I support" the plan "and will do all that I can during my remaining time as the commander of ISAF to implement it."

Both he and Mullen said they were able to voice their views to Obama before the President made the decision. Under Obama's plan, 10,000 troops will leave Afghanistan by year's end, and a total of 33,000 will exit by mid-2012, essentially ending the troop surge that began in December 2009.

The remaining 68,000 US troops are to depart Afghanistan by the end of 2014.

Global Hawk Clipped

The Defense Department has reduced USAF's planned buy of Northrop Grumman RQ-4 Global Hawk aircraft by 11 airframes, to 55, as part of a program overhaul, Pentagon acquisition executive Ashton B. Carter told Congress June 14.

Large increases in the Global Hawk's price triggered a program review under the Nunn-McCurdy law, which governs overruns and schedule delays. Despite trimming the planned buy, Carter said the program is essential to national security and should continue.

The 11 aircraft were all to be in the Block 30 configuration, designed to carry sophisticated sensors and electronic eavesdropping equipment.

According to an Air Force spokesman, the revised program of record calls for seven Block 10 aircraft, six Block 20s, 31 Block 30s, and 11 Block 40s. This cut follows on the heels of a previous 11-airframe cut announced in February, affecting Block 40 aircraft meant to host the Multiplatform Radar Technology Insertion Program (MP-RTIP) surveillance radar.

According to Bloomberg News, the Global Hawk program's estimated cost is now $12.4 billion, down from $13.9 billion for 66 aircraft last December.

Fiel Takes Over AFSOC

Lt. Gen. Eric E. Fiel took command of Air Force Special Operations Com-

07.08.2011

SSgt. Stephen Adams (l) and SSgt. Russell Johnson, 816th Expeditionary Airlift Squadron loadmasters, watch as barrels filled with fuel are dropped from the back of a C-17 over Afghanistan. The crew air-dropped more than 73,000 pounds of fuel, and later that day air-dropped 48,000 pounds of MREs to resupply forces on the ground in Afghanistan.

Underestimating the Air Force Budget?

The Air Force is probably going to be well short of funds over the next 20 years, to the tune of nine percent a year, according to the Congressional Budget Office in a recent report, "Long-Term Implications of the 2012 Future Years Defense Program."

The CBO noted that the Air Force is asking for $66 billion for acquisition in 2012—a figure USAF expects to grow only slightly over the FYDP—but CBO projects that acquisition costs will be closer to $70 billion a year. That spells a $30 billion deficit over the next decade.

Beyond the FYDP, with spending focused on the F-35 fighter and KC-46 tanker, the Air Force's average annual procurement cost will probably be $84 billion a year, "about nine percent higher than costs estimated," CBO said. The problem peaks in 2029, when the budget office says the Air Force will need to spend $89 billion to fulfill its buying plans, $8 billion more than USAF's estimates.

CBO said the Pentagon overall will need $64 billion more over the next five fiscal years just to fulfill its current modernization plans, with no additions.

mand from Lt. Gen. Donald C. Wurster during a June 24 ceremony at Hurlburt Field, Fla.

Gen. Norton A. Schwartz, Air Force Chief of Staff, presided over the ceremony; Adm. Eric T. Olson, US Special Operations Command boss, also participated.

Fiel comes to AFSOC from SOCOM, where he was vice commander.

"AFSOC will continue to change," said Fiel. "We will continue to focus on who we are and what it means to be the specialized air arm of the SOF team." He now commands AFSOC's roughly 16,000 active duty, Air National Guard, Air Force Reserve, and civilian personnel.

"Each of you makes a difference, every job matters," Wurster told AFSOC's airmen. "Despite the relatively small number of personnel in AFSOC, we fight above our weight and produce lasting and strategic effects in our wake." Wurster is retiring after 38 years of service, effective Aug. 1, having led the command since November 2007.

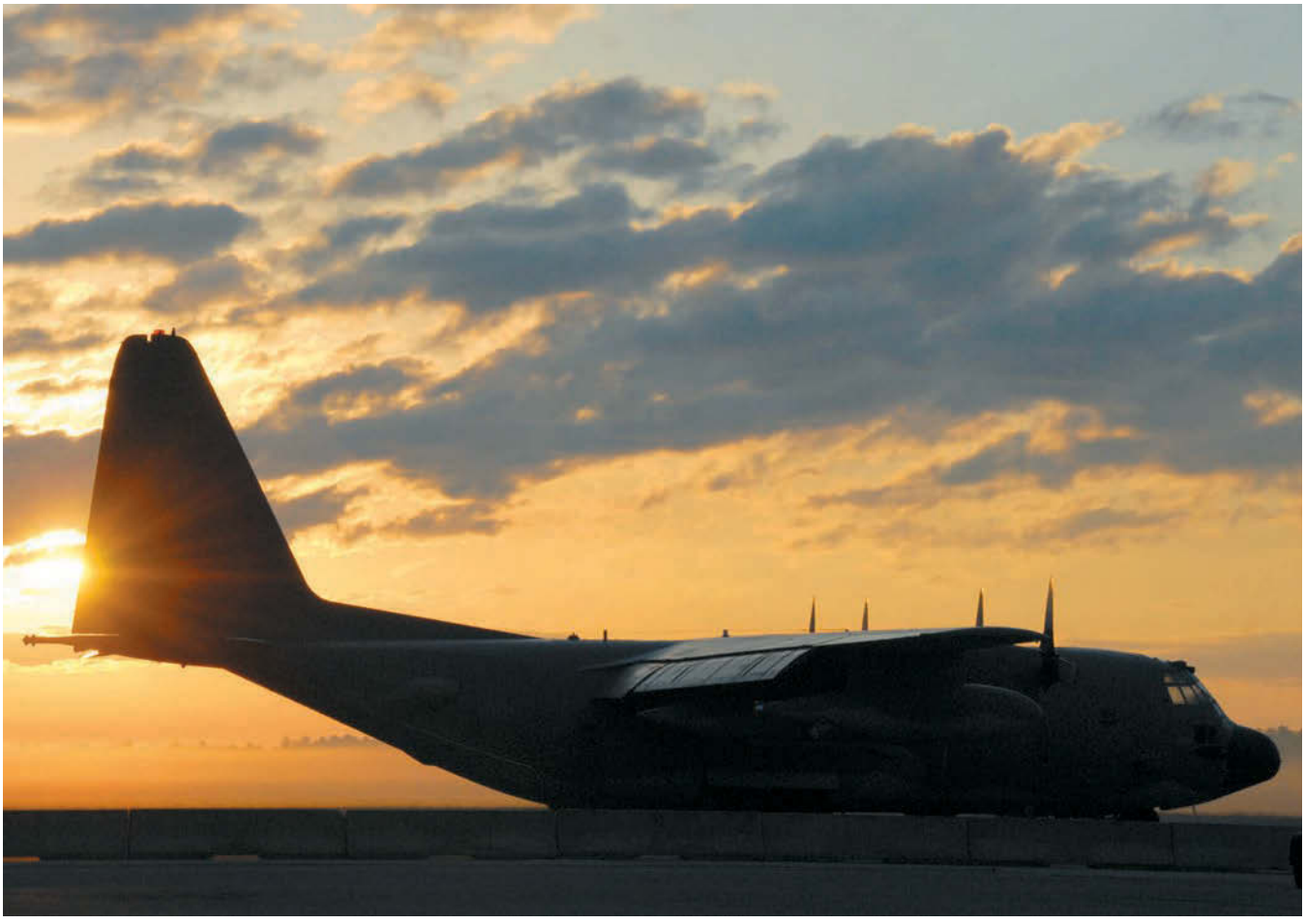
Half-Prompt Global Strike

House defense appropriators roughly halved the Pentagon's funding request for development of conventional prompt global strike capabilities for next fiscal year, approving only $104.8 million of the $204.8 million sought by the Defense Department.

Though the report accompanying the committee's version of the Fiscal 2012 defense spending bill gives no specific reason for reduction, appropriators also upped funding for the Air Force's next generation bomber by $100 million to $297 million.

***Rise and Shine:** An MC-130E Combat Talon waits on the ramp at Duke Field, Fla., for members of the 919th Special Operations Wing to power up a Reserve unit training assembly (UTA). The 919th has now adopted the Super UTA model, in which intensive four-day Reserve training sessions take the place of some traditional one-weekend-a-month sessions.*

USAF photo by TSgt. Samuel King Jr.



Global Hawk Test Worries

Despite its track record of collecting valuable intelligence, surveillance, and reconnaissance material, the Pentagon's top weapons tester found that the RQ-4 Global Hawk Block 30 remotely piloted aircraft is "not operationally effective" for conducting the near-continuous, persistent overhead imagery collection and electronic eavesdropping that the Air Force requires.

In a May report chronicling the results of tests conducted last fall, the director of operational test and evaluation highlighted technical performance deficiencies and air vehicle reliability issues that limited the aircraft's effective-time-on-station coverage to less than half of what the Air Force wants for this new variant of the combat-proven Global Hawk.

In a document issued to Capitol Hill staffers, Northrop Grumman said the DOTE report represents "a snapshot in time" from late last year. Since then, the Air Force has already implemented an array of corrective actions, which have resulted in better performance, as demonstrated during the aircraft's recent use over Japan and Libya, according to the company.

Further, the Air Force is expected to formally approve the Block 30 configuration for operations this summer, said Northrop.

House defense authorizers in May cut $25 million from the Pentagon's CPGS request, citing concern that the Pentagon may be pushing too quickly for an operational system leveraging technology not yet proven.

The Air Force CPGS concept calls for a long-range ballistic missile carrying a hypersonic glide vehicle to strike high-value targets anywhere on the globe within 40 minutes of launch.

B-1B Cuts From Dyess and Ellsworth

Cuts to the B-1B fleet proposed by the Air Force will fall most heavily on the 7th Bomb Wing at Dyess AFB, Tex., which will lose four of the six bombers slated to retire.

The remaining two bombers will be pulled from the 28th Bomb Wing at Ellsworth AFB, S.D., Air Force officials told congressional representatives of the base constituencies, reported the local *Rapid City Journal.*

By retiring six B-1s from the 66-aircraft Lancer fleet, the service intends to press the saved operational costs into modernizing the remaining airframes.

Three of the aircraft marked for retirement from Dyess, home of the B-1 schoolhouse, will be training airframes, according to the *Times Record News* of Wichita Falls, Tex.

Air Force Secretary Michael B. Donley testified in February that the retirements would not pose an unreasonable operational risk.

First MC-12s at Beale

The first MC-12W Liberty intelligence-surveillance-reconnaissance aircraft touched down at their new home on Beale AFB, Calif., on June 10. According to a base spokesman, four of the seven MC-12s expected by year's end had arrived as of late June.

The Air Force has been using these seven MC-12s at Key Field, the Air National Guard base in Meridian, Miss., to train Liberty crews, and they will serve the same role at Beale. The remaining MC-12s in the 37-airframe Liberty fleet are in Southwest Asia for operations in Afghanistan and Iraq.

The move to Beale comes against the backdrop of the Senate Armed Services Committee supporting a provision in next fiscal year's defense policy bill to transfer ownership of the MC-12 fleet to the Army.

Wisconsin Guard Viper Down

A Wisconsin Air National Guard F-16 from the 115th Fighter Wing in Madison crashed in central Wisconsin June 7, during a routine training flight from Volk Field ANGB, Wis.

According to Wisconsin ANG officials, the pilot ejected safely and was recovered by emergency responders south of New Chester, Wis. He was taken to a hospital for medical evaluation.

The F-16 struck an unoccupied summer cottage, according to reports by the *Milwaukee Journal Sentinel;* no injuries were reported on the ground.

The Air Force opened an investigation into the mishap's cause.

GPS Expansion Complete

The 50th Space Wing at Schriever AFB, Colo., successfully moved the last of six Global Positioning System satellites to its new location June 15, completing a two-phase, 18-month expansion of the satellite constellation.

The wing undertook the initiative, known as "Expandable 24," to provide the US military with a more robust GPS signal and a higher probability of signal acquisition in difficult terrain such as the mountains of Afghanistan. Commercial and civil GPS users also will benefit.

Repositioning of the satellites began in January 2010 when the 2nd Space Operations Squadron at Schriever began relocation of the first three satellites.

Phase two began in August 2010. "From the planning phases in the fall of 2009 to its completion today, 2nd SOPS operators, engineers, analysts, and support personnel have done an incredible job in making the Expandable 24 GPS initiative a reality," said Maj. Benjamin Barbour, the squadron's assistant director of operations.

MALD Is Jammin'

The Air Force and Boeing conducted the first powered launch of a Miniature

USAF photo by SrA. Cynthia Spalding

Tied Up Tight: ***SrA. Kelly McLain, a vehicle operator with the 387th Expeditionary Logistics Readiness Squadron, takes advantage of a quick roadside stop to check the cargo tarp and straps during a convoy mission. Making sure cargo is fully secured cuts down on unscheduled stops in a hostile environment.***

Air Launched Decoy Jammer at the Eglin AFB, Fla., test range over the Gulf of Mexico.

Launched from a B-52 bomber in early June, the initial shot was a "successful test," according to Boeing.

"The software functioned exactly as we designed," said Scot Oathout, Boeing's B-52 program director. He added, "This is another great opportunity for the Air Force and Boeing to transform the B-52 and expand its mission from a predominantly offensive role to a more defensive player, defending US and allied aircraft in combat zones."

Boeing designed the B-52's avionics suite, which enables the bomber to launch and control the Raytheon-built MALD-J.

The weapon is a variant of the baseline MALD, optimized to loiter near enemy territory and disrupt enemy radar.

BACN and Next

The Air Force has purchased a Bombardier BD-700 Global Express aircraft for use as an overhead communications-relay platform in Southwest Asia.

Designated E-11A in Air Force service, the aircraft was expected to be handed over to the Air Force in July.

Carrying Northrop Grumman's Battlefield Airborne Communications Node, or BACN, the platform allows disparate battlefield communications systems to share data.

The Air Force leased the aircraft from Northrop Grumman before deciding to buy it outright, in the interest of economy. "The prime contractor understands the military is looking to effectively use every dollar provided

Stealthy MOP-Up

The Air Force has completed testing and integration of the Massive Ordnance Penetrator on the B-2 stealth bomber, declared Lt. Gen. James M. Kowalski, head of Air Force Global Strike Command.

With the 30,000-pound MOP, the B-2 is "our nation's only long-range anti-access penetrating strike platform capable of delivering nuclear and heavy conventional payloads," said Kowalski during a National Defense University Foundation address in Washington, D.C., in June.

USAF began flight testing MOP on the B-2 after taking over last year from the Defense Threat Reduction Agency, which had led efforts demonstrating the MOP on the B-52H.

Kowalski also said AFGSC—together with B-2 prime contractor Northrop Grumman—has completed radar modernization of four B-2s this year, bringing the total number of B-2s with upgraded radar to 12, or 60 percent of the 20-aircraft fleet. The modernization improves radar maintainability as well as performance, explained Kowalski.

The Air Force also is now working to upgrade the B-2's defensive management system to allow the aircraft to "operate in anti-access and aerial-denial environments well into the future," he said.

Quick and Ready: *USAF pararescuemen, soldiers, and "victims" of a simulated aircraft crash, prepare for the arrival of a Marine Corps helicopter in the Grand Bara Desert of Djibouti. The exercise, which involved all branches of the US military stationed at Camp Lemonnier, Djibouti, tested and demonstrated quick response capabilities.*

USAF photo by SSgt. Austin M. May

Operation Enduring Freedom—Afghanistan

Casualties

By July 12, a total of 1,651 Americans had died in Operation Enduring Freedom. The total includes 1,649 troops and two Department of Defense civilians. Of these deaths, 1,299 were killed in action with the enemy, while 352 died in noncombat incidents.

There have been 12,593 troops wounded in action during OEF.

OEF Eagles Win Mackay Trophy

Four airmen from the 48th Fighter Wing at RAF Lakenheath, UK, have been selected to receive the 2010 Mackay Trophy. The prize, presented by the National Aeronautic Association, recognizes the year's most meritorious flight made by an Air Force crew.

Operating as a flight of two F-15Es, the four Strike Eagle crewmen—Lt. Col. Donald Cornwell, Lt. Col. Dylan Wells, Capt. Leigh Larkin, and Capt. Nicholas Tsougas—helped saved the lives of about 30 coalition troops on April 6, 2010.

More than 100 enemy fighters had surrounded the troops in the town of Bala Morgab, Afghanistan. Through bad weather, the airmen used terrain-following radar to execute five "show of force" passes in a valley surrounded by high terrain. As the combat intensified, the airmen delivered six Joint Direct Attack Munitions on enemy positions. The JDAMs helped kill roughly 80 of the insurgents, allowing the coalition troops to survive.

NAA will present the trophy Nov. 7 in Arlington, Va.

Bagram Via the Polar Route

Fourteen mobility airmen from active duty and Reserve ranks teamed to fly a C-5M Super Galaxy transport on a direct, nonstop mission from Dover AFB, Del., to Bagram Airfield, Afghanistan.

More than 15 hours in duration, the June 5-6 flight included an aerial refueling. While commercial airlines routinely use the airspace, the proof-of-concept flight marked the first time an Air Force aircraft flew the northern route from the United States over Canada into the Arctic Circle and back down over Russia and Kazakhstan to Afghanistan.

Maj. John Rozsnyai, a US Transportation Command operations planner, said mobility officials are eyeing the new route as a quicker means of swapping deployed troops, aircrews, and air assets conducting Afghanistan operations.

Similar flights originating from the western United States wouldn't require tanker support, he noted.

Afghan Angels From Alaska

Members of the Alaska Air National Guard's 212th Rescue Squadron at Camp Denali are credited with saving 107 lives during an eight-month deployment to Afghanistan.

"Just about everybody in the unit had the chance to deploy, and they represented the Alaska Air National Guard very well," said Maj. Joe Conroy, 212th RQS director of operations. 212th Guardsmen supported the deployment, which concluded in May, in two- to four-month intervals. During deployments to Bagram Airfield, they provided combat rescue as well as patient transfer between medical facilities.

On a particular harrowing occasion April 23, five of the unit's pararescuemen—Maj. Jesse Peterson, TSgt. Shane Hargis, TSgt. Chris Uriarte, SSgt. Bill Cenna, and SSgt. Zachary Kline—retrieved an Army aviator and his fallen comrade under withering enemy fire.

and worked hand in hand with the government team to facilitate the transition of this new platform into the [Air Force] inventory," a spokesman for Electronic Systems Center at Hanscom AFB, Mass., stated June 16.

The service had considered installing BACN on three BD-700s and two Global Hawk Block 20 remotely piloted aircraft to fill urgent demands for battlefield communications relay in Southwest Asia, though the status of the other airframes is unclear.

Iceland Air

Nearly 100 airmen joined NATO allies for exercise Northern Viking at former NAS Keflavik, Iceland, in June.

An Air Force Reserve Command KC-135 from the 459th Air Refueling Wing at JB Andrews, Md., accompanied F-16s from the Wisconsin Air National Guard's 115th Fighter Wing to join Danish, Italian, and Norwegian aircraft in practicing air defense tactics.

Italian Eurofighter Typhoons also participated in the exercise, flying with US and Norwegian F-16s for the first time, while a duo of Norwegian Dassault Falcon 20 electronic warfare aircraft flew jamming sorties.

USAF's 1st Combat Communications Squadron from Ramstein AB, Germany, and the Icelandic Coast Guard supported the week-long exercise, which ended June 10.

The biennial event is aimed at providing partner nations with "continuity from year to year to sustain our combat capability," explained Lt. Col. Brian Vaughn, exercise director.

Minotaur on the Chesapeake

A Minotaur I rocket carrying ORS-1, the Defense Department's first Operationally Responsive Space satellite, blasted into space from NASA's Wallops Flight Facility on Virginia's eastern shore June 29.

Delayed one day for inclement weather, the liftoff took place at 11:09 p.m. Eastern time after two countdown pauses to address technical concerns.

ORS-1 is designed to provide overhead imagery to commanders in Southwest Asia, enhancing battlespace awareness.

The satellite carries a customized version of the SYERS-2 sensor resident on U-2 reconnaissance aircraft. Once on orbit, ORS-1 was to undergo a 30-day trial and adjustment check before handover to USAF's 1st Space Operations Squadron at Schriever AFB, Colo.

Second X-51 Test Cut Short

The second flight test of an X-51A experimental hypersonic air vehicle was cut short because the vehicle's scramjet engine ignited but failed to transition to full power, the Air Force announced.

"Obviously we're disappointed and expected better results," said Charlie Brink, Air Force Research Lab's X-51A program manager. A B-52 released the X-51 at about 50,000 feet altitude, off the California coast, for its June 13 flight. The X-51's booster then accelerated the vehicle to a speed around Mach 5 before it separated. While the vehicle's scramjet engine subsequently lit on ethylene, it did not properly transition to JP7 fuel operation.

The vehicle then continued controlled flight until ocean splashdown. The first X-51 flight, considered overwhelmingly successful, took place

Senior Staff Changes

RETIREMENTS: Lt. Gen. John T. **Sheridan,** Lt. Gen. Donald C. **Wurster,** Maj. Gen. Floyd L. **Carpenter,** Maj. Gen. Marvin T. **Smoot Jr.,** Brig. Gen. Joseph A. **Lanni. AFRC RETIREMENTS:** Maj. Gen. Mark W. **Anderson,** Maj. Gen. Floyd C. **Williams.**

NOMINATIONS: To be Lieutenant General: Stanley E. **Clarke III,** Bradley A. **Heithold. To be Major General:** Terrance A. **Feehan,** Leonard A. **Patrick.**

CHANGES: Lt. Gen. Robert R. **Allardice,** from Cmdr., 18th AF, AMC, Scott AFB, Ill., to Vice Cmdr., AMC, Scott AFB, Ill. ... Brig. Gen. Steven J. **Arquiette,** from Dep. Dir. Ops., Ops. Team Two, Natl. Mil. Command Ctr., Jt. Staff, Pentagon, to IG, AMC, Scott AFB, Ill. ... Brig. Gen. Christopher J. **Bence,** from Dep. Dir., Ops. & Plans, TRANSCOM, Scott AFB, Ill., to Dep. Dir. Ops., Ops. Team Two, Natl. Mil. Command Ctr., Jt. Staff, Pentagon ... Brig. Gen. Theresa C. **Carter,** from Dir., Instl. & Mission Spt., AMC, Scott AFB, Ill., to Cmdr., 502nd AB Wg., AETC, Fort Sam Houston, Tex. ... Maj. Gen. Stanley E. **Clarke III,** from Sr. Defense Official, Ofice of Defense Cooperation Turkey, EUCOM, Ankara, Turkey, to Cmdr., 1st AF, Tyndall AFB, Fla. ... Maj. Gen. Walter D. **Givhan,** from Commandant, AFIT, AETC, Wright-Patterson AFB, Ohio, to Dep. Asst. Secy., Plans, Programs, & Ops., Department of State, Washington, D.C. ... Brig. Gen. Timothy S. **Green,** from Spec. Asst. to the Cmdr., EUCOM, Supreme Allied Cmdr. Europe, SHAPE, Casteau, Belgium, to Dir., Instl. & Mission Spt., AMC, Scott AFB, Ill. ... Maj. Gen. Bradley A. **Heithold,** from Cmdr., AF ISR Agency, DCS, ISR, USAF, Lackland AFB, Tex., to Vice Cmdr., SOCOM, Pentagon ... Maj. Gen. Mary Kay **Hertog,** from Cmdr., 2nd AF, AETC, Keesler AFB, Miss., to Dir., Sexual Assault Prevention & Response Office, Office of the USD, Personnel & Readiness, Washington, D.C. ... Brig. Gen. Richard A. **Klumpp Jr.,** from IG, AMC, Scott AFB, Ill., to Dir., US Forces-Afghanistan Liaison to the US Embassy, Kabul, Afghanistan ... Maj. Gen. Bruce A. **Litchfield,** from Spec. Asst. to the Cmdr., AFMC, Tinker AFB, Okla., to Cmdr., Oklahoma City ALC, AFMC, Tinker AFB, Okla. ... Maj. Gen. (sel.) Leonard A. **Patrick,** from Cmdr., 502nd AB Wg., AETC, Fort Sam Houston, Tex., to Cmdr., 2nd AF, AETC, Keesler AFB, Miss. ... Maj. Gen. Joseph **Reynes Jr.,** from Dir., Jt. Experimentation, Norfolk, Va., to DCS, Ops., Allied Joint Force Command, Brunssum, Netherlands ... Lt. Gen. Paul J. **Selva,** from Asst. to the CJCS, Jt. Staff, Pentagon, to Vice Cmdr., PACAF, JB Pearl Harbor-Hickam, Hawaii ... Brig. Gen. Burke E. **Wilson,** from Cmdr., 45th Space Wg., AFSPC, Patrick AFB, Fla., to Dir., Air Component Coordination Element-Fort Meade, 24th AF, AFSPC, Fort Meade, Md.

COMMAND CHIEF MASTER SERGEANT RETIREMENTS: Thomas S. **Narofsky,** David E. **Spector.**

COMMAND CMSGT CHANGE: Richard A. **Kaiser,** to Command Chief Master Sergeant, AMC, Scott AFB, Ill.

SENIOR EXECUTIVE SERVICE RETIREMENTS: Donald B. **Paul,** Garry B. **Richey,** Judith L. **Simon.**

SES CHANGES: Nancy K. **Andrews,** to Dir., Contracting, Ogden ALC, AFMC, Hill AFB, Utah ... Timothy A. **Beyland,** to Administrative Asst. to the SECAF, USAF, Pentagon ... Roger S. **Correll,** to PEO, Space Launch, Office of the Asst. SECAF, Acq., Pentagon ... Robert E. **Corsi Jr.,** to Asst. DCS, Manpower, Personnel, & Svcs., USAF, Pentagon ... Richard P. **Deavel,** to Chief Operating Officer, AF Review Boards Agency, Office of the SECAF, Manpower & Reserve Affairs, Washington, D.C. ... Stephanie Paige **Hinkle-Bowles,** to Principal Dep., Civilian Personnel Policy, Office of the USD, P&R, Pentagon ... Elain A. **McCusker,** to Dir., Resources & Analysis, CENTCOM, MacDill AFB, Fla. ... Ronald A. **Poussard,** to Dir., Contract Mgmt. Div., Office of Procurement, NASA, Washington, D.C. ... Gordon O. **Tanner,** to Dep. Asst. SECAF, Reserve Affairs, Office of the Asst. SECAF, Manpower & Reserve Affairs, Pentagon ... John S. **Wilcox,** to Dir., Munitions, AFRL, AFMC, Eglin AFB, Fla. ▪

in May 2010. The next flight test is tentatively scheduled for this fall.

Bigger Belly BUFF

The Air Force is upgrading the B-52's internal weapons bay interface capability to add eight smart weapons, thus increasing the aircraft's precision guided munitions payload by roughly two-thirds, according to Lt. Gen. James M. Kowalski, commander of Air Force Global Strike Command.

"The B-52 delivers the widest variety of stand-off, direct-attack nuclear and conventional weapons in the Air Force and we have been investing in multiple improvements," Kowalski said at a National Defense University Foundation-sponsored event in Washington, D.C.

This effort represents the "most significant B-52 modernization since the [1980s] and will add 21st century capability to the aircraft," stated Kowalski unequivocally.

Major improvements include new flight-control software to enhance targeting pod capabilities and incorporate miniature air launched decoys onto the B-52, as well as a modern digital communications system.

With progress thus far, Kowalski said he expects the B-52's combat network communications technology upgrade to enter low-rate production by 2013.

Boeing's T-X, Osprey Prospects

Boeing successfully partnered with BAE Systems to build the Navy's T-45 Goshawk jet trainer, but it is "keeping its options open" about how to approach the Air Force's T-X trainer aircraft competition, Boeing Military Aircraft President Christopher M. Chadwick said in June. Those options include teaming with other partners or even drafting a clean-sheet design.

Speaking with reporters at the Paris Air Show, Chadwick said he thinks the T-X will likely be a completely new kind of training system, with far heavier emphasis on simulators and less on airplanes in order to hold down cost and risk. "That's the future," he said.

Chadwick also said that, after nearly 30 years of development and production, the V-22 tilt-rotor aircraft might soon become available for export.

Boeing has "held discussions with several international customers" about buying V-22s. "As we add capacity ... and as we work on cost reductions," the V-22 could become more attractive, and the US government seems to have no objections, he said.

Each of Boeing's products is working toward "an affordability target," Chadwick noted. When the V-22 reaches that point, "there's a good chance for international sales."

He also thinks the Navy may buy additional V-22s to backfill aging C-2 Greyhounds used for transporting cargo and passengers between aircraft carriers and shore bases.

Preventing Space Debris

The Joint Space Operations Center at Vandenberg AFB, Calif., has sent Russia 252 notifications and China 147 notifications in the past year "regarding close approaches between satellites," said Frank A. Rose, deputy assistant secretary of state for arms control, during a conference in Prague, Czech Republic.

The warnings are part of a US effort to prevent collisions that could create more orbital debris in an already congested near-space environment.

In the last year alone, government and commercial satellite operators have had to reposition satellites more than 100 times in low Earth orbit to avoid debris created by China's 2007 anti-satellite-weapon test, Rose said in June.

Space became even more littered in February 2009 when a commercial communications satellite collided with an inoperable Russian military satellite. The 2007 and 2009 events "created significant amounts of dangerous debris" in LEO, Rose asserted.

Spartan Accommodations

The Air Force will establish the C-27J Spartan training schoolhouse at Key Field in Meridian, Miss., home of the 186th Air Refueling Wing.

Two C-27J transports and associated personnel will be available to begin training Spartan pilots, loadmasters, and maintenance crews at Key Field by the second half of 2014, according to a joint statement issued by Mississippi lawmakers in June.

The training mission will be fully operational in 2015 with 142 personnel. Key Field is already slated to host four operational C-27s starting in early Fiscal 2012, giving the base six of the 38 C-27s that the Air Guard will operate.

Last December, the Air Force identified Key Field as the preferred site to host training, pending completion of an environmental impact study, which determined the mission to have "no significant impact," said lawmakers. Key Field has been the training site for MC-12W Liberty intelligence-surveillance-reconnaissance aircraft, but that mission is moving to Beale AFB, Calif.

Satellite Exports Stymied

PARIS

The US has "lost enormously in market share in commercial satellites," chiefly because of export restrictions, noted Aerospace Industries Association President Marion C. Blakey.

In an interview at the Paris Air Show, Blakey said US export controls have driven the United States from one-time leadership in the satellite business to one of a struggling competitor. Controls need to be reformed swiftly, she said.

"It's not just a question of economic activity, such as jobs and sales," she said. If companies can't sell their products, "they won't see a reason to innovate" in technology and cost, she continued, and the US will lose even more ground in the market.

She applauded the Obama Administration for already taking significant strides in export control reform, eliminating some 70 percent of restrictions on some categories of items, such as vehicles. It is now undertaking a similar "case by case" analysis of aerospace goods, but it can't come fast enough, Blakey said.

T-38 Pilot Error

Air Education and Training Command officials determined that pilot error led to a hard landing of a T-38C trainer at Ellington Field, Tex., Feb. 11. The incident caused roughly $2.1 million in damage to the T-38 in addition to slightly damaging the runway, located near Houston.

Assigned to the 14th Flying Training Wing at Columbus AFB, Miss., the pilot lost altitude too quickly and allowed his airspeed to fall below a safe level, according to AETC's accident investigation board findings.

He exited the aircraft safely, but sustained minor injuries in the landing, which resulted in catastrophic damage to the T-38's undercarriage and damage to the right wing.

Investigators further cited pilot fatigue, inappropriate supervisory policy, and inadequate operational risk management as contributing factors in the mishap.

At the time of the accident, the pilot was on a solo cross-country flight to Ellington Field as part of his training.

USAF photo

Heavy Load, Hot Times: *Airmen and soldiers recently responded to the crash of an Afghan Air Force Mi-17 helicopter at Forward Operating Base Fiaz in Kunar province. Members of the recovery team worked for more than a week, 10 to 12 hours per day, in temperatures exceeding 110 degrees, securing and evaluating the nonfatal-crash site and recovering the helicopter.*

Expeditionary in Bulgaria and Romania

Members of the 621st Contingency Response Wing at JB McGuire-Dix-Lakehurst, N.J., opened Burgas Arpt., Bulgaria, and Mihail Kogalniceanu AB, Romania, for temporary use by USAF tanker and cargo aircraft.

An element of about 50 people established cargo operations at MK, opening it for use as an air hub for equipment and material flowing to Southwest Asia via Romania's Black Sea port of Constanta.

A smaller team of 12 people simultaneously set up Burgas for tanker operations, establishing it as a temporary home for KC-135s performing refueling missions over Afghanistan.

The wing arrived May 9 at both locations, setting up airfield operations and paving the way for follow-on aircraft and personnel during the following three weeks.

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USAF photo by A1C Daniel Hughes

***Big Love:** Capt. Nicholas Eberling conducts a preflight check on an F-15E's engines at Nellis AFB, Nev., before heading out on a Green Flag-West mission. The unscripted combat training exercise is meant to replicate warfare conditions in Afghanistan and Iraq.*

Distinguished Flying Crosses

Three rescue airmen assigned to Nellis AFB, Nev., received the Distinguished Flying Cross with Valor Device for heroic actions in Afghanistan.

Maj. Keith Altenhofen, 561st Joint Tactics Squadron instructor pilot; MSgt. Joshua Fetters, 34th Weapons Squadron flight engineer; and TSgt. Christian Corella, 88th Test and Evaluation Squadron aerial gunner were awarded the honor in a ceremony at the base, June 15.

On April 4, 2009, Corella manned an HH-60 helicopter door-gun in a blinding sandstorm, helping to evacuate and save the life of a wounded Afghan soldier. Corella is credited with saving the lives of 40 US Special Forces soldiers that same day, redirecting their convoy after it came under enemy attack.

In separate action on May 19, 2009, Altenhofen and Fetters overcame heavy enemy fire and a critical engine failure in their HH-60 Pave Hawk helicopters to save three wounded soldiers.

Missing Bomber Crew Laid To Rest

The Defense Department identified the remains of five airmen missing in action since World War II, returning them to family members for burial with military honors.

All crew members of a B-25J bomber that crashed northeast of Consolacion village in the Philippines on April 3, 1945, were disinterred at Jefferson Barracks National Cemetery in St. Louis for individual identification beginning in 2008. They were: Capt. Leonard E. Orcutt of Alameda, Calif.; TSgt. Louis H. Miller, Philadelphia; SSgt. George L. Winkler, Huntington, W.Va.; 2nd Lt. Harry L. Bedard, Minneapolis; and 2nd Lt. Robert S. Emerson, Norway, Maine.

Orcutt was buried on May 5 in Oakland, Calif.; Miller on June 17 in Arlington National Cemetery; Winkler on May 5 in Arlington; Bedard on June 25 in Dayton, Minn.; and Emerson's interment was scheduled for July 9 in his hometown. ■

News Notes

■ Norway's parliament has authorized the purchase of four F-35s for the training of Norwegian pilots at Eglin AFB, Fla., starting in 2014. Norway expects to buy as many as 56 F-35s, including the four training airframes, Norwegian policy chief Adm. Arne Roksund announced at the Paris Air Show in June.

■ The Air Force Academy is buying 25 Cirrus SR20 two-seat cadet trainers. Designated T-53A in USAF service, the SR20s will replace the fleet of Diamond DA-40s currently leased by the academy. Equipped with digital cockpits, the aircraft will enter training service in January 2012.

■ JB Charleston, S.C., is preparing to completely refurbish its 9,000-foot main runway, shared with Charleston Airport. The nine-month, $50 million project is the first time the runway will have been totally redone since construction in the 1940s.

■ The first C-17 transited the newly built $30 million ramp at the Manas Transit Center, Kyrgyzstan, June 1. The ramp adds four C-17-sized slots and was negotiated under a lease renewal with the Kyrgyz government in 2009.

■ A retired F-16 Block 25 will decorate the entrance to the Minnesota Air National Guard 148th Fighter Wing in Duluth, thanks to local business donations. The wing retired its Block 25s last year and currently flies the Block 50.

■ Airmen of the 55th Logistics Readiness Squadron at Offutt AFB, Neb., snatched rare artifacts, military vehicles, and weapons on display at Omaha's Freedom Park from floodwaters from the Missouri River in June. Several displays were then taken to Offutt for safekeeping.

■ A UH-1N helicopter assigned to the 58th Special Operations Wing became the second Huey to surpass 15,000 hours flight time. Serial No. 69-6650 entered the USAF inventory in 1971, attaining the milestone on a late May sortie from Kirtland AFB, N.M.

■ Lockheed Martin will lose $15 million in available award fees and agreed to restructure its contract with the Air Force to offset the cost of the first Advanced Extremely High Frequency communications satellite's tardy arrival on orbit. AEHF-1 suffered a propulsion system anomaly shortly after launch in August 2010 and has yet to reach its intended orbit.

■ Three C-130s and more than 70 airmen from the 374th Airlift Wing at Yokota AB, Japan, flew to Halim AB, Indonesia, for Cope West in June. During the week-long bilateral exercise, US and Indonesian airmen practiced contingency and air mobility tactics.

■ Despite weather delays and communication disruptions, the 30th Space Wing successfully launched an unarmed Minuteman III ICBM on June 22. Fired from Vandenberg AFB, Calif., the reentry vehicle landed on target near Kwajalein Atoll in the Pacific's Marshall Islands—4,200 miles from Vandenberg.

■ Four C-130s deployed to Kirtland AFB, N.M., to fight wildfires in the southwest in June. California and North Carolina Air National Guard crews targeted areas near Pacheco Canyon and Raton, N.M., and the Apache-Sitgreaves National Forest in Arizona, dropping a combined total of 65,035 gallons of retardant in the first week alone.

■ GEO-1, the first Space Based Infrared Systems geosynchronous satellite reached its intended orbit in mid-June, deploying its solar arrays, high-gain communications antennas, and infrared sensors light shade. The satellite began performance tests required before being declared operational.

■ The Indian defense ministry signed a foreign military sales agreement with the US government to purchase 10 C-17 transports. Slated for delivery between 2013 and 2014, the buy will make India the largest foreign operator of the C-17. A follow-on buy is also possible. ■

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The Joint Strike Fighter has to be affordable. Currently, it is not.

Make or Break for the F-35

The sun rises on six Air Force F-35As awaiting flight testing at Edwards AFB, Calif., in June. After lackluster testing progress in 2010, test sorties are mounting rapidly in 2011 as the test fleet grows.

As the Pentagon's biggest and most expensive program, the F-35 is getting intense scrutiny, both from Pentagon managers and Congress. Now that tight fiscal limits put every defense dollar under threat, the F-35 needs to prove itself—and fast.

There's been a whirlwind of action on the F-35 over the last 18 months. The program has been shaken up and restructured—twice—prompted by severe cost and schedule overruns. The Nunn-McCurdy law requires the Defense Secretary to scrutinize such programs and decide whether the requirement can be met some other way.

Ashton B. Carter, the Pentagon's acquisition, technology, and logistics chief, told the Senate Armed Services Committee in May that after this analysis: "We didn't come up with any better alternatives to the Joint Strike Fighter. We want it."

However, Carter immediately added, "At the same time, it has to be affordable; and at the moment, … it's not."

Carter said that during the last decade, the F-35's per-aircraft cost "has doubled in real terms." That has happened, in part, because as the nation was fighting two wars at once, money was flowing to the Pentagon, and there was "an erosion of focus on affordability," he admitted.

This doubling of the F-35's price is "unacceptable," Carter acknowledged, but will come true "if we keep doing what we're doing." He pledged to the senators that DOD is doing all it can to break out of habits that drive cost up, and he expressed cautious optimism that it can drive cost out of the program.

Following the Nunn-McCurdy breach, Defense Secretary Robert M. Gates certified that the F-35 program is essential and must continue in order to accomplish a massive modernization of US fighters, many of them nearing the end of their useful service lives.

However, he ordered sweeping changes to the project. Flight testing, well behind schedule, was extended, and he added $4.6

Time

By John A. Tirpak, Executive Editor

Lockheed Martin photo

billion and two years to the development program. Correspondingly, he slowed purchase of production-representative aircraft to just 32 to 35 aircraft per year for three years, representing an overall reduction of more than 220 F-35s from the Future Years Defense Program.

That move was meant both to keep the program within spending limits and reduce concurrency—what Carter described as the "balance" between building airplanes "too fast [or] too slow," given that discoveries made in flight test can force changes in design and costly rework of early production aircraft. Carter also told the SASC that to keep risk down, the production rate will only increase by a factor of 1.5 a year.

Gates put the F-35B short takeoff and vertical landing version—STOVL for short—on a two-year "probation." He did so because, of the three variants in the program, the STOVL was causing the most problems with regard to design and disruption of production, and its problems were slowing down the pace of testing the other two versions. Those versions are the conventional takeoff F-35A for the Air Force and carrier-capable F-35C for the Navy. Gates said if the F-35B can be brought up to snuff within two years, the Marine Corps can still buy it. If not, the STOVL JSF will be terminated, and the Navy and Marine Corps alike will use the F-35C model.

Gates based his decisions on a top-to-bottom evaluation by JSF Program Executive Officer Vice Adm. David J. Venlet. Called the Technical Baseline Review, it reset the clock on the F-35 program, with new timetables and new expectations of the contractor, Lockheed Martin, and its suppliers.

"There will not be another rebaseline of this program," Lockheed Martin CEO Robert J. Stevens told reporters at a company press event in May. "There will not be; we understand that."

Before the baseline review, Carter said the Pentagon largely relied on Lockheed for F-35 cost data. Now, having added hundreds of contracting experts to DOD's ranks, and with review

data in hand, Carter said the Pentagon has better knowledge of the F-35 program "than we've ever had," and this will improve oversight and management of the project.

The emphasis on restraining F-35 costs is not simply proactive management on Carter's part. It's also the law. The Weapon Systems Acquisition Reform Act of 2009 requires, among other things, that the Pentagon use much more realistic metrics for predicting costs on a program.

Venlet told the SASC that he's committed to "realism" on the F-35, and told reporters this spring that he's determined not to overpromise on the program, since so many previous expectations have not panned out.

Previous F-35 program managers insisted there was no comparison between how legacy fighters were designed and built and how it would be done on the F-35.

The F-35 was to be designed in a whole new way, using digital blueprints that suppliers all over the world would use to make parts. Theoretically, when the parts were brought together, they would mate perfectly. The same digital database would streamline the assembly line and aid in the building of tooling. Test aircraft would be built on production tooling. The airplane could be "flown" virtually to prove out the design before it ever flew, using computers far more powerful than those used on any previous airplane.

In fact, because early flight tests matched well with performance predicted in simulators, it was decided to rely more heavily on the simulations. Flight tests were taken out of the program several years ago, to speed it along and reduce time and cost.

Lockheed Martin photo by Paul Weatherman

F-35s line up at Edwards AFB, Calif. The Air Force's F-35 test force is making the quickest progress, as the short takeoff and vertical landing F-35B is on "probation" and the F-35C is still new to flight testing. Arguably the least complicated model, USAF's version will be produced in the largest numbers.

Deliveries Accelerate

That move, Pentagon Director of Operational Test and Evaluation J. Michael Gilmore told the SASC, was "a mistake." The hops have since been added back in, and at a cost premium.

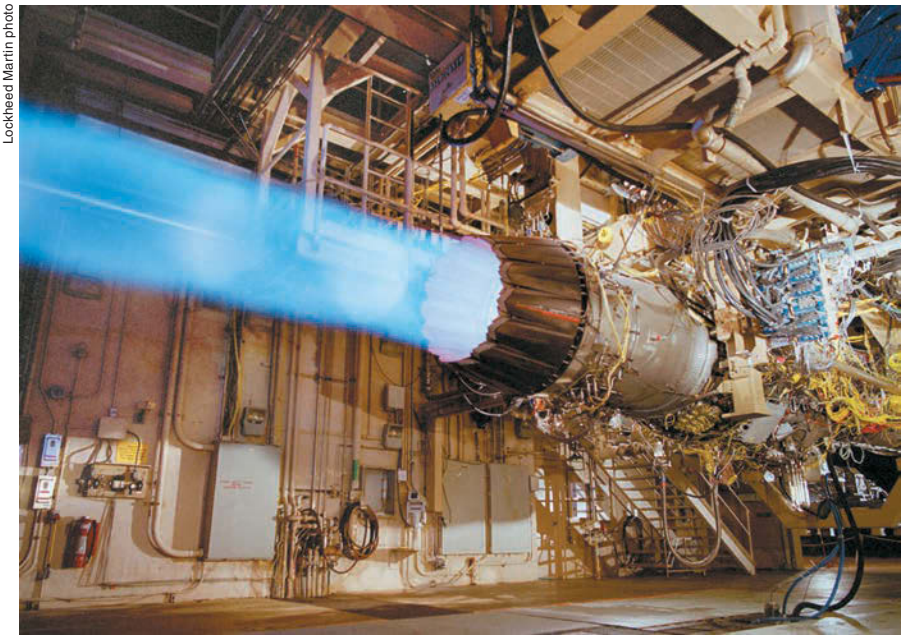
Steve O'Bryan, Lockheed Martin F-35 vice president, said the criticisms are, to a degree, fair.

Costs were higher "than we had hoped and planned," he said. Initial production lots took longer and cost more because changes—things discovered in flight test or found to be unworkable on the production line—were "much more disruptive than planned." The original single-piece wing needed a major redesign into smaller subassemblies, and a bulkhead failed prematurely in durability testing. As a result of these and other detours, tooling was altered and test aircraft did not appear on the promised timetable.

Kevin J. Smith, Lockheed's Air Force F-35 production manager, said slow deliveries early on delayed the pace of testing. In an interview at the company's Fort Worth, Tex., F-35 plant, Smith said the delays were due to many factors: There were engineering changes requiring rework, and parts were late or of insufficient quality from vendors. This disrupted the assembly line and forced work to be done out of sequence, which costs more.

O'Bryan believes that pattern is now "mostly behind us," saying that changes have dwindled in number, adding predictability to production and allowing deliveries to accelerate. Moreover, the learning curve and the results of actions to reduce cost are "better than we thought."

Compared with the new plan, Lockheed in May was 20 percent ahead of the new Technical Baseline Review schedule on test flights accomplished, and 33 percent ahead on test points, Stevens reported. That means more flights are taking place, and each one is more



Lockheed Martin photo

The F135 engine powers up on a Pratt & Whitney test rig. The alternate F136 engine has been terminated, but GE-Rolls Royce wants to keep at it, with company funds.

Lockheed Martin photo

An F-35 in production at Fort Worth, Tex. More than 60 are under construction, but deliveries have slowed to give testers more time to prove out the design.

productive. He said that these are signs "that the program is stabilizing."

Ironically, using the new, more "realistic" metrics on the program may very well make it possible to beat cost estimates in the future, when counted against the new cost and schedule.

For example, a much-ballyhooed trillion-dollar cost estimate for the F-35 program—contained in a recent Pentagon quarterly acquisition report to Congress and based on all related lifetime acquisition and sustainment costs for the program, using inflated dollars over five decades—was calculated in part on the assumption that it would cost the same to operate the F-35 on a per-aircraft basis as it does for the F-16 and F/A-18, two of the aircraft it is to replace. Lockheed thinks the F-35 will be cheaper to own than its predecessors.

Besides performance requirements such as speed, range, and payload, the F-35 program specifies reliability and maintainability as two key performance parameters, or KPPs.

"Meet those KPPs and you're twice as reliable as an F-16 Block 40 and 50," said O'Bryan, in an interview.

On reliability and maintenance, "we are either exceeding the requirement or exceeding the objective," which is the desired, nice-to-have performance level over and above threshold minimums, O'Bryan said. If the F-35 requires only half the required maintenance actions, the services can look hard at the manning levels required for F-35 maintenance squadrons, which could be a huge cost reducer, he said. So far, no change in manpower has been taken into account.

The three variants of F-35 will also have common logistics, training gear and syllabus, parts and ground support gear, an autonomous self-reporting, self-diagnostic onboard system, and a centralized sustainment center that automatically tracks trends in parts consumption and makes sure needed parts are available when required.

The Volume Efficiency

That single support system replaces the individual logistics and training tails of the F-16, AV-8B, and F/A-18C/D.

The savings of consolidating separate logistics systems into one "has to be profound," O'Bryan insisted.

Another factor the Pentagon is not taking into account in figuring F-35 costs, O'Bryan claimed, is the overseas market for the airplane. Since the beginning of the program, he said, affordability has been a product of volume. In addition to the US requirements—1,763 for the Air Force and 680 for the Navy-Marine Corps—eight international partners on the F-35 collectively plan to buy about 700 aircraft.

Pentagon estimates currently only assume about 350 of those export aircraft will actually be built, even though the partners—Australia, Britain, Canada, Denmark, Italy, Netherlands, Norway, and Turkey—have largely stuck to their commitments to buy the F-35. The volume efficiency, O'Bryan argued, is undercounted.

Beyond the eight original partners, the US has given briefings to five more countries that have signaled their interest in buying the F-35 under foreign military sales. Collectively, those five countries—Israel, Japan, Singapore, South Korea, and Spain—have a requirement for 700-plus airplanes—more than the partner countries themselves, O'Bryan said.

He noted that more than 4,500 F-16s have been built and will need replacement, and there are "a couple thousand" F-18, AMX, F-111, Tornado, and other type aircraft the F-35 could backfill.

The Pentagon, O'Bryan said, hasn't "adequately looked at the FMS quantities."

Lockheed Martin also says the F-35 is a good deal because additional capabilities usually bought a la carte to "bolt on" to a late-model F-16 or F/A-18 are included on the fighter. Systems such as the Sniper or Litening electro-optical targeting pods, electronic warfare pods, pylons, additional fuel tanks, an AESA radar, etc., are all internal equipment on the F-35, Smith said. "We have it all."

Performance-wise, the F-35A can still maneuver at nine Gs and Mach 1.6, even with all of that gear on the

Lockheed Martin photo

Two USAF F-35s on a test hop. Pentagon leaders say there's no alternative to the fighter, but that its present estimated cost is too high.

Lockheed Martin photo by Andy Wolfe

A Navy F-35C makes an impromptu visit to the open house at JB Andrews, Md., in May. Unqualified success over the next year is deemed critical to the program's future.

airplane. Legacy aircraft "couldn't do that without dropping munitions and sensors," Smith said.

Making the same point, O'Bryan asserted that, at maturity—meaning after all US F-35s have been delivered, circa 2035, and their cost is averaged out—"a fully operational F-16 or F-18 costs about the same as a fully combat-capable F-35," a price he quoted as "about $65 million in 2010 dollars." Moreover, those airplanes would not be stealthy, fifth generation airplanes, he said.

(Boeing, maker of the F/A-18E/F, promptly challenged O'Bryan's figure, saying its Super Hornet will cost $53 million at maturity, with all the bells and whistles. Boeing defense president Christopher M. Chadwick also said his company considers the fifth generation argument "irrelevant," and the Super Hornet can be just as survivable as the F-35, by using electronic warfare as a substitute for stealth features.)

The trillion-dollar figure also represents a sudden shift in how the Pentagon counts life cycle costs. Previously, these were counted as costs over a 30-year lifespan. Now the predicted service life of the F-35 is counted as 52 years, and that "includes the price of fuel," O'Bryan said, questioning how the government can rationally predict the price of fuel five decades hence.

He also said that the government made some changes of its own: For example, it wants more simulators for training pilots, seeing a potential significant cost reduction by doing more training in a virtual cockpit than in a real-world F-35.

When Gates restructured the F-35, he took out of the equation some $614 million in award fees that were calendar-driven, not event-driven. He said at the time that Lockheed could earn those award fees through performance on critical milestones.

Talking with reporters in April, Venlet said that in 2010, Lockheed had a chance to earn $35 million in award fees, as there were five milestone events, each valued at $7 million. However, he said Lockheed only hit one milestone on time—delivery of CF-1, the first Navy aircraft—and thus only earned $7 million in award fees. The $28 million it did not get is gone, Venlet said, and can't be reclaimed later in the program.

The No. 1 Threat

In the same press conference, Venlet said that while a recent visit he had made to the Fort Worth plant was "confidence building," he noted it was "chock full of rework."

Smith said the 2011 milestones, which could earn Lockheed $35 million in bonuses this year, are:

- begin ship testing with the STOVL version,
- complete land-based carrier tests with the F-35C,
- complete static tests on the F-35C,
- deliver Block 1B software to flight test, and
- update the training program.

Now that structural and durability testing is nearly complete on the F-35A and is well under way for the B and C models, O'Bryan thinks the biggest potential "discoveries" that could yet be found on the F-35 lie in its high angle-of-attack performance and in software.

Twin-tail aircraft have often suffered from a problem called "wing drop"—a sudden loss of lift on one side of an aircraft in certain flight regimes, usually associated with carrier operations. This was a serious and costly issue with the F/A-18 Super Hornet.

Rather than wait and see if the F-35 suffers from wing drop, a fix—which O'Bryan described as a small wing fence outside of the wing fold on the carrier model—was designed into the F-35C. If wing drop manifests in flight testing, "we would be able to fix it with those spoilers." If it turns out wing drop isn't an issue, "we'll pull them out of the airplanes [and] reduce cost and weight."

Carter and Gilmore both described software as the No. 1 threat to the F-35's schedule. To try to get ahead of the problem, Lockheed has added 150 software engineers, boosting its F-35 code-writing cadre by 50 percent. Software proved to be the F-22's developmental Achilles' heel, and Lockheed officials said they had learned many lessons from that program and were applying them on the F-35.

For instance, software is flown on a flying testbed, using F-35 hardware, before it is even loaded onto an F-35 test aircraft. This approach serves as a pathfinder and identifies software issues well in advance.

Another potentially serious problem is with the F-35 helmet.

While the F-35's "dashboard" is a single flat-panel display that can be configured by the pilot to show whatever information he wants, the helmet is meant to be the primary status display. No matter where the pilot looks, projected on the helmet faceplate will be the altitude, speed, weapons, and other aircraft information—which in previous aircraft was projected on a head-up display in the forward canopy only.

Integrated with the helmet is the DAS, for Distributed Aperture System. This series of cameras around the aircraft is supposed to allow the pilot to "look" at the surrounding landscape in total darkness and see it as if it were daylight. DAS even allows him to look "through" solid pieces of the aircraft, such as below his seat. The overall system is meant to allow the pilot to see 360 degrees around him and cue weapons no matter where he looks.

In testing, however, the helmet system is suffering from two problems: The data display has a distracting jitter, and the infrared night image suffers from latency—a time lag, and sometimes a less-than-seamless transition as the pilot's view moves from one camera to another.

Second Engine, Second Guessing

Early in the F-35 program, because the anticipated production run was so large, program managers envisioned developing a second engine for the single-engine fighter, with the idea of competing the two power plants to drive down cost and increase quality. This had worked with great success in the "Great Engine War" of the 1980s, which pitted Pratt & Whitney against General Electric on the F100 and F110 engines, respectively, to power the F-15 and F-16.

Pratt & Whitney builds the F135 engine used on all variants of the F-35 fighter. General Electric and Rolls Royce have partnered to develop the F136 engine as the alternative engine—now lauded as the "competitive engine" by supporters and derided as the "unnecessary engine" by detractors.

Throughout the program, the engines were intended to be interchangeable—their operation to be "transparent" to the pilot and using the same equipment for removal and repair.

For years, however, Defense Secretary Robert M. Gates tried to terminate the alternative engine program, describing it as an "unnecessary, wasteful" use of taxpayer funds. Modern engines are so reliable—and a sole-source engine supplier has worked so well on other programs, such as the F-22—that there's no need for the second engine, Gates has argued. His acquisition managers and service Secretaries in recent years have concurred.

Congress has countermanded Gates all along, insisting that competition will save money over the long run. It has consistently added funds to the defense budget to keep the program going. GE has said the savings could be as high as $20 billion.

However, Congress finally relented this spring, when the Pentagon issued a statement that it was terminating the F136 development project, and Congress declined to add money to the budget to continue it.

General Electric and Rolls Royce subsequently announced they will continue development of the F136 for the next two years with their own funds, hoping the Defense Department—and now Congress—will have a change of heart.

Pentagon acquisition, technology, and logistics chief Ashton B. Carter told the Senate Armed Services Committee in May that while the company's move is unprecedented, it has not changed the Pentagon's view that the second engine is unnecessary.

One F-35 pilot said that the helmet "sometimes has a problem in one jet, and then you go to another jet with the same helmet, and it's fine."

Gilmore told the SASC there are several approaches to fixing the helmet issue. One is to keep working on the existing system and try to correct its problems. A second is to use an existing helmet-mounted cuing system, supplemented with night vision goggles for flying in darkness.

"That's the way pilots do business at night now," Gilmore said, but it's an awkward arrangement and one officials hoped to fix on the F-35.

"As a very last resort, the program would consider incorporating a heads-up display," Gilmore said, but this is the least desirable of the options because it would require, in his words, "a major modification of the aircraft."

Although flight testing still has another five years to go, training of F-35 operational pilots could begin as soon as this fall. A schoolhouse has been built at Eglin AFB, Fla., where Air Force, Navy, and Marine Corps pilots will train together. The first Eglin aircraft, AF-8, was to arrive as early as July. The training aircraft will only fly if the Block 2 software is delivered in a timely way; this software puts enough of the F-35's mission capability in the aircraft such that pilots can fly the fighter without their missions being monitored by a mission control-like test facility, which remotely checks the health of the aircraft.

The Affordability Track

Lt. Gen. Herbert J. Carlisle, USAF's deputy chief of staff for operations, plans, and requirements, told senators in May that the Air Force has given a lot of thought to when the F-35 will be available for combat.

Although it will be up to the head of Air Combat Command to declare initial operational capability—which would be 12 to 24 F-35s loaded with Block 3 software, which provides all basic weapons and combat power—Carlisle said that even if this milestone has not yet been achieved, the F-35 could be called on for combat.

If combatant commanders ask for the F-35 in 2017-2018, before IOC is declared, "then we would clearly provide it," Carlisle said. By then, the Air Force will have "on the order of 100" F-35s in an earlier, Block 2B configuration. While less capable than the Block 3, the Block 2B version will still offer "very impressive" capabilities, Carlisle said, and they would be far beyond those of even an updated F-16.

Pilots will have thoroughly learned flight maneuvers as well as tactics, techniques, and procedures, and there will be a functional maintenance capability. If the software is deemed safe, "we would … be ready to go" even short of IOC, Carlisle testified.

This would not be a unique situation: The E-8C JSTARS aircraft went to war long before it was officially operational, and the Global Hawk reconnaissance drone has gathered intelligence over numerous battlefields without having reached official IOC status.

Carter made much of the fact that the F-35's Lot 4 production contract was negotiated for a fixed-price contract. This is a reason for optimism that the program is headed in the right direction, and also challenges the government and Lockheed to meet cost goals. Lot 4 also came in at a lower-than-expected unit cost, Carter said.

Asked if Lot 5 will deliver a still-lower price, Lockheed Martin officials were noncommittal.

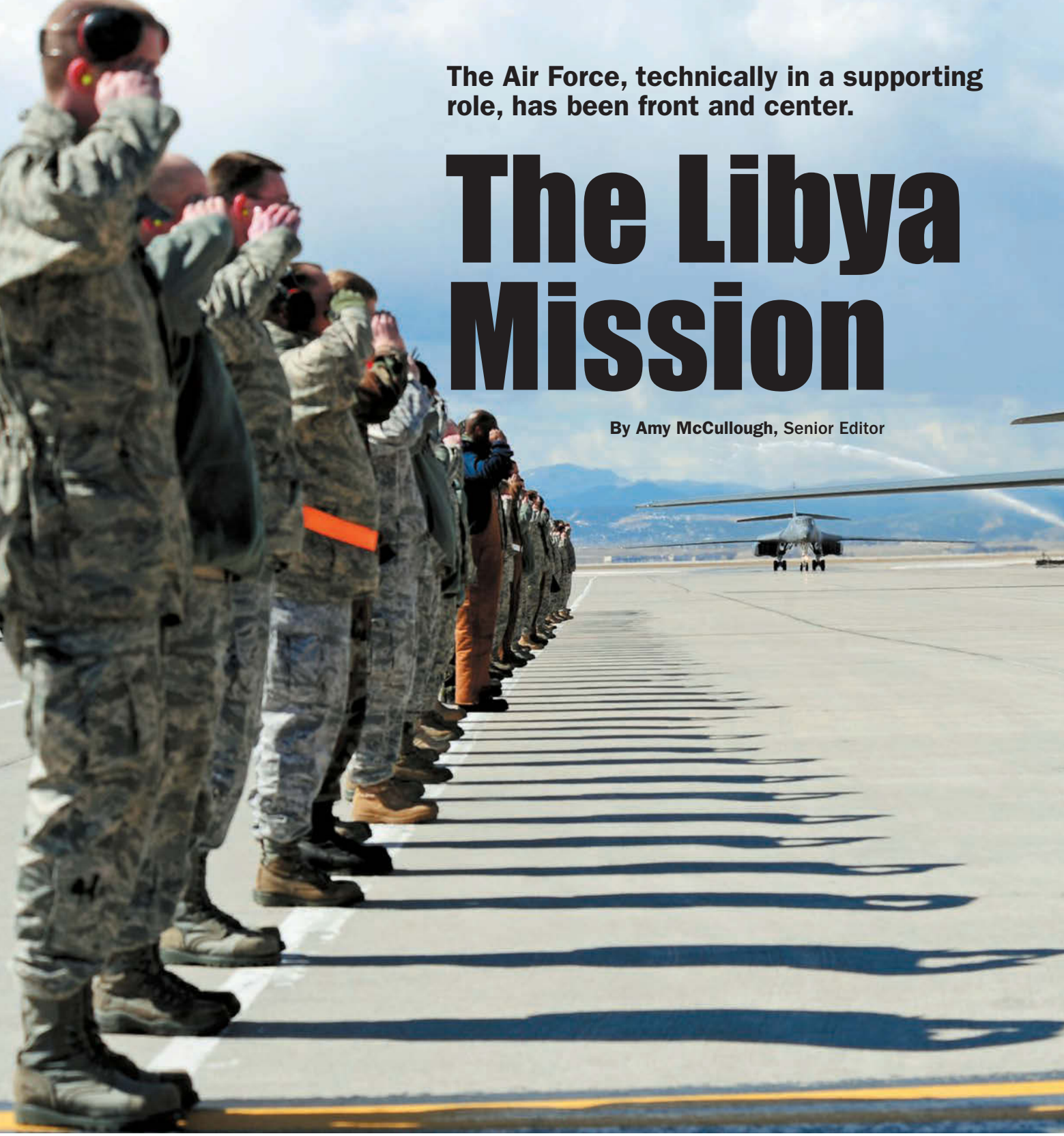
Lockheed's bid is in, but "there's a variant change," O'Bryan said. "We go from 17 STOVLs to three. So that's a challenge on [our] supply chain." The government, he said, is doing a "should-cost" analysis on Lot 5, and negotiations will follow.

"The way I look at it," he said, "the goal is to maintain that affordability track."

Carter said the Pentagon's should-cost analysis will identify each piece of the F-35 bill in great detail, so "we're only going to be paying costs that we understand and are willing to justify." If costs have grown in the last 10 years, DOD is going to ask, "Why is it larger?" and what can the department do to "drive it back to where it was when the program started?" Carter explained, adding, "We'll do that both for production and for sustainment."

Even though the Pentagon believes there is no alternative to the F-35, Sen. John McCain (R-Ariz.) told Carter at the May hearing if the F-35's cost is indeed unaffordable, then "it seems to me we have to start at least considering alternatives."

McCain did not specify what those might be. ■



The Air Force, technically in a supporting role, has been front and center.

The Libya Mission

By Amy McCullough, Senior Editor

When US Air Forces Africa stood up in October 2008, the original vision for the command centered around low intensity conflict scenarios, humanitarian relief missions, and training and advising African partner militaries.

But by mid-February 2011, conflicts had erupted across much of the north of the continent, and the command's role began to change. After the leaders of Tunisia and Egypt were overthrown in popular revolutions, Libyan dictator Muammar Qaddafi essentially declared war on his civilian population in a bid to stay in power. Officials at Ramstein Air Base in Germany, where AFAFRICA is based, began working closely with US and coalition countries to prepare for a potential contingency operation there.

Planning lasted until March 17 when the United Nations Security Council approved a resolution authorizing the use of force to protect civilians in Libya, including a no-fly zone over the restive North African state. The measure, which came five days after the Arab League called on the Security

USAF photo by SSgt. Marc I. Lane

Airmen salute as B-1s taxi at Ellsworth AFB, S.D., following a mission to Libya. Below, an F-16CJ takes off from Spangdahlem AB, Germany, for Libya on a mission for Operation Odyssey Dawn.

Council to establish a no-fly zone, called for an "immediate cease-fire and a complete end to violence and all attacks against, and abuses of, civilians" targeted by Qaddafi and forces loyal to him.

Opening Days

Two days later, US and British warships based in the Mediterranean launched more than 100 long-range Tomahawk cruise missiles against Libyan air defenses—kick-starting Operation Odyssey Dawn. Three B-2 stealth bombers flew from their home station at Whiteman AFB, Mo., and blew out hardened shelters used to protect Libyan combat aircraft, said Vice Adm. William E. Gortney, Joint Staff director, following the opening assault. Four F-15Es and eight F-16CJs participated in the initial wave of attacks, Air Force officials said. KC-135 tankers from RAF Mildenhall in England and Global Hawk unmanned reconnaissance aircraft flying out of NATO air base Sigonella, Sicily, also supported the strikes.

"Our bombers and fighters performed magnificently," said Maj. Gen. Margaret H. Woodward, commander of 17th Air Force and the joint force air component commander for Odyssey Dawn.

The opening days of the conflict were hectic. It was clear from the beginning that the United Kingdom

DOD photo by A1C Matthew B. Fredericks

US Domination of NATO Comes at a Cost

BRUSSELS, BELGIUM

The United States will have to cut down its peacetime flying hours and pull funding from other defense programs to cover the rising cost of operations in Libya.

The Pentagon has spent $715.9 million on military operations and humanitarian assistance in the war-torn African country as of June 3, including some $270 million from Air Force coffers. However, the total price tag for operations in Libya is expected to exceed $1 billion, according to a White House report to Congress outlining the Administration's military and political objectives in Libya.

Air Force officials are still working out exactly how they are going to pay the bill. As of mid-June it was not clear exactly what programs would be affected or how many flight hours would be cut, but the bill will be immediately funded through USAF operation and maintenance accounts.

The United States continues to provide the lion's share of NATO resources in some key areas. US forces are providing roughly 80 percent of the aerial refueling capabilities, and about 70 percent of the intelligence-surveillance-reconnaissance capabilities needed over Libya, said Defense Secretary Robert M. Gates in June at NATO headquarters here.

In addition, the US also is providing other unique capabilities, such as strategic lift, personnel recovery and search and rescue, and an alert strike package. The exact breakdown of assets is classified.

US and coalition forces have flown more than 10,000 sorties over Libya since mid-March and struck roughly 1,800 "legitimate military targets," said Italian Adm. Giampaolo Di Paola during a NATO briefing. Di Paola serves as chairman of the NATO committee in charge of Libya operations. NATO officials do not break statistics down by individual countries' participation, so an exact US sortie number is not available.

Only nine of the 28 NATO countries are providing assets and/or support in Libya, and much of that support comes with caveats. For example, Netherlands, Spain, and Turkey are supporting the no-fly zone, which stretches across the northern coast and out into the Mediterranean Sea, but they do not have permission to actually drop bombs. Other major NATO powers, such as Germany and Poland, have opted not to participate at all, increasing the burden on an already strapped US force.

"In the past, I've worried openly about NATO turning into a two-tiered alliance: between members who specialize in 'soft' humanitarian, development, peacekeeping, and talking tasks, and those conducting the 'hard' combat missions," said Gates in his final speech to NATO June 10. "Between those willing and able to pay the price and bear the burdens of alliance commitments, and those who enjoy the benefits of NATO membership—be they security guarantees or headquarters billets—but don't want to share the risks and the costs. This is no longer a hypothetical worry. We are there today, and it is unacceptable."

Gates said "most of the allies are sitting on the sidelines" because they simply do not have the capabilities to participate. ISR assets are particularly lacking.

"The most advanced fighter aircraft are of little use if allies do not have the means to identify, process, and strike targets as part of an integrated air campaign," he said.

The NATO air operations center in Italy was designed to handle more than 300 sorties a day, yet it is "struggling" to launch 150 despite a "major augmentation of targeting specialists," most of whom come from the US.

"Furthermore, the mightiest military alliance in history is only 11 weeks into an operation against a poorly armed regime in a sparsely populated country—yet many allies are beginning to run short of munitions, requiring the US, once more, to make up the difference," Gates said in his speech.

As of June 3, the Pentagon has spent nearly $400 million on munitions; however, the White House has said it does not intend to ask for supplemental funding to cover any of the costs associated with Libya. Instead, munitions will be replaced as part of the Defense Department's "normal programming and budgeting process," according to the White House report.

Air Force Lt. Col. Tara Leweling, senior policy advisor to the US ambassador to NATO, acknowledged there are some "shortfalls" in dynamic targeting capabilities among the European allies. That's because there is not enough capacity inside of the NATO command structure to be able to properly target mobile systems, such as artillery tanks, said Leweling. However, there has been a significant improvement in the allies' airpower capabilities from the end of operations in Kosovo in the 1990s to the start of operations in Libya today, she added.

"They have a greater ability to drop precision guided munitions instead of dumb bombs. That was a big takeaway" from the battles in the 1990s, she said. "Now we are seeing the investments made over the past 10 years coming to play into Libya," said Leweling in an interview. "It's making it a very precise operation with very, well as far as we know, very few casualties."

NATO leaders agreed June 8 to extend pressure on Libyan leader Muammar Qaddafi's regime for another 90 days, until the end of September, or until the dictator agrees to cease attacks on civilians, withdraw regime forces to its bases, and allow immediate and unhindered humanitarian access.

and France would participate in the operation, but additional coalition partners were coming in nearly every day, offering up support or assets and forcing officials to adjust accordingly. US Africa Command took the initial lead as the coalition worked to figure out who would ultimately take control of the operation. Since 17th Air Force (US Air Forces Africa) was the air component to AFRICOM, that meant the relatively new command was now in charge of a full-scale air war. It was the command's largest contingency operation ever and was certainly nothing like the humanitarian relief missions most expected to dominate attention.

Operation Odyssey Dawn would test the coalition's ability to come together quickly and seamlessly and prove just how important joint exercises really are.

The Biggest Challenges

"I think when you look back, we will see this coalition effort as a historic operation that is a testament to the day-to-day training, exercising, and interoperability we've built with various partners around the world," Woodward said in June. "Without those existing relationships and experience working together, we could not have accomplished the task we were given in so short a time frame."

Early on, the 617th Air and Space Operations Center (AOC), which falls under AFRICOM, joined forces with the 603rd AOC, which falls under US European Command. It was clear that a lot of the air assets participating in the operation would be staged from Europe, so the 603rd became "critically important," said Col. Stephen Hart, commander of the 617th AOC. Plus, its operations floor was nearly twice the size of the 617th's, making room for a growing coalition.

"Our mission and people, over time, have developed and evolved to meet the mission demands you see AFAFRICA execute today," Hart said. "The merged

USMC photo by SSgt. Danielle M. Bacon

Marines run electronic checks on a CH-53 helicopter before it takes off on a mission to rescue two downed airmen. The team recovered the F-15E pilot, and the combat systems operator officer was rescued by Libyan civilians and promptly returned to US custody.

Odyssey Dawn AOC was an excellent example of not only how the active could come together to command and control operations, but an example of how the Air National Guard and their emerging [air operations groups] were able, with the regional associations, to step in and operate side-by-side with their active counterparts."

Air Force officials declined to release most of the staging locations, citing operational security, but they did say most of the fighters flew out of Aviano AB, Italy, and the tankers flew out of Moron AB, Spain. That meant that, unlike the wars in Iraq and Afghanistan, time and distance became the biggest challenges.

"We were operating from bases that were a fair amount away from our joint operating area," said Hart. "It's not that there are lessons learned [from Operation Odyssey Dawn]; it just highlights the importance of air refueling, the importance of training, the importance of having good, redundant capabilities, and aircraft that are multirole."

More than 150 US and coalition aircraft, including US fighters, bombers, tankers, airlifters, surveillance, and command and control platforms, participated in the operation. And even though USAF Chief of Staff Gen. Norton A. Schwartz told members of the Senate Armed Services Committee days before the initial assault that he expected the F-22 Raptor to make its combat debut "at least in the early days," the aircraft never got its chance.

It turns out the Raptor just wasn't close enough when the operation came together, Schwartz told lawmakers at the end of March.

"Clearly, had the F-22s been stationed in Europe, both closer in proximity, and therefore, more available, they undoubtedly would have been used," he said in testimony before the SASC defense panel.

Combat-configured F-22s are based in Alaska, Hawaii, New Mexico, and Virginia, and since the operation came together quickly, combat planners made a judgment call "to apply the various tools" already in Europe and operating in the Mediterranean Sea, he said.

Deconflicting

However, Air Force Secretary Michael B. Donley acknowledged in the same hearing that the F-22's air-to-ground capability is "somewhat more limited" than that of the F-15E, which has seen significant action against ground targets in Libya.

On March 21, an F-15E assigned to RAF Lakenheath, England, crashed about 25 miles from Benghazi, located on the eastern coast of Libya. The aircraft was operating out of Aviano at the time and was on a mission to attack Qaddafi's missile capabilities, Adm. Samuel J. Locklear III, Joint Task Force Odyssey Dawn commander, said during a Pentagon briefing after the accident.

Two Marine Corps CH-53 helicopters, two AV-8B attack aircraft, and two MV-22 Ospreys, launched from the nearby USS *Kearsarge,* successfully recovered the pilot. The aircraft's combat systems operator was rescued by Libyan civilians, who offered him treatment and then almost immediately returned him to US custody. Neither crew member received serious injuries.

As of early June, officials were still deciding whether they would release information from the completed safety investigation board, or whether the Air Force would convene a follow-on accident investigation board, said a spokesman at US Air Forces in Europe, which conducted the investigation.

The number of aircraft in the air fluctuated based on mission needs and time of day, said Hart, but members of the 617th AOC sometimes found themselves deconflicting as many as 25

USN photo by Mass. Comm. Spc. 1st Class Nathanael Miller

A sailor guides a USAF HH-60G Pave Hawk to the deck of USS* Ponce *during evening training operations. The rescue crew was aboard* Ponce *to provide combat search and rescue coverage for pilots over Libya.

USAF photo by SrA. David Dobrydney

Left: MSgt. Steve Butler and Capt. Viveca Lane prep for a refueling mission for Operation Unified Protector, the NATO-led mission aimed at protecting civilians during the Libyan civil war. Below: An F-15E taxis prior to departure from RAF Lakenheath, UK, on a mission for Odyssey Dawn.

aircraft all performing different missions in the same joint operating area.

Despite the AOC's lack of operational experience, Hart said its management of the contingency "was excellent." The key to that success, he said, was the standardized training processes developed at the 505th Command and Control Wing at Hurlburt Field, Fla. All personnel assigned to an AOC, regardless of the center's function or geography, are sent to Hurlburt where they receive specialized training focused on the applicable AOC division they are projected to work in.

Meeting the Objectives

"The Air Force has invested a lot of time and effort in ensuring that the people who get assigned to AOCs are trained mostly the same way," Hart said. "Every AOC has its functions and they all look the same. The geography may be a little different, and the manning may be a little different, but the processes are all the same. ... If we were different, it was only the total numbers of personnel."

By the time the US handed the reins for overall control of the operation over to NATO on March 31, the coalition had flown 1,990 sorties, of which the US flew 1,206, said an AFAFRICA spokesman. Of the nearly 2,000 sorties, 952 were strike sorties, including 463 conducted by US aircraft.

USAF photo by TSgt. Lee A. Osberry Jr.

USAF photo by TSgt. Stacy Gault

SSgt. Stephen Paluga works on a KC-135 navigation system. He and other members of the 313th Air Expeditionary Wing carry out NATO's Unified Protector mission.

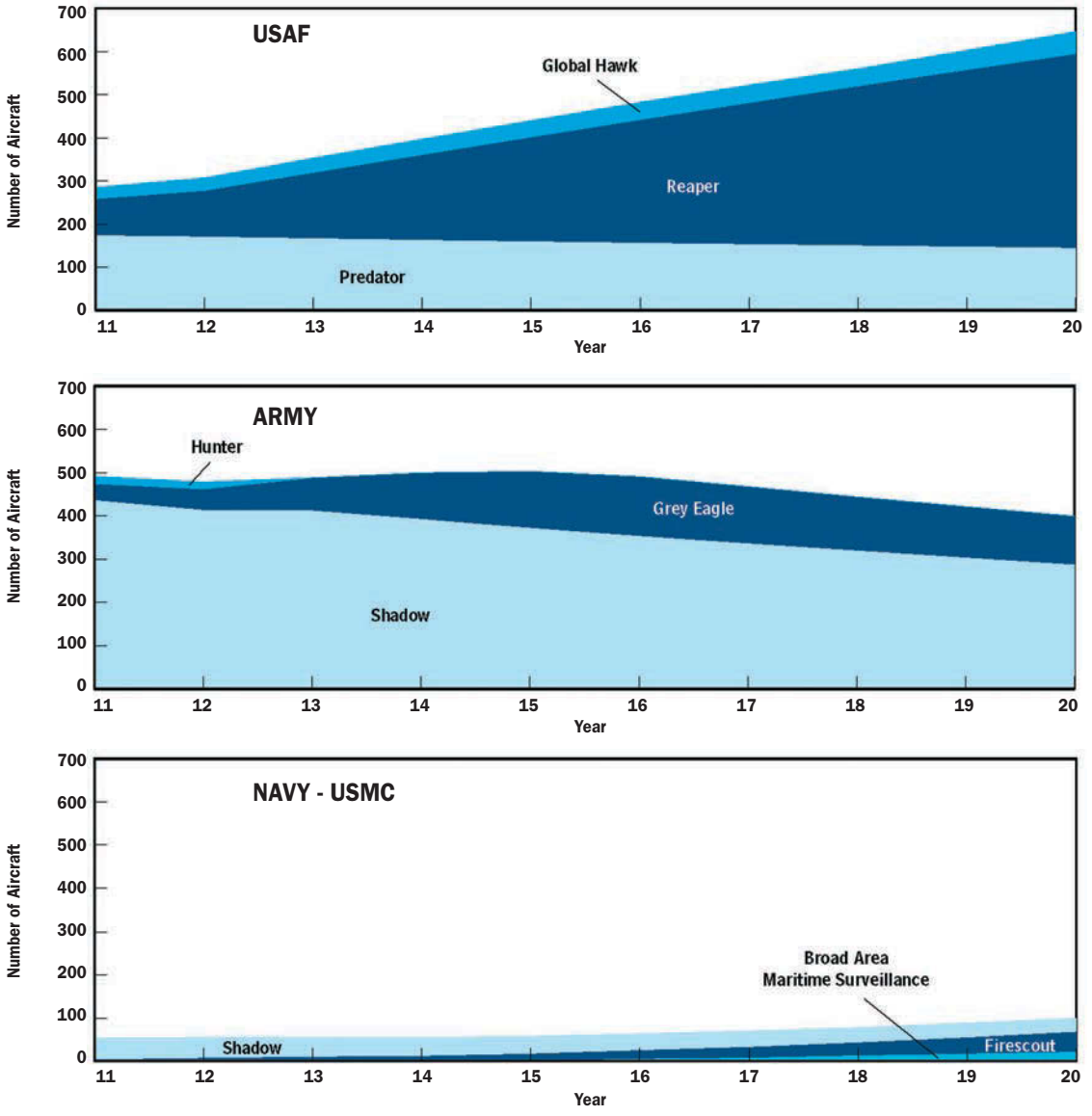
"We protected thousands of Libyan civilians and significantly degraded the regime's capability to conduct attacks from the air and on the ground," Woodward said. "We met our objectives before handing the lead to NATO forces, and we continue to support NATO under Operation Unified Protector as they carry out the same mandate."

At press time, the Libyan operation was expected to be short-lived, but Qaddafi steadfastly refused to yield power. Loyalist and Libyan rebel forces both dug in, with neither side able to gain a decisive advantage despite NATO's support for civilian populations frequently targeted by Qaddafi's forces. In recognition of the battle ahead, NATO in June extended its Libya mission through September. ■

Trading Places on UAVs

The Congressional Budget Office says the Air Force and Army are going in opposite directions on unmanned aerial vehicles. CBO reports that DOD's budget for Fiscal 2012 allots $4.6 billion to develop and buy its planned medium-size and large UAVs, and $3.7 billion to $5.7 billion annually thereafter. USAF plans to purchase 288 Reapers, 28 Global Hawks, and about 200 of an unspecified type, raising its inventory from 300 to nearly 700. Meanwhile, the Army, which today has roughly 500 medium-size unmanned aircraft, will see attrition reduce the inventory of Shadows and Grey Eagles to 400 aircraft by 2020. As the chart shows, the Navy and Marine Corps are and will continue to be negligible players in unmanned aircraft operations.

Air Force Up, Army Down, Navy Flat



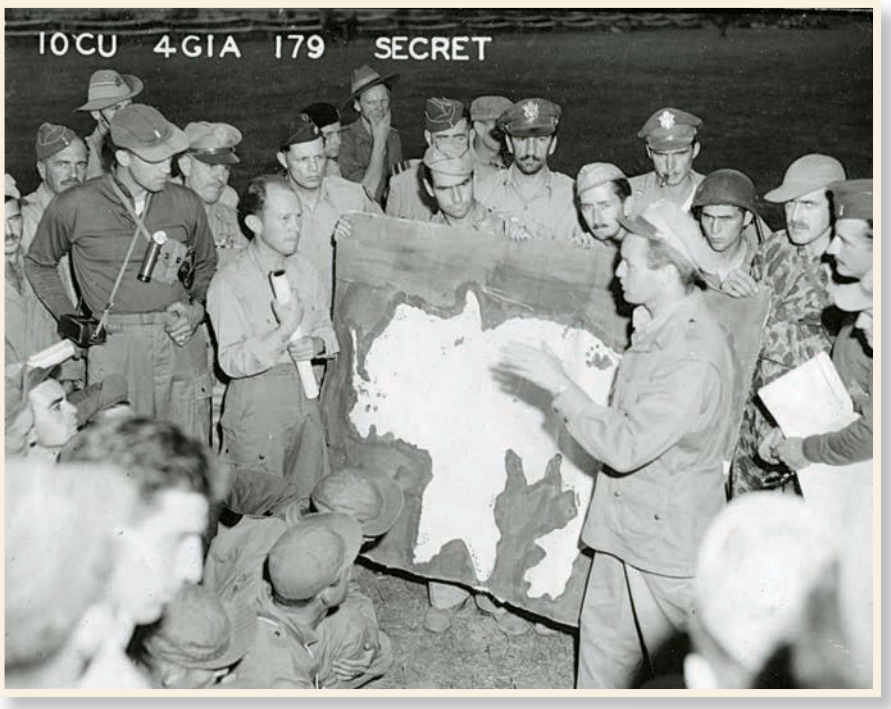
Source: "Policy Options for Unmanned Aircraft Systems," Congressional Budget Office, Washington, D.C., June 2011. Based on Fiscal 2012 Defense Department budget request.

Alis

By Peter Grier

Legendary pilot, leader, and airpower advocate Johnny Alison died June 6 at the age of 98.

Left: Alison during flight training at Randolph Field, Tex. Right: Alison listens intently (left, with a roll of photos) as Col. Philip Cochran briefs pilots for the Operation Thursday mission to Burma.



on

The Curtiss-Wright people were not happy with their prospective test pilot.

The firm was about to show off its P-40 Warhawk on a wintry day in late 1940 to some important customers—officials from the Chinese government of Chiang Kai-shek. Accompanied by their American advisor, Claire L. Chennault, the Chinese were shopping for aircraft for what would become the famous American Volunteer Group, the "Flying Tigers."

The US Army Air Corps had dispatched a P-40 and a young pilot to Bolling Field in Washington, D.C., to put on the show. But the pilot, a lieutenant by the name of John Alison, was on the short side. "I wasn't a very impressive looking officer," said Alison decades later. The Curtiss-Wright reps wondered if their company's own pilot could take over the flight.

But Bolling officials said the switch would be too much trouble. So Alison taxied to the end of the runway, turned into the wind off the Potomac River, and flew two minutes of aerobatics so astounding they became service legend.

He retracted his gear by the time he passed the reviewing stand. Boosting the engine past its recommended limit, he pulled the aircraft straight up and over in an Immelmann Turn, which left him roaring back in the opposite direction. Coming back toward his observers, he did a slow roll, cut power, and pointed his right wing tip directly at the Chinese and Chennault. Then he accelerated into five turns at high speed at about 100 feet. He concluded by racing downwind over the runway at altitude, then rolling, diving, and landing all at once in a Split S.

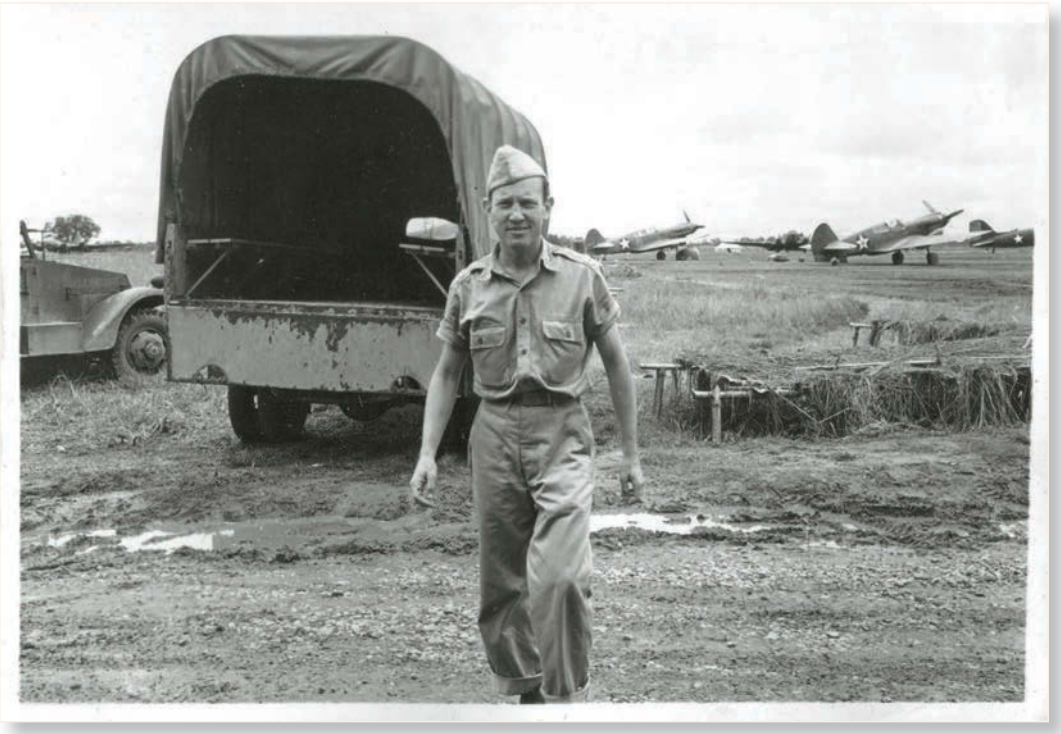
The Curtiss reps didn't know their airplane could perform like this. The Chinese were agog.

As they walked up to Alison afterward, a Chinese general turned to Chennault and said of the P-40, "We need 100 of those." Chennault stepped to Alison and tapped the young flier on the chest.

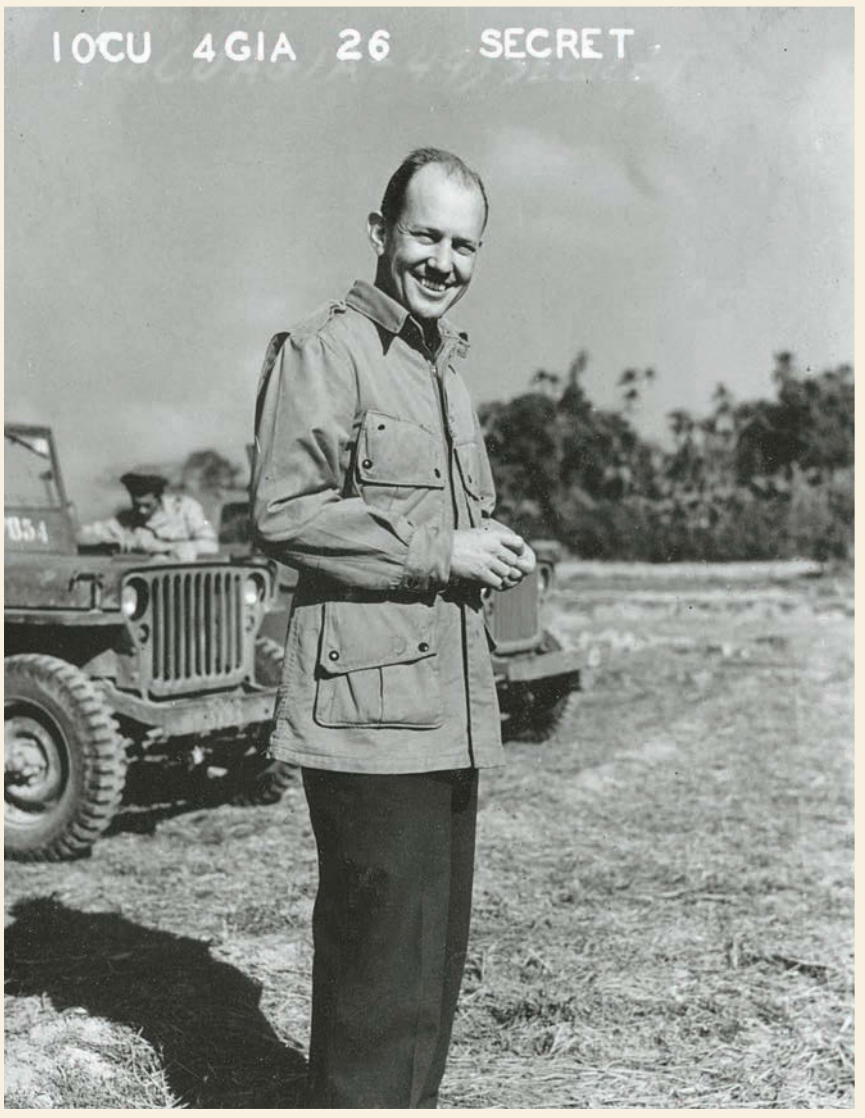
"No. You need 100 of these," Chennault said.

John R. Alison, the famed World War II fighter ace who died June 6, was American airpower incarnate.

As a pilot, he had few equals. He once safely landed a P-40 whose entire rudder was shot away.



Alison in India. As co-commander of what would become the 1st Air Commando Group, he led the air invasion of Burma.



In China, Alison became an ace by shooting down at least six Japanese aircraft. He also destroyed others on the ground, and flew a captured Zero.

As a leader, he was inspiring. When the 1st Air Commando Group invaded Burma, he flew one of the first gliders in.

As an administrator, he was a pioneer: He shaped the future of US airlines as a civilian government official in the wake of World War II.

"General John Alison is truly an American hero," says retired Air Force Lt. Gen. David A. Deptula, who was his friend.

Alison began his career as a second lieutenant living two doors down from a major named Carl A. Spaatz, who would later become the independent Air Force's first Chief of Staff. In his 90s, Alison was still meeting with Air Force officials to talk about such things as squeezing more efficiency from engines and pushing for the F-22.

Along the way Alison saw an astounding amount of history.

In London, bombs straddled his hotel on the worst night of the blitz.

In Moscow, he heard the guns as German tanks rolled toward the city limits.

We Have Met

In Tehran, he was set to take the Shah on a joy ride until the US ambassador scuppered the plan. "Suppose you killed the Shah?" said the outraged envoy. Alison replied, "I really hadn't thought of it, sir, because if I killed him, I would be dead, too."

He watched FDR envoy Harry L. Hopkins negotiate secret Lend-Lease deals with the Soviets. He gave Ike Eisenhower advice about gliders prior to the D-Day invasion. Winston Churchill, visiting an air base, walked up to Alison so he could shake a young US airman's hand.

"Johnny Alison was a participant and witness to history to a degree uncommon even by the standards of public personages. ... His was a life that, had it been written as a novel, would have been rejected by publishers as too fantastic to be believed," says Richard P. Hallion, Air Force historian from 1991 to 2002.

Even the first time Alison fired a shot in anger was dramatic. It was mid-July of 1942, and Alison was in China serving as deputy commander of the 75th Fighter Squadron of the China Air Task Force, the US follow-on to Chennault's American Volunteer Group. Alison had convinced a colleague to try and catch Japanese bombers, which were hitting their field at night with impunity. Spotting enemy airplanes from below by the blue flame of their exhaust, he firewalled the throttle, turned with them, and slid toward them.

"As I began to pull up on them, I called the radio on the ground, and I said, 'OK, watch the fireworks,'" Alison remembered in his Air Force oral history.

In truth, he had mixed emotions. He was about to pounce on a V formation of three bombers, and he knew each carried five men, a total of 15 people. He was about to kill them all. Alison was traveling fast at this point, so he sideslipped and cut the gas in an effort to get in firing position.

"I remember saying, 'Lord forgive me for what I am about to do,'" he said. In that moment, the right Japanese wingman shot up Alison—the bomber's top turret twin guns stitching Alison's P-40 from nose to tail. Bullets smashed his radio and burned his left arm.

The young pilot had no time to be frightened. Veering right he fired his own guns at the wingman, who pulled straight up, spewing oil. He kicked the rudder and blew up the second wingman, and then the leader. Both fell burning to the ground. Alison's canopy was covered with oil and he knew he had to get down. He dove toward the airfield.

At 3,000 feet his engine started backfiring and flames came from under the cowling. As Alison came toward the runway in the dark, he realized he was going too fast to skid in on his belly. But the propeller was still turning and he thought he had just enough left to make it over a hill and railroad trestle to a river beyond. As he flew past the field, colleagues thought he

was a goner. Seconds later they heard the sound of impact and were sure he was dead.

Alison had made the river—barely. His face slammed into the gun sight, but he didn't black out. He rolled the canopy back and stepped out onto the wing. The P-40 sank.

In the river, he swam to a raft of logs left by a lumber cutting operation. As he approached he noticed a Chinese man running over the logs to him. He reached down, took Alison's hand, and pulled him out. Three Chinese soldiers on the bank kept their rifles trained on him until they were sure he was American.

Eventually the Chinese sent him back to his riverside quarters in a small boat. He stepped onto a dock near the hostel where he lived and started to walk up the hill. Suddenly, six Japanese bombers came in at low altitude and blew up the dock. "They weren't after me. They intended to bomb the airdrome but their bombs were long," said Alison.

Years later, in the late 1950s, Alison was a customer relations official at Northrop. The firm had bought several small research firms located near Boston, and he decided to visit them to see if his services were needed. At one, Alison walked in to meet the chief engineer, a Chinese emigre. After talking with Alison, the engineer discovered this visitor had been a pilot for Chennault, stationed near Hengyang. "He looked at me and said, 'Are you John Alison?'" said Alison. "I said, 'Yes, I am.' He said, 'We have met. ... I pulled you out of the river.'"

Alison was born on Nov. 21, 1912, in the small town of Micanopy, Fla., about 12 miles outside of Gainesville. The family moved to Gainesville when he was young and he attended school there, including college (their house was blocks from the University of Florida).

As a child Alison occasionally saw barnstormers flying Jennys—the iconic Curtiss biplane. But the moment he pinpointed as the beginning of his interest in flight came during high school. A friend had a brother who was an Army Air Corps lieutenant. One day, this brother decided to buzz the town in a Curtiss P-1.

Alison was sitting in study hall. "I heard that sound and said, 'I think that's something I would like to do,'" he later remembered. His parents were not keen on the idea.

Alison prepares to fly a captured Japanese Zero for the first time. He found the aircraft highly maneuverable, but fragile compared to hardy US P-40 fighters.

When he was a bit older, his father tried reverse psychology, figuring by allowing his son to fly, Alison might get airsick and decide against a pilot career. Alison's father traded a used car to an acquaintance for flying lessons—but the instruction only served to hook Alison for good. Eventually his parents grew reconciled to their son becoming a pilot, though neither of them ever left the ground themselves.

Exotic Assignments

After graduating from the University of Florida in 1936 with a degree in industrial engineering, Alison tried to enlist in the Navy to serve with friends, but was rejected because he was a quarter-inch shy of the height requirement. He entered the Army Air Corps instead, with an ROTC commission, and took flight training at Randolph and Kelly Fields in Texas. Classes were small and instruction haphazard. But Alison never had doubts he would earn his wings. "Not only did I want to fly, but I appeared to have an aptitude for it," he remembered.

Langley Field was his first assignment.

Initially Alison did not get enough flying time, but the base was also the general headquarters of the Army Air Corps, and he met many men who would become famous in World War II. Besides Spaatz, 1st Lt. Curtis E. LeMay was then living at Langley, among others. "It was still a very small community where you really had an opportunity to know people, and you had no idea they were going to be the leaders in a great war," said Alison.

Over three years at Langley, Alison honed his flight skills in hours of air-to-air combat against colleagues. He developed a reputation as an extremely skilled pilot—someone who could fly anything and get the most out of it. This led to an exotic assignment in 1941 as war loomed: assistant air attache. The Army dispatched Alison and his friend and colleague Lt. Hubert A. "Hub" Zemke overseas to advise Britain, then the Soviet Union, on the operations and maintenance of the P-40 and other US aircraft.

This experience in turn led to Alison's first drink. In the port city of Archangel in the northwestern Soviet Union, he and Harry Hopkins were feted with a sumptuous shipboard dinner. To this point, Alison was a teetotaler. But there was nothing for it: When a Soviet general offered a

Major General Alison (l) with then-Col. Gerald Johnson at Biggs AFB, Tex. Alison served in the Reserve after his time on active duty.

toast in friendship, Alison knocked back a shot of vodka. Hopkins laughed. He had been urging his aide to take a nip for days. "Well, Alison, that shows a definite lack of character," said Hopkins.

Alison was awed by the stoic Soviet approach to big tasks. He saw prisoners build a 5,000-foot runway entirely out of timber at a boggy site in Archangel. But he tired of the secrecy and fear which permeated dealings with Soviet counterparts. They would accept US P-40s but in return provided no information about how the airplanes would be used or the status of their air force. The experience informed his attitudes toward the USSR and the Cold War later in his career. "We went there as friends, and they were sitting on the other side of the table as adversaries," Alison said.

The Air Commandos

He sent back letters to the US begging for a spot in a fighter squadron. After a pleasant interlude in sunny Iran, prepping A-20s and other aircraft for Soviet delivery, he got his wish. Then-Captain Alison received a telegram from Gen. Henry H. "Hap" Arnold, ordering him to the China-Burma-India theater for service in the new 75th Fighter Squadron of the 23rd Fighter Group, which had taken on the AVG Flying Tigers nickname.

Alison spent a year in China, from mid-1942 to early 1943. He rose to squadron commander and became an ace, shooting down six Japanese aircraft and destroying one on the ground, with several additional probable kills. He earned the Distinguished Service Cross and the Silver Star while flying from primitive air strips with little logistical support against a numerically superior enemy.

Lack of medical facilities for his men bothered him greatly, though. They had no doctor to tend to wounds or sickness. At one point, their Chinese cook fed them a meal cooked in inedible tung oil, incapacitating them for more than a day. "People remember how formidable America is after it is armed, but for almost two years, there were a lot of young Americans that were out there on the edges of that war holding on with their teeth, and thousands of them died because they didn't have the proper equipment or the proper training," Alison said. Memory of that unpreparedness was a major reason why, after the war, he became a founding father of the Air Force Association.

In China, Alison learned the value of planning and shrewd leadership. Chennault established a network of informants in his area of operations, providing US fliers with invaluable early warning of Japanese air movements. Chennault also drilled his pilots in the proper use of the fast, heavily armed P-40: Dive from altitude through enemy formations, hit, and run.

Alison flew a captured Zero, and found it a beautiful flying machine, with terrific maneuverability. But compared to US fighters, the Zero was fragile. "One of the very important things in aerial warfare is that you would like to be decisive once you get in a position to shoot your weapons," Alison said. "The P-40 with its six .50-caliber machine guns was a decisive weapon."

In May 1943, Alison was recalled to the United States. Arnold had a job for him: Organize and lead one of the most innovative air operations of the war. With a fellow lieutenant colonel named Philip G. Cochran (the model for the character Flip Corkin in the comic strip "Terry and the Pirates"), Alison co-commanded Operation Thursday, the airborne invasion of Burma.

Alison and Cochran molded some 500 people and an assortment of more than 300 aircraft into Project 9, later known as the 1st Air Commando Group, which supported British Maj. Gen.

USAF photo by TSgt. Joe Ramirez

Alison (r) receives the Distinguished Service Medal presented by Gen. Bruce Holloway (l), SAC commander in chief, at Alison's retirement ceremony in 1971. Alison retired as a special assistant to Lt. Gen. Paul Carlton (center), 15th Air Force commander.

Orde C. Wingate's "Chindit" guerrillas. Flying L-5 light ambulance aircraft, the air commandos delivered mail and supplies to deep-penetration troops while evacuating the sick and wounded. The group was the first to employ the military's new helicopters in operational situations, pioneered the use of rockets on P-51s, and used depth charges to attack enemy troops beneath jungle canopy.

On March 5, 1944, Alison and Cochran's unit dispatched C-47s, towing gliders, from their base in India to a spot code-named "Broadway"—150 miles inside Burma. The gliders were packed with assault troops, mules, bulldozers, and other crucial equipment. Operation Thursday was on.

Alison was the pilot of a lead glider. The problem was, he'd never flown a glider. At least, he'd never flown a loaded glider; he had three drops in an empty one the night before. As he descended on the landing site, his copilot kept reading off the airspeed as 80 mph. Alison just could not get the aircraft to go any slower; he was supposed to be at 60 as he approached the ground.

The glider was going too fast because it was overloaded. It hit the ground and blasted through underbrush before rolling to a stop, right where he was supposed to land. "It had to be luck. ... It really was a very demanding flight," said Alison years later.

Of the 37 gliders that landed at Broadway, only three weren't busted up in some manner after landing. But most of the cargo made it intact and the force quickly scraped out a real runway. Within days C-47s had delivered more than 9,000 of Wingate's troops deep behind enemy lines. From there, they would bog down Japanese forces, helping head off a feared Japanese invasion of India.

Alison's last World War II assignment was operations officer for Fifth Air Force, which was running bombing raids against the Japanese in the Philippines and Japan itself. His commander was Maj. Gen. Ennis C. Whitehead, the sort of tough chief prone to calling up and asking where the 90th Bomb Group was, or how many 500-pound bombs were stockpiled in-theater, when he already knew the answer.

Alison quickly learned the answers and earned Whitehead's trust. At one staff meeting, Whitehead laid into his bomber commander because the latter could not get his aircraft off the airdrome fast enough. "One man in this theater can do it," growled Whitehead. He meant Alison.

Alison, shown here in 1987, was AFA National President and Board Chairman.

Always an Airpower Advocate

Alison got up, saluted, and went straight to the tower. He stayed for two days, working on ways to speed up runway traffic. When he was done, bomber missions were getting off in 12 minutes. On the morning of the third day, the tower phone rang. "This is General Whitehead. You can come down now," said the voice on the other end of the line.

One day Alison began to field curious reports from crew members running missions over Japan. They involved a tremendous explosion, with smoke and flames at 50,000 feet. He called Whitehead to report all hell had broken loose at a spot near Hiroshima.

"Johnny, they have just dropped the atom bomb," said Whitehead.

After the war Alison left the active duty Air Force. He would have preferred to have stayed in but his then-wife did not like the life. For a while he tried to help organize an airline. Then in 1947, he got a call from W. Averell Harriman.

Harriman, the secretary of commerce, was looking for an assistant secretary for aeronautics, and *Washington Post* publisher Philip L. Graham—whom Alison had met when both were University of Florida students—had suggested him for the job.

Alison served almost two years in the post. He pushed airlines away from reliance on military surplus toward new aircraft designs better suited to civilian needs. He also found time to campaign in Florida for President Harry S. Truman in the 1948 election. Subsequently he joined the Northrop Corp., from which he retired in 1984 as a vice president. He served in the Air Force Reserve through much of his post-active duty career, rising to the rank of major general, and flew as often as opportunity presented.

Even in retirement, he remained concerned about Air Force issues. Consider the experience of Mark J. Lewis, chief scientist of the Air Force from 2004 to 2008. One day during his tenure, Lewis received an inquiry asking if Alison could meet him to discuss advanced propulsion issues. Of course he could, replied Lewis—the honor would be all his.

On the day of the meeting, Lewis got a call saying Alison would be a little late. Alison was already at the Pentagon, and a wheelchair was reserved to push him down the building's long corridors (Alison was past 90 at this point). But Alison was having none of it. He was going to walk to Lewis' office.

Lewis was not just humoring a respected elder, either. Some of Alison's thoughts were passed along to Air Force and Army scientists and labs for further work. After he returned to a teaching position at the University of Maryland, Lewis had Alison visit and address a class of freshmen who were considering a major in aerospace technology. Afterward, some students told Lewis it was the highlight of their year.

More recently, Lewis saw Alison at an Air Force Association banquet. The famous pilot was seated at a table. Medal of Honor recipients were lined up to shake his hand.

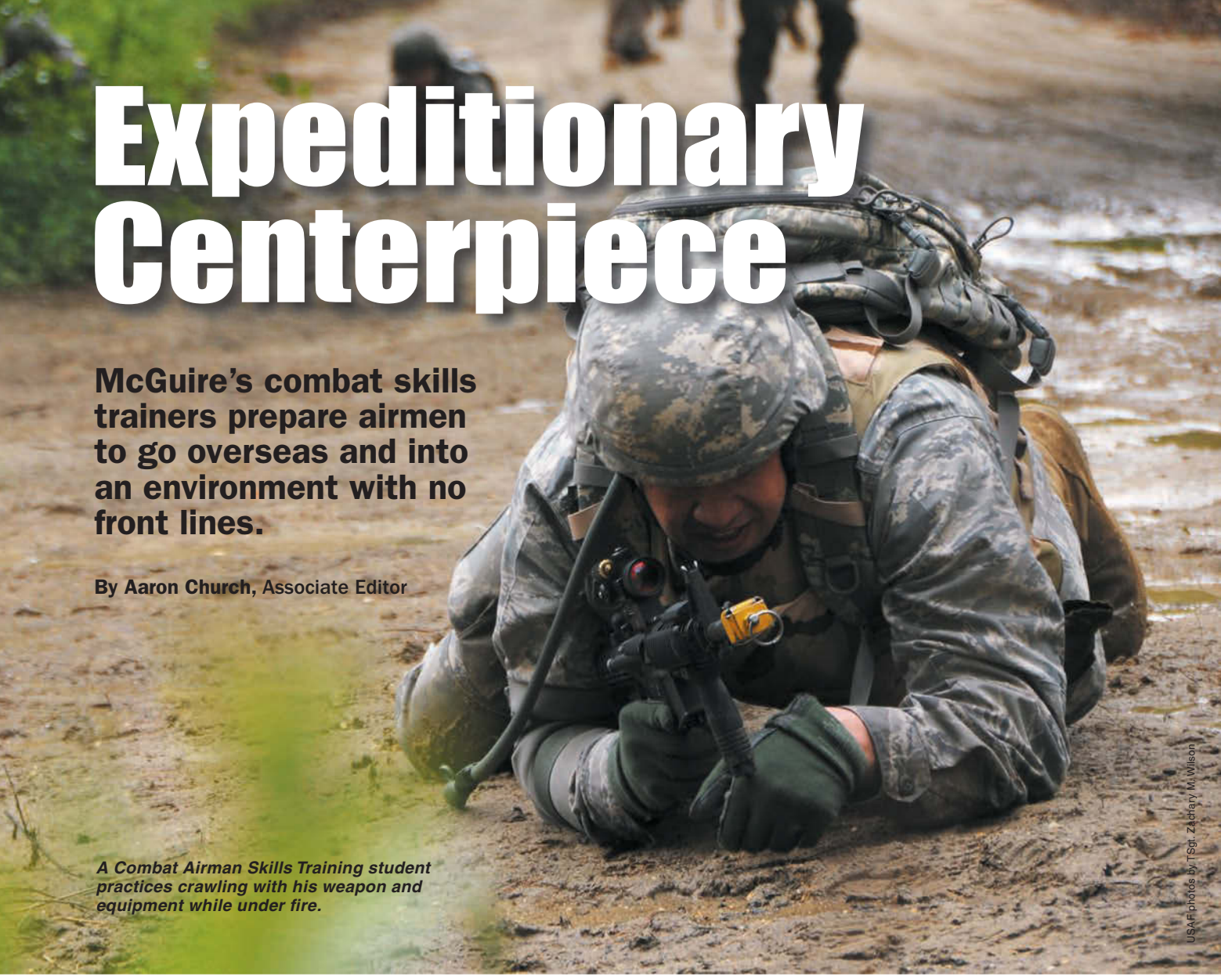
"We are at once enriched by having known him, and impoverished by his passing," says Hallion. "But if his presence is missed, his life will always be celebrated and treasured as a life particularly well-lived." ■

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, i*s a longtime defense correspondent and a contributing editor to* Air Force *Magazine. His most recent article, "CyberPatriot Nation," appeared in July.*

Expeditionary Centerpiece

McGuire's combat skills trainers prepare airmen to go overseas and into an environment with no front lines.

By Aaron Church, Associate Editor



A Combat Airman Skills Training student practices crawling with his weapon and equipment while under fire.

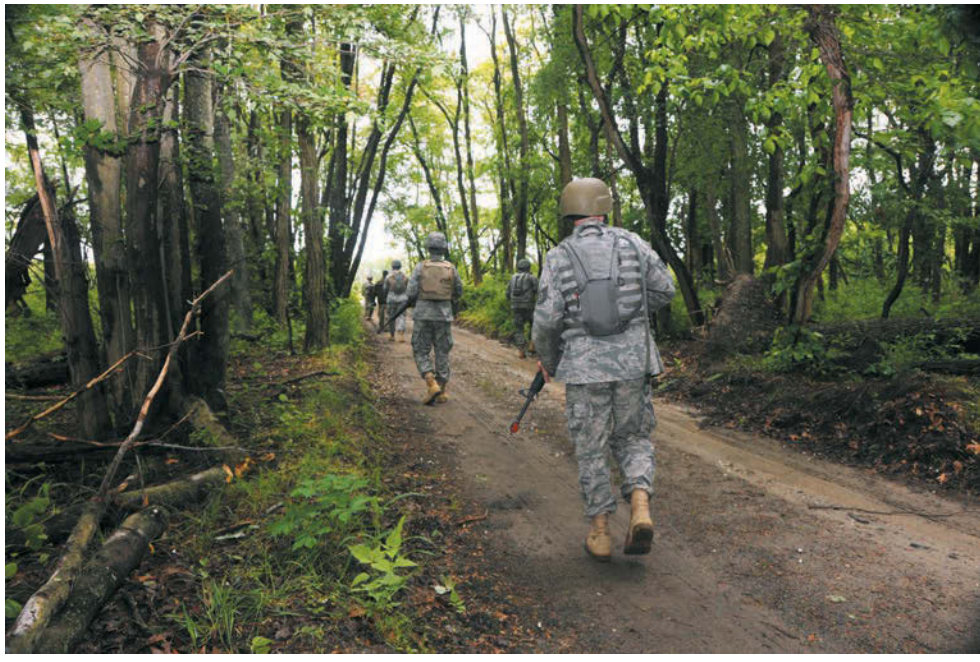
USAF photos by TSgt. Zachary M. Wilson

Expeditionary training instructors at JB McGuire-Dix-Lakehurst, N.J., ensure airmen are prepared for the war zone.

For those in some Air Force specialties, seeing combat was not even a remote possibility when they signed up. Chaplains, civil engineers, public affairs officers, accountants, and managers, for example, don't sound like front-line combat jobs.

Today, though, with almost everyone in the Air Force on the hook to spend at least some time in a forward deployed area, the service is determined airmen will not go without some fundamental skills in fighting and surviving in a combat zone.

Those skills are taught at Combat Airman Skills Training at Joint Base McGuire-Dix-Lakehurst. There, two days into a CAST course, a group of airmen previously at home in a desk-



CAST teaches skills needed to survive in war zones.The airmen learn to keep alert on patrol, make quick decisions, and take decisive action.

and-PC environment find themselves face down in the mud, gripping a rifle.

These first two days are an unnatural, confusing, and surreal experience for these airmen—which is exactly why they're here.

Less than two weeks from deployment, Lt. Col. Charles Spillar, a 22-year veteran of space and cyber command and control operations from Petersen AFB, Colo., confided that CAST is "probably the third time in my life that I've handled a gun." Heading to Iraq to serve on the strategic planning staff at Camp Victory in Baghdad, Spillar is typical of those here getting ready to deploy.

Early on in Afghanistan and Iraq, bases and commands realized the need to prepare airmen to work in theaters without front lines. Not just battlefield airmen such as pararescue jumpers and combat controllers were in the crosshairs. Anyone can be a target.

Back then, there were multiple and varied such schools. Air Mobility Command had Advanced Contingency Skills Training (ACST), and Air Education and Training Command provided Common Battlefield Airman Training (C-BAT). These courses excelled in preparing airmen for deployment, however, many of those who would deploy fell through the cracks.

Thus, in 2008, USAF leaders tasked AETC to conduct a thorough review of existing training, with an eye toward standardization. With the ACST schoolhouse already well established, the Air Force Expeditionary Center was chosen to develop the common program, which today is known as CAST.

Joint Base McGuire is the largest of three CAST training sites, handling an average of 150 to 180 airmen per class. This year alone, McGuire will host 16 course rotations, prepping 3,648 airmen for potential combat zones. Between McGuire, and USAF's two other CAST sites at Camp Guernsey, Wyo., and Camp Bullis, Tex., nearly 5,768 airmen will pass through the course—ideally, just in time for deployment.

While the curriculum is standard across all three sites, the training cadre at each is unique. At Bullis, instructors are combat specialists in areas such as combat control and pararescue, and Guernsey's trainers are all security forces airmen. For its part, McGuire's staff is a blend of "regular airmen" and prior-military contractors.

A CAST student holds her M4 ready, as she lies in wait as part of a force-on-force exercise between two groups of trainees.

"All the different Air Force specialty codes—civil engineering, comm, you name it—they're out there teaching," noted Col. Mark W. Ellis, Expeditionary Operations School commandant at McGuire.

"There's some real goodness to airmen training airmen," added Lt. Col. David M. Lenderman, commander of the 421st Combat Training Squadron, which conducts the CAST training and the expeditionary center's more specialized predeployment courses.

Essentials of Combat Survival

"It's great for that warrior ethos to see that somebody like me has done this," he said.

On top of this, the 421st CTS civilian contract instructors add a wealth of tactical experience. Hired in 2010 to fill a shortfall of available, combat-experienced airmen, the 33 civilian instructors include former snipers, EOD techs, and combat infantry.

"Culturally, it's exceptional to have it that way, but that blend has brought a lot of experience and a lot of different teaching styles," Lenderman said. "It is more intense."

"You get the best of both worlds," added Ellis.

"We're not teaching them to be infantrymen and we're not teaching them to be marines. These are airmen, going to airmen roles" in theater, emphasized Brig. Gen. William J. Bender, commander of the USAF Expeditionary Center. "You bring in an airman who's never deployed and he walks around for the 12-day course with a weapon," Bender said. "We hold them accountable for how they handle that weapon, how they care for it. ... So that they've had just enough immersion in the [combat] environment" before they arrive in theater.

Unlike Army expeditionary training, CAST is the bare essentials of combat survival—how to react to enemy contact, communicate and move as a team, identify hazards such as improvised explosive devices, and come home.

"The marines and the soldiers are sent to prosecute the ground war. Our guys are being trained here to defend themselves, survive, and return, while continuing to be able to do their jobs—because they're going to be threatened," explained Capt. Thomas E. Wenz III, a public affairs training instructor with the expeditionary center.

In Afghanistan and Iraq, there are few traditional lines or safe zones, meaning that no matter their role, airmen must be trained to react. Recent experience has shown that deadly fire can just as easily erupt in a classroom in Kabul as on convoy duty outside the base. Preparing airmen for the worst is the objective of CAST. It is a rude awakening—filled with explosions, smoke, gunfire, and a heavy dose of tactics.

In a brief 10 to 12 days, instructors saturate trainees with tactics and

USAF photo by TSgt. Zachary M. Wilson

Capt. Robert Shane Gwaltney, a student, moves quickly, as TSgt. John Gray, an instructor with the 421st Combat Training Squadron, shouts out some guidance.

information. The instructors know full well they are giving airmen more than they can possibly absorb, but they also know that in the critical moment, subconscious retention and trained reflex can, and does, save lives.

"We're trying to get that reflex response out of them—that muscle memory so when something happens, they know they need to do A, do B, and get the heck out of Dodge," explained TSgt. Luke Korpak, a CAST training instructor with the 421st Combat Training Squadron. Despite the pace, instructors emphasize a "crawl, walk, run" method of learning based on firsthand experience. The course is not intended to wash out students, but to prepare them.

On the first full day of training, the crawling is literal. After a few hours of classroom theory, airmen load up for the drive out to one of the joint base's abundant Army ranges.

The first order of the day is the low crawl. The maneuver is second nature to any soldier or marine, but few airmen ever have occasion to use it after basic training. Humbling it is, but denying enemies a clear shot is a skill best learned before it's a matter of life or death.

Encumbered with a fragmentation vest, Kevlar helmet, field equipment, and rifle, the exercise is fatiguing. Some airmen move quickly, keeping a low profile and ready weapon, while others veer off course, lose ammunition pouches, or gouge their rifle barrel into the earth—costly missteps on hostile terrain, and eye-opening lessons in training.

The pace varies across the range from one squad to another. Some transition quickly to basic maneuvers, learning to communicate and move, cover their teammates, and function as an effective element. The "walk" and "run" phases build on this crucial foundation.

The pace is dictated by the airmen. "If we deem that they're doing more poorly, then we'll do it a whole lot more so they can get a handle on it and know exactly what they're supposed to do," stated Korpak.

Choices To Be Made

By early afternoon, the class is up and walking. Airmen are each issued two magazines of 5.56 mm blank cartridges for an M16 or M4 carbine rifle, depending on the weapon with which they'll deploy. There's still awkwardness in the way many carry the weapon, but as one of the squads forms on a road for the next exercise, they all show an understanding of their role.

On the instructor's command, the squad splits into two single files evenly spaced down both sides of the gravel road. With dense forest on either side, each person scans a sector intently as the formation moves. The airmen are initially alert, maintaining even spacing and good discipline. The forest is calm and a light drizzle falls. After 15 minutes of crunching along, however, the column begins to bunch toward the front, leaving two airmen covering the rear some 130 feet behind. Complacency is a matter of time and this is precisely what the instructors are waiting for.

Without warning, the squad leader in the center of the formation drops to the ground. There is no shot and no explosion heard. The only sound is the dull thud of his body hitting the gravel.

"What are you going to do?" shouts Nathaniel Hutt, an advanced marksmanship instructor and the squad's civilian trainer for the exercise. Suddenly, there are split-second choices to be made. With the squad leader down, someone must step up to take the lead, communicate a plan, and take decisive action.

For airmen accustomed to discussion and problem solving, this is a totally new mindset that instructors are putting to the test. Here, airmen are taught above all not to leave a comrade behind. They are also taught to assume instantaneously that any time someone drops to the ground unexpectedly, they are under sniper attack. Two squad members quickly seize their leader's tactical vest, dragging him with the column.

"Where are we going to?" prompts Hutt.

Through the morning, the airmen are taught to return fire, take cover, and quickly get out of the sniper's sight. At the rear, one of the airmen throws a smoke grenade to mask the group's movement, but the squad breaks into a run charging directly up the same line of advance. About 500 feet farther on, with the smoke screen behind and no indication of the sniper's true location, another airman is picked off.

"Out in the road is not the answer," Hutt reiterates patiently, letting the unfolding scenario sink in. It's an understandable mistake, and one the instructors expect. Attempting to outrun the shooter, the squad has inadvertently run to a wide open area.

Hutt calls the group together, ending the exercise, for a debrief.

"Initially, you guys took a casualty. You didn't hear the shot—you assumed sniper, which is good," he said.

USAF photo by Jerry Green

Brig. Gen. William Bender (left), Expeditionary Center commander, is greeted by CMSgt. John Gallo at Pope AFB, N.C., while visiting a medevac training unit. Bender said the 12-day CAST course provides just enough immersion into the combat environment.

However, "the longer you guys go, ... staying in his field of view, he's going to continue to make casualties—that's just how it is," explained the former marine sniper.

"You want to move with a purpose—when you're moving, you need to know where you're going," he added. With two intense tours in Iraq under his belt, Hutt is a reassuring source of firsthand expertise, and the squad clearly takes his critique seriously.

Over the first two days of CAST, trainees focus on defensive combat tactics—basic skills.

"We do ambush, we do sniper, we do indirect fire, which is taking mortar rounds, how they need to react to that," listed Korpak. "We'll strategically place the squad somewhere on the range and have them on a mission and end up getting hit," he illustrated.

The airmen break into groups, rotating through a variety of course modules for the remainder of the course, culminating in a schoolwide field training exercise. Rotations include urban operations, IED recognition and response, combat first aid, combat marksmanship, land-navigation, and "mounted" convoy operations. These serve as a more advanced introduction to mission-specific skills.

In the final FTX, airmen are given scenarios that force them to combine skills in a realistically unpredictable scenario. As students move through the rotations, "you do see a huge improvement from now until [the] final FTX," observed Korpak.

"We try to incorporate tactics into just about everything we do, whether it's mounted operations, urban terrain, [or] marksmanship; we're trying to create a learning environment so that by the time FTX comes along, we shouldn't have to tell them anything at all. They should know … exactly what they need to do" when they come under fire.

Measure of Success

This is the crux of what CAST aims to achieve. "We almost put them in a worst-case scenario—a convoy getting hit. We hope it never happens to them, but [we teach them] how to react if it does," summed up TSgt. Troy Colen, a CAST training instructor and veteran of deployments to both Iraq and Afghanistan.

The real measure of success, however, comes downrange. Are airmen making it home alive because of their training, or not?

"That gets to that point about giving them confidence to go out and do what we're asking them to do," said Bender.

"Over and over again, we get great feedback from folks coming home saying, 'If it weren't for the training you gave me, I would not have been able to react to the situation or would not have felt as safe as I did.' "

The expeditionary center has several channels for gathering feedback, including the 422nd Joint Tactics Squadron, which is solely dedicated to rapidly gathering, analyzing, and implementing lessons learned in the field. However, the testimony of individual airmen is often the most compelling.

Case in point: Traveling in a mine-resistant, ambush-protected vehicle from Camp Victory, Iraq, to Baghdad's "Green Zone" in August 2009, Capt. Wendy Kosek was struck by an armor-penetrating IED. The blast tore through the vehicle, peppering her with shrapnel.

"I remember seeing red and white, and I knew there was something really wrong with my leg," recalled Kosek. "I was trying to stay really calm. I didn't really feel anything."

Deploying as a legal officer from the 19th Airlift Wing, Little Rock AFB, Ark., Kosek was lucky enough to have received Advanced Contingency Skills Training—the predecessor of CAST.

"The training we received saved my [life], and my teammates' lives," said Kosek. "It's important, because you don't want to be in that situation [for] the first time when you're deployed, when you have no idea what your enemy's going to throw at you." As a result of her training, Kosek was collected even as the vehicle filled with smoke.

She assessed her situation and decided "from a military standpoint, I knew that we would need to exit." She relied on her teammates' training to pull her to safety. Despite a shattered portion of her tibia and femur, and a chunk of shrapnel lodged behind her kneecap, Kosek survived.

With this mission in mind, CAST is continually evolving to incorporate lessons learned in theater. Through the joint tactics squadron, "it's very common here to change a portion of the curriculum … from one class to the next," Bender said. "And it's just that fast. ... It's a strength of the expeditionary center that we're very responsive to tactics and can change curriculum on a dime."

For example, given the MRAP vehicle's high center of gravity and frequent rollovers in theater, the center recently incorporated a new MRAP rollover module into the curriculum. It is difficult to exit a damaged armored vehicle under fire, injured, and with equipment, and this training too may also save lives downrange.

"I think there's a tacit recognition [that] how we've operated as an Air Force in Iraq and again in Afghanistan is an enduring mission," Bender observed, "and in some cases [is] a growing mission." The challenge going forward will be to "formalize" expeditionary training's place in the Air Force psyche, he said. ■

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SOUTHCOM's Concerns

By Marc V. Schanz, Senior Editor

USN photo by Mass Comm. Spec. 2nd Class Rafael Martie

SOUTHCOM photo by Jose Ruiz

Above: US and multinational troops storm the beach during a joint training exercise in Panama. Left: USAF Gen. Douglas Fraser (l), with Belize Defense Force Commander Brig. Gen. Dario Tapia, speaks at a Central American security conference. Below: US sailors, Coast Guardsmen, and members of the Colombian Navy search for illicit drugs in the Caribbean. More than a quarter-ton of illicit drugs was recovered from the water on this mission.

USN photo by Lt. Ed Early

US Southern Command doesn't expect major war, but it must deal with criminals, drug cartels, and natural disasters—all very near the United States.

Top officials at US Southern Command manage a unique mission: They face a range of threats, not always military, but close to home.

"From Latin America and the Caribbean, I don't see a military threat to the United States," SOUTHCOM's Gen. Douglas M. Fraser stated flatly this past February.

This is quite a contention, and surprising in some lights, as South America's militaries have quietly become some of the fastest modernizing militaries on the planet, according to trends of arms and aerospace equipment sales. Across Latin America, total military sales rose from $29 billion to $39.6 billion between 2003 and 2008, led by countries such as Brazil, Chile, Colombia, and Venezuela.

"So why do we need military engagement in Latin America, you might ask?" Fraser added.

SOUTHCOM's main efforts are described by a nebulous phrase that has come to define a range of military, civilian, and law enforcement operations in the region: counterillicit trafficking operations (CITs).

"Here's my real concern," said Fraser in February after noting the absence of traditional military threats in the region. "It's transnational criminals; it's illicit trafficking."

In his various briefings and public statements over the past year, Fraser often has on hand a litany of indicators and metrics to point out the progress Latin and South America have made in regard to economic growth and alleviating poverty. Countries such as Brazil, Chile, and Panama have made great strides in helping to close the income inequality gap in their countries as they grow economically.

No Respect

He caveats these developments, however, by noting a third of the region still lives below poverty level, on less than $2 a day, with 13 percent living on a dollar a day. "That has significant social impacts," Fraser said. As a result, violence and corruption are "endemic" through different parts of Southern Command's area of responsibility, reflecting on people's individual security and their opportunities.

While the security situation within Mexico has received the lion's share of American media attention recently, the trafficking routes for drugs into the US run through Fraser's AOR, making transnational criminal organizations (TCOs) a "continuing challenge to regional and hemispheric security" as they engage in the movement of drugs, arms, money, and people through the porous borders of the region.

"They don't respect national sovereignty, laws, governments, or human life," Fraser said in a March briefing at the Pentagon. He highlighted the "northern triangle" of Central America —Guatemala, El Salvador, and Honduras—as an area of great concern, as it has seen growing levels of violence and become "probably the deadliest zone in the world outside of war zones—active war zones in Iraq and Afghanistan and others around the world."

The description is surprising to some, but is borne out by the facts. In 2010, the United Nations reported 14 violent deaths per 100,000 in Iraq, while in Honduras the same year it was 77 per 100,000 and 71 per 100,000 in El Salvador. The murder rates are a direct result of criminal activity, a collision of the massive monetary resources of cartels and the modestly equipped governments in the region.

According to SOUTHCOM estimates, transnational criminal organizations bring in between $300 billion to $400 billion a year, from activities spanning the globe. "That's a significant number when you put it against the capacities of the governments that we're talking about," Fraser added.

Drug traffic from South America is an old problem, but movement patterns have shifted significantly, especially since the implementation of "Plan

An E-3 AWACS searches for drug runners over the eastern Pacific Ocean. In the past, the US has staged AWACS missions from Manta Air Base in Ecuador, but that nation recently ended the relationship.

USAF photo by TSgt. Cecilio Ricardo

Colombia," the ramp-up of US aid to the Colombian government dating back to 2000.

While the vast majority of cocaine originates from Colombia, "what has changed in the last 10 years is the direct route has largely been interrupted," said Robert Knotts, SOUTHCOM's chief of counterillicit trafficking operations. The retired Army lieutenant colonel oversees all CIT operations throughout SOUTHCOM, in coordination with Joint Interagency Task Force-South (a counterillicit trafficking subordinate command, headquartered in Key West, Fla.), and tracks detection and monitoring activities across the theater.

Colombia's institutions, such as its counternarcotics law enforcement and its military, have grown much stronger and more capable in the past decade, so as a result, illicit traffickers have had to push to the east, into spaces such as Venezuela's Apure region, where more than 90 percent of air smuggling flights originate, Knotts noted. Small loads move short distances, whether by air, sea, or even miniature submersible to get to the Central American land bridge.

This is a relatively recent trend in drug trafficking, SOUTHCOM officials have noted. The shift to land took place because a Colombian "air bridge denial" program has heavily curtailed criminal air traffic (with US assistance).

"Nearly all cocaine destined for the US crosses the Guatemala-Mexico border," command officials note. The expansion of Mexican cartels in Central America has fed violence and instability, and the command is pushing forward with a number of cooperative activities between US Northern Command (which includes Mexico in its AOR), partner civilian agencies, and affected countries. Focusing specifically on the vulnerable Mexico-Guatemala-Belize region, SOUTHCOM is moving to develop a "regional operations capability" among these three countries, according to its most recent posture statement.

What exactly this entails is tricky, however. More than capability, what's needed to more effectively combat the rise in violence and instability wrought by illicit trafficking is effective communication and intelligence sharing, SOUTHCOM officials contend. Also, US forces under SOUTHCOM only have a piece of the solution, as under US Code, military forces can only monitor and track suspected criminal traffickers, with US law enforcement agencies leading interdiction efforts in international waters. Even in countries where US forces are carrying out interdiction missions, the host governments are responsible for decisions to interdict suspected illicit traffickers within their borders, waters, and airspace.

ITAR-TASS photo by Lev Fedoseyev

A Russian-made Su-30 of the Venezuelan Air Force over the southern Caribbean during joint exercises there between Venezuela and Russia in 2008. Venezuela is heavily investing in military aircraft modernization.

Critical Information Sharing

"In many instances, the end games are conducted through the partner forces," said Juan Hurtado, the SOUTHCOM science advisor and a retired Air Force lieutenant colonel, who leads commandwide efforts to develop science and technology tools and rapidly field them. Even for relatively simple equipment such as sensors, radar, and aircraft, he said, detection and monitoring is expensive for many nations in the SOUTHCOM region.

"The commander has tried to push efforts to fuse information, ... fuse it in a way that is less expensive," Hurtado said. "We can develop an operational picture [and] you could have the information available to all stakeholders."

Senior SOUTHCOM planners and intelligence officials say the countries affected are making an effort to close this gap, and to do it without spending a lot of money. Doug Sellers, SOUTHCOM's chief of strategic initiatives, said the Panamanian government has recently opened a coordination center, and the US is working on the development of an unclassified-information sharing network, which originates from the command's south Florida headquarters and ties in the sensors, radars, and intelligence networks of America's partners in the region. It would form a collection pool for maritime, air, and land countercriminal trafficking activities. Several countries in the region have expressed interest in joining the network, Sellers added.

In addition, SOUTHCOM and its partners must also maintain constant communication with US Northern Command, as it is the primary liaison with the Mexican government, and spends a great deal of effort on CIT activities.

Marine Col. Pete Baumgarten, NORTHCOM's liaison officer at SOUTHCOM headquarters, completed a workshop with several countries in the region and Mexican officials in March. The problem along the southern Mexican border with Central America is that "you have so many smaller countries that the movement of these [illicit trafficking] organizations is so quick, it is very difficult for them to act in time," he said.

Better information sharing—between the US, its allies in Central America, and the Mexican government—is critical to any future success. Resources are also an issue, and countries such as Belize and Guatemala are seeking additional means to improve ground and air mobility. Some countries have asset-forfeiture laws, Knotts points out, which allows them to take confiscated aircraft and equip them with inexpensive sensors.

Despite longstanding military-to-military engagement with many countries in the AOR, a gap in the partnership activities persists, Fraser said. "We have a very good system that supports our ability to

work with peers or near-peer partners in capability; we understand how to do that," he noted. The US participates with a wide range of exchanges and exercises with modernized militaries such as Chile and Colombia, but they are not the areas facing the most significant threats from criminal trafficking and violence.

Countries such as Guatemala and Honduras are not near-peers, and have significantly less capability than the United States, with small fleets of aircraft and limited resources to confront these threats.

The US needs high-reliability, low-cost systems to assist these places, Fraser said of countries such as Guatemala and Honduras. Light airlift and light ISR platforms would make a huge difference in Central America, and there are opportunities to expand US and allied partnerships with platforms such as the MC-12 surveillance aircraft, now in high demand in Afghanistan. "We've got to figure out how to do that ... and bring that [aircraft] into the region," he added.

The US military footprint in the region is a sticky issue, as evidenced by the Ecuadorean government recently ending the US presence at Manta Air Base, where E-3 AWACS often staged monitoring flights.

A 2009 accord with the Colombian government for the US to have access to several of its military bases for the purpose of CIT activity (partially to make up for the loss of Manta) was scuttled by the country's constitutional court last year, which said any international treaties had to be approved by the Colombian congress.

For now, SOUTHCOM uses two "cooperative security locations," one at Comalapa, El Salvador, and another on Aruba, where it stages detection and monitoring activities with partner nations. A redrafted version of the base access agreement with Colombia is anticipated.

Despite the legal setback, the US and Colombia maintain a close relationship, Knotts notes, and the Colombians themselves are taking a larger role in the training and advising mission in the region (the US has supplied more than $7 billion in aid since 2000). Years of expertise in counterillicit trafficking and counterguerilla operations against the FARC (Revolutionary Armed Forces of Colombia) have made the country's security forces the go-to experts in the region.

Colombians regularly conduct training of Mexican helicopter pilots, host members of the Panamanian military in their schools, and carry out other regional activities. "We are very ... pleased" they are taking on a larger role, Knotts said. "We have partnered for 14 years [on Plan Colombia] and at this point, they are able to export their training capability and ... operational expertise," he added.

Natural Disasters

SOUTHCOM also watches with a wary eye Colombia's immediate neighbor, Venezuela, and while Fraser often downplays the bellicose rhetoric of the Hugo Chavez government, senior intelligence officials at the command monitor the country's modernization activities and its ties to groups such as the FARC.

Though South America's arms spending has jumped, many of the governments have gone years without modernization. Those with improved economies are now investing in their defense, one senior official noted.

Venezuela, on the other hand, "is going above and beyond what is needed," with approximately $9 billion in acquisitions over the last five years. Acquisitions include T-72 and T-90 tanks, transport and attack helicopters, thousands of AK-103 small arms, and 24 Su-30MK2V fighters.

Still, a SOUTHCOM intelligence official added, the consensus is Venezuela is not a regional threat, as many of these acquisitions are spaced out over years and the ability of the nation to sustain this equipment over the long term is questionable.

More of a concern is the Venezuelan government's closeness with the FARC and their associated criminal trafficking activities. "The majority [of cocaine] goes through Venezuela," said the intelligence official at SOUTHCOM. "Clearly that amount cannot go through without someone in the Venezuelan government being aware."

A good deal of information about the ties between the Venezuelan government and FARC has come to light following the Colombian military's raid on the camp of FARC senior leader Raul Reyes in 2008, just inside the border of Ecuador (resulting in his death and the confiscation of documents and computer equipment by the Colombian military). Since then, the Chavez government has publicly acted several times against certain FARC figures, extraditing some to Colombia. "We are seeing a little bit of change on that level as far as what he is willing to do," the SOUTHCOM official noted.

The multilateral, pan-institutional mission of SOUTHCOM is gaining visibility as the US is investing heavily in efforts in the region. Much of this visibility comes through emergency humanitarian efforts.

Fraser, currently the sole airman serving as a geographic combatant commander, helped lead DOD's response to one of the most significant humanitarian operations in recent memory: the relief effort in the wake of the January 2010 Haitian earthquake, Operation Unified Response.

He helped direct a massive US and allied military mobilization of some 22,000 troops, more than 30 ships, and 300 aircraft, providing emergency assistance and delivering millions of pounds of food and water following the 7.0 magnitude earthquake that devastated the Caribbean nation. The operation also saw the first use of the MQ-1 Predator remotely piloted vehicle in support of disaster relief operations, a capability that greatly aided efforts to gather real-time reconnaissance about the devastated country.

The command incorporated lessons from the operation later on, in other relief efforts such as Chile's February 2010 earthquake and the June 2010 Guatemala storm and flood relief operations, working with the host nations and US civilian agencies such as the US Agency for International Development.

"The region is prone to natural disasters, … and our ability to respond quickly and effectively remains a real time issue," Fraser said, noting such operations will be an "ongoing requirement" for the region.

Effective communication with Central and South America is crucial for SOUTHCOM, whether for disaster relief or to combat shadowy criminal organizations.

Therefore, in December, Fraser presided over the opening of a new $402 million headquarters building for the command in Doral, Fla., part of greater Miami. The facility includes expanded conference rooms, training facilities, and a Conference Center of the Americas which gives users the ability to translate meetings into multiple languages and conduct video teleconferences. ■

Air Force Space Command's Gen. William Shelton feels USAF is making solid progress toward effectively developing and fielding critical on-orbit capabilities.

Getting a Grip on Space

By Robert S. Dudney

Gen. William L. Shelton, the new leader of Air Force Space Command, once famously remarked USAF's space programs had become "the poster child" for "late and expensive" US defense projects.

Shelton did not then—and does not now—think the label is justified. "It's not fair that we get painted with the same broad brush—[as if] all space programs are over cost and well beyond schedule," he says. "There are challenges in the acquisition community across the board. Pick a domain. Pick a platform."

Even so, Shelton would be the last to deny that some space programs face serious problems. In a recent interview, he voiced concern about high-cost rockets and satellites, as well as cracks in the space industrial base.

It is a matter of record that significant turbulence in US space programs in the past decade or so generated cost increases and schedule delays of an often spectacular nature.

Shelton emphasizes, however, that USAF's critics should pay attention to an often overlooked fact: The Air Force acknowledged these problems in the space enterprise years ago, and ever since has been taking steps to get on top of them.

"I think we've made a reasonable start," said the general. "There has been broad recognition for the past several years that this is a problem ... controlling the cost of space programs." He argues USAF's unheralded actions have led to

United Launch Alliance photo

A United Launch Alliance rocket boosts the Advanced Extremely High Frequency satellite into orbit. ULA boosters have chalked up an outstanding launch record.

improvements. "We are starting to see them pay off," Shelton says. "No one can predict the future, [but] I would like to believe that we have turned the corner."

Among the prominent examples supporting Shelton's claim:

■ Recent launches of the first Advanced Extremely High Frequency jam-resistant communications satellite and the first Space Based Infrared System missile-warning satellite, two spacecraft that had become notorious for cost growth, busted schedules, and disappointment.

■ A string of 77 straight successful national security space launches, going back to 1999 with the Delta II and the Evolved Expendable Launch Vehicle (EELV) program's Delta IV and Atlas V rockets.

■ Development of the next generation GPS III positioning, navigation, and timing satellite, which Shelton calls the model program. Built to a strict and unwavering set of requirements, using mature technologies, GPS III is on schedule and on cost.

In USAF's drive to tame its space programs, the stakes are high. Space spending, totaling $8.8 billion, comprises 10 percent of USAF's budget and 21 percent of its investment accounts. The Air Force provides 80 percent of total DOD space funding and 90 percent of all DOD space personnel.

The Sweet Spot

In listening to Shelton talk about space systems, one gets a strong sense that booster rockets have become Worry One.

The problem is not the actual performance of USAF's space rockets. The boosters now provided by United Launch Alliance (a 2006 joint venture of Lockheed Martin and Boeing) have provided flawless launches for more than a decade and performed beyond all expectations.

The problem, rather, is budgetary. "I'll just be very frank with you; we are very concerned about the cost of space launch," says Shelton. Cost growth has been eye-watering. In a May 11 session of the Senate Armed Services Committee, Sen. Jeff Sessions (R-Ala.) pointed out that the new Fiscal 2012 budget contains $9.8 billion to build 23 new EELV boosters. A year earlier, he went on, the plan for the same period called for spending $6.4 billion on 26 boosters. "That's three less rockets, but $3.4 billion increase in cost," the senator said.

What is causing such cost growth?

"When we first started [the EELV program], back in the 1990s, we thought we were going to have a very robust US launch program," Shelton said. "We were going to have all of these satellites going up for commercial broadband capability, these commercial cell phones. You know, all kinds of designs.

"Those didn't come to fruition, but Boeing and Lockheed Martin ... both bought big quantities of piece parts—engines, booster components, all of those kinds of things. ... As we came into buys of blocks of boosters, we [USAF] got good deals, because they had bought economic-order quantities of these components."

For years, said Shelton, "we've been living off that," but the pool of relatively cheap components is drying up. "So now, we are getting into the real world of small numbers, manufacturers that have gone out of business, in some cases obsolescent technology."

Many second and third tier suppliers have disappeared. Those that are left have trouble finding parts. The common upper stage, the RL-10 engine, has in particular become very expensive; it is plagued by old technology and scarce components. Fabrication of small quantities of new parts carries a huge price tag.

"So, it's a matter of, 'What's the best approach to drive that cost down?' " says Shelton.

The Air Force essentially has two cost-cutting steps.

First, USAF conducted a "should-cost" review of boosters. It has looked at all of the individual components that drive cost in the program. The SCR came up with 84 recommendations. The Air Force is pursuing each one. Plans called for completing the scrub this summer, with the expectation of sizeable savings.

Second, said Shelton, the Air Force has proposed that Congress approve large booster orders so as to capture economies of scale. The plan calls for procuring eight boosters per year—five for the Defense Department (including the Air Force) and three for the National Reconnaissance Office.

"That gives the manufacturers some reliability on what we are going to purchase," said Shelton. "They can go out there on the contract with much more economic-order quantity buys for their components."

This is not blue-sky dreaming—the contractors themselves have affirmed the savings. "This was the result of a very detailed study," he says, and ULA officials were part of that study. "Eight is the sweet spot. ... If you can guarantee eight per year, you can certainly work that economic aspect, and they're not having to buy one booster at a time."

USAF photo by Duncan Wood

Gen. William Shelton, chief of AFSPC, believes USAF has "turned a corner" in controlling costs in space programs.

The Air Force plan is admittedly unorthodox. Congressional approval is key.

"They have to agree with our plan here, because, if they don't sign up to it, that's not a lot of help to ULA," says Shelton. "I see no pushback. ... Everything we've heard from congressional staff and members seems very favorable."

Shelton says the Air Force is moving toward use of another tried-and-true tool: competition. The service, for the first time in more than a decade, is seeking new launch players.

"We are actively promoting competition in the launch business," says Shelton. "We are looking at the criteria for new entrants to come into the business."

In this, potential launch providers face "a bit of a Catch-22," says Shelton. "We are reluctant to put a national security payload on somebody's booster until they've proven their reliability," he notes. "Yet it is very difficult, from an investment point of view, to prove reliability."

As a result, the Air Force has begun working with companies such as SpaceX, Orbital Sciences, and others, performing the Air Force's "due diligence" to help them become qualified.

"It may be five years," says Shelton, before the Air Force has satisfied itself and allows in a new player. SpaceX "will be very aggressive. They would prefer that I say, 'Yes, in a couple of years.' Whether or not they will pass through all of the gates ... that's the question."

Some see SpaceX's recently proposed Falcon 9 Heavy as a likely defense launch entrant for the near future, but Shelton is taking a wait-and-see attitude. The Falcon 9 Heavy has never flown, making it a "drawing board" rocket, he notes. "Twenty-seven engines going at the same time. Three booster cores strapped together. I mean, there's a lot of rocket science here."

Shelton said, "It's kind of self-evident that we want to see success before we are willing to bet an expensive national security payload."

The Air Force is proceeding slowly, mindful that, in today's relatively small launch market, new competitors could weaken the current provider, ULA. "We've talked a lot about kind of the Hippocratic Oath on this: 'First, do no harm,'" said Shelton. "But, at the same time, we're not crazy about a monopoly."

When it comes to development and production of modern satellites the problems are much the same, though their scope and magnitude have declined somewhat.

This modest improvement is no accident, in Shelton's view, but rather the result of get-well efforts launched in the wake of billion-dollar overruns and years-long delays in the fielding of satellites.

"I think that there was recognition several years ago that we needed to get, quote unquote, back to basics," says Shelton. "And we've done that. We've gone after a much more incremental approach to developing new space capabilities."

Still, Worries

In addition, Air Force Space Command officials took a new approach to adherence to stable operational requirements. "We've told ourselves that we will hold the line on requirements, that we won't allow incremental requirements growth to eat us alive and produce all of these engineering change proposals from contracts, [which] are very costly."

A prime example of lower-risk approach is the operational arrival of the new Wideband Global SATCOM system. The still-incomplete but expanding WGS constellation provides high-capacity military communications to forces around the world. Each WGS satellite delivers 10 times the capacity of each "ball" in the old Defense Satellite Communications System, which it will eventually replace. Three have been placed in orbit, and another five are in various stages of actual or planned production.

Also successful are the two SBIRS payloads placed in highly elliptical orbit aboard classified spacecraft. The general says Space Command has had "wonderful success" with those two sensors, which for several years have been gathering and dispatching valuable infrared data.

Then there is GPS III. This new satellite has been engineered to deliver better jam resistance, more power, a civil signal compatible with Europe's Galileo GPS-like system, and sharper accuracies. "As we look at GPS III," says Shelton, "we think that is going to be very production-oriented, unlike most satellites. ... The acquisition of that capability thus far has been very good."

Unfortunately, the same confidence does not hold for all Space Command satellite projects. One that continues to concern Shelton is the geosynchronous-orbit portion of SBIRS. In May, the Air Force successfully launched and raised to final orbit the first of these spacecraft, SBIRS GEO-1. That was an achievement, but no one is ready to declare victory.

"SBIRS I will continue to worry about," says Shelton, noting its troubled developmental past. "There's no reason to believe it won't perform as advertised, but I'm from Missouri. There's a long check-out period, and we'll make sure that satellite is the way it's supposed to be. That's just going to take some time."

Similar concerns extend to the AEHF system, which is to replace the Milstar secure communication constellation. The AEHF program began more than a decade ago; its first ball was launched last August, four years behind schedule. Even then, an onboard rocket malfunction prevented a swift rise to

geosynchronous orbit. It won't reach geosynchronous orbit until some time this fall, said Shelton, "so the jury is still out on Advanced EHF."

The GPS IIF also suffered an early glitch. The first satellite, launched last year, encountered interference problems as a result of the transmitter construction and antenna patterns, said Shelton. With the second satellite set for launch this summer, technicians worked to fix the system. "We think we've got it solved for the second one," said Shelton.

The Air Force's new Defense Weather Satellite System, or DWSS, "is still a work in progress," he said. "We hope to launch that in 2018, but we've got a lot of work to do to bring that capability together. ... We think we're going to make it, but it's going to be fairly tight, according to the timeline and the funding profile."

Shelton expresses a guarded optimism that several new acquisition approaches will help reduce cost and schedule woes. One is called Evolutionary Acquisition for Space Efficiency. EASE is based upon four principles: block buys, stable research and development investment, fixed-price contracting, and full funding through advance appropriations.

EASE will soon get a road test. Air Force Space Command has proposed block buys this year of the fifth and sixth satellites of the AEHF systems. It plans to do the same next year with the fifth and sixth models of the SBIRS GEO constellation.

"We fully intend to get fixed-price contracts on those and buy those two satellites in blocks, if the Congress gives us authority to do incremental funding on those."

In Shelton's view, fixed-price contracts are proper for satellite programs that have moved beyond development, as is the case with both AEHF and SBIRS. Congress seems to agree, but lawmakers had a different view about providing advanced funding to be spread over many years, as the Air Force requested.

"The original EASE concept has been modified," he said. "Congress was not comfortable with advance appropriations, which is where we were initially, but it looks like incremental funding will be there."

Better Contracts

By "incremental funding," Shelton means that Congress would approve a plan for the full amount, but would vote each year on the next increment of funding, a procedure Shelton said "would be adequate to the task."

EASE is not the only contracting step in the works. Shelton maintains that the Air Force needs to generally tighten up on its contracts with space contractors.

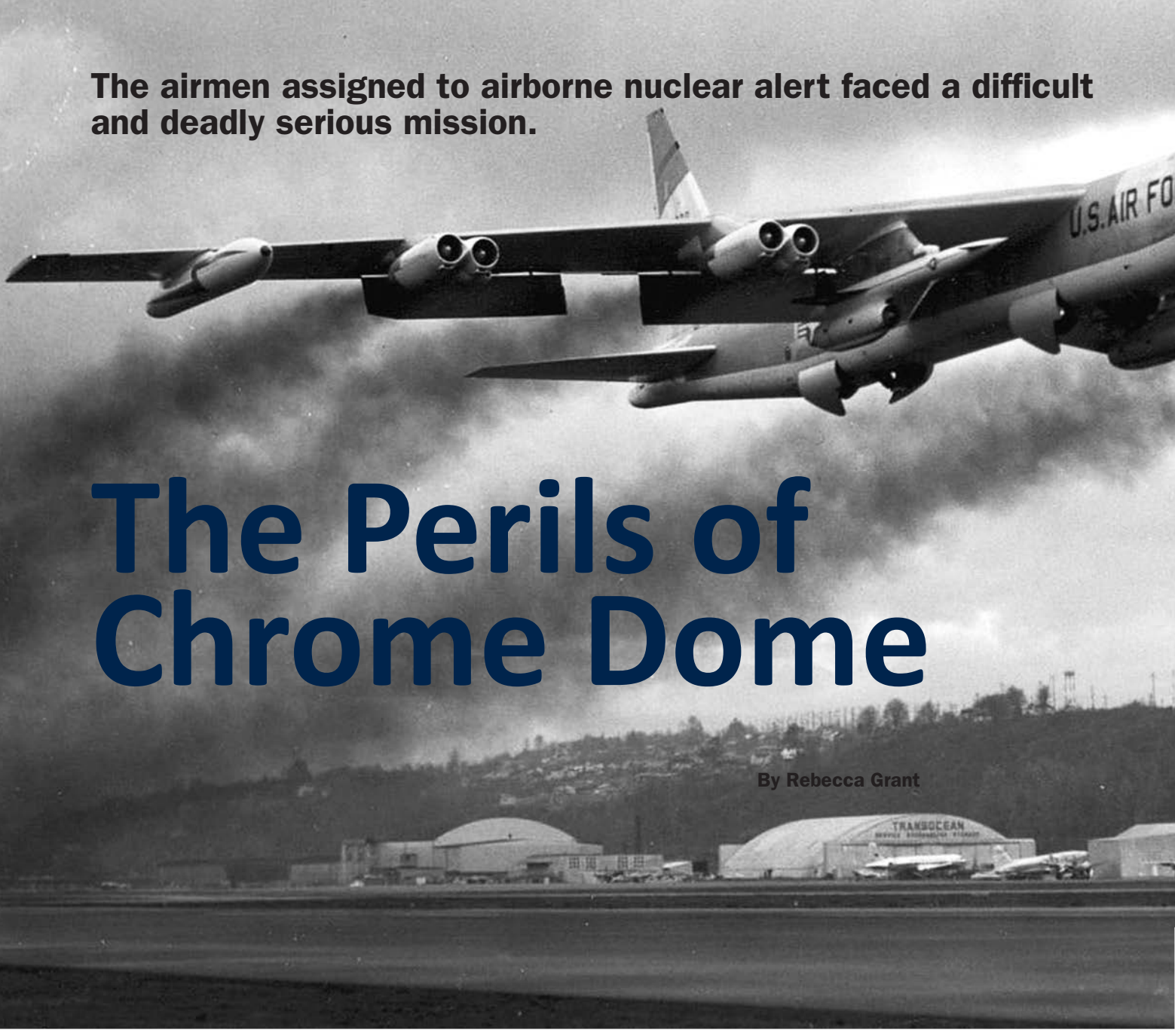
"We've just started to look at the kinds of contracts that we are going to write, with our providers, to get much more into a fixed-price sort of arrangement, instead of what has been, in the past, much more of a cost-sharing type of arrangement, in developing capability."

With all of the emphasis on cost containment and adherence to schedule, some worry that USAF space systems of the future may be pretty vanilla in nature. Shelton doesn't buy that argument.

"They will still be world-beating capabilities. It's all about how you bring capabilities together onto a particular satellite. You don't need to chase the state of the art." ■

Robert S. Dudney is a former editor in chief of Air Force *Magazine (2002-2010). His most recent piece was "Five Roads to Space Dominance" in the July issue.*

The airmen assigned to airborne nuclear alert faced a difficult and deadly serious mission.



The Perils of Chrome Dome

By Rebecca Grant

On Jan. 16, 1966, a B-52G—call sign Tea 16—departed Seymour Johnson AFB, N.C. The crew completed two refuelings and an orbit near Turkey. Refueling No. 3, on Jan. 17, was their last act.

For some reason, the bomber was a little too fast. The KC-135's boom struck the B-52's longeron, and the left wing of the bomber snapped off.

Four nuclear weapons were released. Three of the bombs fell with the B-52 wreckage near the village of Palomares on Spain's Mediterranean coast. The first was located near the beach. Another dug deep into a tomato field, while the third landed near a cemetery. The dirt dampened the plutonium, which escaped from the damaged bombs. USAF teams raced to dig the bombs out and haul away tons of radioactive dirt.

The fourth bomb, however, was missing. The US Navy sent more than 30 ships and the submersible vessel *Alvin* to scour the sea floor. Finally, 11 weeks after the accident, USS *Petrel* lifted the fourth Mk 28 aboard just before 8 a.m. on April 7.

The nuclear bomb looked to be in pretty good shape for having spent 80 days in salt water. The tail was slashed in two places. The bomb's nose had one large dent and four smaller ones. Luckily, the switch was still in the "safe" position.

Quickly crews on the deck of the recovery ship taped over the bomb's serial number and markings. Those had been orders directly from Secretary of Defense Robert S. McNamara. Then, Spanish officials inspected the bomb, while press photographers took pictures.

Above: A B-52 with AGM-28 missiles takes off. Right: Spanish officials, US Rear Adm. William Guest, commander of the US Naval Task Force, and USAF Maj. Gen. Delmar Wilson, 16th Air Force commander, examine the nuclear bomb recovered from the sea near Palomares, Spain.

There was just one problem that morning in April 1966. The warhead cover wouldn't budge. After a good pounding, the jammed warhead cover came open and the bomb was made safe for transport back to the US.

More than 1,600 USAF personnel worked on the Palomares cleanup. The Air Force tracked a group of individu-

als known as the "High 26," potentially exposed to more serious levels of plutonium. As late as 2001, the Air Force again reviewed contamination sampling records and concluded exposure had been minimal.

The Palomares incident was the denouement of Strategic Air Command's nightmare: a bomber down, with nuclear weapons aboard. All told, Air Force aircraft were involved in a total of 25 nuclear weapons accidents from Feb. 13, 1950, through Jan. 22, 1968. Some were alert missions, others training and ferry flights. But by far the most harrowing moments came from the activities of line B-52s flying airborne alert missions under the name Operation Chrome Dome.

24-Hour Missions

SAC Commander Gen. Thomas S. Power was the architect of Chrome Dome. In its main phase from 1961 to 1968, it was a daring assertion of airborne nuclear deterrence. Power was a bomber pilot who'd seen extensive combat in World War II beginning with missions from North Africa in B-24s, then B-29s in the Pacific. At SAC he was vice commander under Gen. Curtis E. LeMay then headed SAC himself from July 1957 to November 1964.

Power began regular airborne alerts in 1958. Fully armed bombers in the air could guarantee a second-strike response even if a Soviet first strike knocked out SAC airfields.

The B-52s on Chrome Dome missions flew two typical profiles. One stretched south across the Atlantic to a refueling over the Mediterranean Sea. The other was a northern route tracing a big box around Canada with a crucial late air refueling near Alaska.

By early 1961, more than 6,000 airborne alert missions had flown under a variety of code names. The missions were no secret. Power announced them publicly in January 1961 and pledged that some of SAC's fleet would be airborne at all times. Hence bombers on airborne alert became a staple of deterrence at the peak of the Cold War. At times, 12 armed bombers were aloft at any given moment.

Crews flew 24-hour missions for Operation Chrome Dome. One aircraft commander by the name of Maj. Adelbert Gionet claimed he never flew without a toothbrush, mouthwash, surgical needle, catgut, and a flask of whisky. "If I ever rip any of me, I want to be able to put myself together," he explained in a *Time* magazine interview.

Publicity for the Chrome Dome missions detailed how these B-52s carried nuclear weapons with all the codes and procedures for arming and releasing the bombs. They made quite an impression on Soviet Premier Nikita Khrushchev during the 1962 Cuban Missile Crisis when SAC surged as many as 75 airborne nuclear flights per day. "About 20 percent of all Strategic Air Command planes, carrying atomic and hydrogen bombs, were kept aloft around the clock," Khrushchev later wrote with due respect.

Airborne nuclear alert also bolstered the nuclear strategy of the Kennedy Administration. McNamara declared that both the US and the Soviet Union should have "the capability of surviving a first strike and retaliating selectively." This would provide a "more stable balance of terror," added McNamara.

As to safety, the SAC publicity machine chose its words carefully. "At worst, only the TNT in an unarmed H-bomb explodes on impact," recorded *Time* in 1961.

It wasn't quite that simple, however.

A string of accidents with nuclear weapons had already occurred in the 1950s. In the records, anything involving a nuclear weapon shape or bomb body, armed or not, was deemed a nuclear accident.

The first recorded USAF nuclear weapon accident occurred in February 1950.

SAC commander Gen. Thomas Power wears a hard hat for a visit to Vandenberg AFB, Calif. Chrome Dome was Power's brainchild.

A B-36 flying a simulated combat mission from Alaska to Texas lost three engines and developed icing at 12,000 feet. The crew jettisoned its weapon over the Pacific complete with a bright flash, bang, and shock wave on impact near Vancouver, Canada. Fortunately, they were carrying a dummy capsule filled only with high explosives.

Crashes and emergencies on B-29s, B-36s, B-47s, and B-50s took place across the nation from New Mexico to Ohio to California. They happened for all the usual reasons: Airplanes skidded on wet runways, flew into mountains, dropped out of the sky on a clear day from 7,000 feet, and caught fire during takeoff. One accident involved a B-29 with a propeller malfunction at Fairfield-Suisun Air Force Base in California in August 1950. Explosions and fire claimed the lives of 19 crew, including Brig. Gen. Robert F. Travis, and rescue personnel. The base was later renamed for Travis.

The early accidents rarely posed major problems. The weapons of the day required mating a capsule of nuclear material with the bomb body itself. Airplanes often carried both weapon and capsule but rarely joined them together. Such was the case in a 1957 incident where a B-36 was ferrying weapons from Biggs AFB, Tex., to Kirtland AFB, N.M. On approach, the weapon dropped and fell through the closed bomb bay doors from a height of 1,700 feet. The blast blew a crater 25 feet wide and 12 feet deep, but luck held.

Although the weapon and capsule were aboard, the capsule was not inserted due to safety concerns, a Pentagon report later noted.

Accidents happened outside the US, too. One of the most mysterious was the disappearance of a B-47 over the Mediterranean in March 1956. The bomber penetrated a cloud deck to hit a refueling point at 14,000 feet and was never seen again. No trace was ever found of the airplane or its crew. Two nuclear capsules vanished.

Although some airmen died, the Air Force made it through the first 10 incidents with no contamination from nuclear material. That changed in 1958.

Tensions with the Soviet Union after Sputnik increased the pace of operations. Bombers were busy adjusting their deterrence postures during a renewed Berlin crisis. Five accidents took place that year. The first incident at an overseas base was bad enough for SAC to tear out portions of an asphalt runway due to contamination.

Then in February, a B-47 jettisoned a nuclear weapon in Georgia's Wassaw Sound. Divers searched for two months but came up empty-handed. The weapon has never been found.

In March 1958, a B-47 crew accidentally released an unarmed bomb about six miles from Florence, S.C.

Early Accident

Early in November 1958, a B-47 crashed on takeoff from Dyess AFB, Tex., leaving a crater 35 feet wide.

Less than three weeks later, on Nov. 26, a ground fire in a B-47 at Chennault Air Force Base in Louisiana consumed one more nuclear weapon. Contamination was limited to the immediate vicinity of the weapon residue within the aircraft wreckage, however.

These early incidents had their share of drama, but they would soon be upstaged by five memorable incidents with B-52s under the Chrome Dome missions.

Crash No. 1 took place within a week of Power's announcement of Operation Chrome Dome in January 1961. Structural failure of the right wing caused an aircraft to break up below 10,000 feet. One bomb parachuted safely to earth. The other shattered on impact, with one piece containing uranium falling into soggy farmland and disappearing. After weeks of digging, the Air Force gave up and paid for an easement on the land to block anyone else from excavating there.

The B-52's structure was beefed up following the incident.

Crash No. 2 happened in March 1961, caused by a string of errors beginning with a failure of cabin pressure. The B-52 descended to 10,000 feet, but suddenly the crew found they'd burned too much fuel to make it to their tanker, and had to bail out near Yuba City, Calif. Two nuclear weapons broke loose on impact. Neither exploded.

For the next three years, SAC maintained the Chrome Dome missions without incident. Then came the night when Maj. Thomas W. McCormick and his crew of four took off from Westover Air Force Base in Massachusetts on Jan. 13, 1964, for a night flight home to Turner AFB, Ga. Only McCormick and his co-pilot, Capt. Parker C. Peedin, would survive.

A winter blizzard roaring across the Appalachian Mountains hit the B-52D near Grantsville, Md., in wooded mountains dotted with farms. McCormick and Peedin got clearance to climb from 29,500 to 33,000 feet in search of smoother air. It was too late. The turbulence sheared off the tail and damaged the left horizontal stabilizer. The BUFF rolled on its back and McCormick ordered the crew to bail out. Four did, but the bombardier was unable to and died in the airplane. Two nuclear bombs "remained in the aircraft until it crashed and were relatively intact in the approximate center of the wreckage," noted the official Pentagon report.

The bombs and surviving crew were now stuck in remote mountains with at least 14 inches of fresh snow.

On the ground, McCormick holed up near a tree during the frigid, snowy night. Peedin landed in a tree some distance away from McCormick and was eventually found by the Civil Air Patrol. The gunner, Sgt. Mel Wooten, was injured in the ejection and died that night. Navigator Maj. Robert L. Payne was injured and attempted to walk to safety but perished when he slid into a partially frozen stream.

Volunteers, 500 soldiers from Fort Meade, Md., and marines from Quantico,

Photo by Bruce Aro

A Chrome Dome KC-135 on the ramp at Moron AB, Spain. In 1966, a KC-135's refueling boom hit the longeron of a nuke-carrying B-52, causing its wing to fall off—one of the most dangerous accidents to occur during Operation Chrome Dome.

Va., converged on western Maryland to search for the wreckage and its payload. Eventually, a local quarry operator lifted out the weapons.

The next crash was the infamous incident at Palomares. By the time of the Palomares incident, Chrome Dome was scaled back to four airborne alert aircraft. Larger Minuteman arsenals and better early warning changed the surprise attack calculus. However, airborne alerts continued—as did the risks.

A final accident in January 1968 ended the Chrome Dome missions altogether. "A recovery team is searching for wreckage from an American Air Force B-52 bomber, armed with four hydrogen bombs, which crashed into the sea near the Arctic air base of Thule in Greenland," reported the BBC.

That B-52 crew was Hobo 28. They'd taken off on Jan. 21, 1968, flying with an extra pilot aboard for a 24-hour airborne alert mission.

Thule was home to a special radar, key to the Ballistic Missile Early Warning System (BMEWS). The radar and its command and control link were also thought to be at the top of the Soviet Union's target list if war started.

Hobo 28 was an experienced crew that made one small mistake: Extra seat cushions were brought aboard for the flight and placed too close to a heat source. Hours into the flight, something started to smoke. Soon the crew had expended all their onboard fire extinguishers. As the cabin filled with smoke, they bailed out over the ice.

Greenlander dogsled teams set out immediately to help search for the downed aircrew. Six out of seven crew members survived after spending hours on the subzero ice. One crewman had been fatally injured on ejection.

Dogsled teams led survey work for the first several days until it was determined the sea ice was thick enough to support vehicles. The Thule crash—with bombs loose on Greenland territory—was a diplomatic nightmare. Greenland belonged to Denmark, and Denmark had a nuclear-free policy. A week after the crash, investigations determined that all four bombs had disintegrated into the ice.

Conditions Perilous

Of course, that meant the nuclear material was dispersed, too. The B-52 and its four nuclear weapons dug a long, charred scar into the ice. The four bombs held more than 13 pounds of plutonium. About half spilled onto the blackened streak, which also had tritium contamination and perhaps half a pound of the plutonium lodged in the ice. The remainder saturated the wreckage itself.

A team of US and Danish officials concluded the radioactivity spread was "not a hazard to people or biological species."

Still, the US agreed to remove all the radioactive ice. So began Crested Ice. It would ultimately involve 700 people from 70 different agencies.

Conditions were perilous. Temperatures averaged minus 25 degrees Fahrenheit and even slight winds plunged the wind chill to minus 50. The sun did not rise over the crash area until February, but that caused its own problem: snow glare.

Four months after the crash, a total of 237,000 cubic feet of radioactive snow, ice, and water—not to mention the crash debris—had been loaded and moved to a storage site back in the United States. Cleanup work continued through the summer. The last of 600 containers of contaminated material departed on a US Navy ship on Sept. 13, 1968. Along the way, extensive ecological surveys probed the impact on the birds, mammals, and marine life in the area, fortunately finding no significant impact.

Operation Chrome Dome itself was long since over. It had ended almost eight months earlier, on Jan. 22, 1968—the morning after Hobo 28 went down.

"Great technological accomplishment imposes great responsibility," wrote retired USAF Maj. Gen. Richard O. Hunziker, who'd been in charge of the crash scene at Thule.

Bombers remained a vital leg of the nuclear deterrence triad, but the days of airborne nuclear alert were over. From January 1968 on, bombers pulled alert on the ground. ■

Rebecca Grant is president of IRIS Independent Research. She has written extensively on airpower and serves as director, Mitchell Institute, for AFA. Her most recent article for Air Force *Magazine, "Crunch Time for the Industrial Base," appeared in June.*

North Vietnam's Thanh Hoa Bridge was a critical but seemingly invincible target. It took years of bravery, innovation, and technological advances to finally take it out.

Breaking the Dragon's Jaw

By Walter J. Boyne

USAF F-105s, directed by an F-100, on a mission to bomb military targets in North Vietnam.

Some World War II targets—the refineries of Ploesti in Romania, the V-2 infrastructure at Peenemunde in Germany, the Japanese naval base at Truk—were so obviously important they immediately commanded the attention of both attackers and defenders.

Such was the case with the Thanh Hoa Bridge in North Vietnam, during the Vietnam War.

Supplies flowed in a torrent through this rugged span, from North Vietnamese ports and factories to the Ho Chi Minh Trail and on to South Vietnam. The Americans tried to use the irresistible force of their weaponry to destroy this vital conduit and bottleneck.

The North Vietnamese strove to make the bridge an immovable object with an incredibly powerful integrated defense system. The defenders succeeded in keeping the bridge in service for seven long, casualty filled years.

Officially called the Thanh Hoa Railroad and Highway Bridge, it was nicknamed the Ham Rong (Dragon's Jaw) because of its layout.

Two concrete abutments were each sited on slight elevations in the generally flat plain. The bridge was supported in the center with a massive concrete pier. To the North Vietnamese, the layout of the bridge looked like a gaping dragon's mouth.

Located just three miles northeast of Thanh Hoa, the capital of Annam province, the bridge had a special place in the minds of the North Vietnamese. In 1945, during their war against the French, the rebel Viet Minh forces destroyed the original structure by exploding two ammunition-filled railroad trains on it.

Reconstruction began in 1957, and Ho Chi Minh attended the opening ceremony in 1964. A conventional steel through-truss structure, the new bridge was 540 feet long, 56 feet wide, and ran due west about 50 feet above the surface of the river Song Ma.

A single one-meter gauge railroad track passed down the center of the bridge, while roadways permitting foot and truck traffic were cantilevered on either side of the structure. The North Vietnamese knew it was vitally important and ultimately placed five air defense regiments nearby to defend it. A few elderly MiG fighters were stationed in proximity as well, and they proved surprisingly capable.

In 1965, the United States began a two-day assault on the bridge. US planners underestimated the Dragon's Jaw's strength and defenses and overestimated the capability of their own ordnance.

Lt. Col. Robinson Risner, an eight-victory ace in the Korean War, was commander of the "Fighting Cocks," the 67th Tactical Fighter Squadron, flying out of Korat RTAB, Thailand. On April 3, his strike package consisted of 46 Republic F-105 Thunderchiefs, well supported by 21 North American F-100s, two McDonnell RF-101s, and 10 tankers. The entire North Vietnamese fighter strength at this time was 56 aircraft.

The F-105, designed as a supersonic long-range tactical nuclear bomber, on this mission carried two types of ordnance. Sixteen carried two AGM-12

Bullpup missiles each, while 30 carried 750-pound bombs.

Mounted externally, the bombs degraded the Thud's speed and agility. The rocket-powered Bullpup, an early precision guided missile, had a 250-pound warhead. The pilot tracked a flare in the back of the missile, using radio signals to steer it. The Bullpups were fired one at a time, requiring two passes at the target.

The precisely coordinated attack began at 2 p.m. on April 3, with Risner in the first airplane. The 32 Bullpups, released at about 12,000 feet, proved difficult to guide, and those that did hit the target did not do significant damage. The effect of the 120 conventional bombs that struck the bridge was also negligible.

An F-100 and an RF-101 were lost, and Risner's airplane was severely damaged, forcing him to land at Da Nang. A second assault was ordered for the following day.

This time 48 F-105s, accompanied by 21 F-100s, dropped their 750-pound bombs. Three hundred bombs struck the bridge, damaging it severely, but not knocking it down.

A surprise came from the success of the North Vietnamese MiG-17s, which scored their first kills of the war. In a well-planned counterattack, they shot down two F-105s. Air Force Chief of Staff, Gen. Joseph P. McConnell was furious that two of the elderly MiG-17s could shoot down the F-105s, and launched an inquiry.

The debacle led to a change in fighter tactics, training, and procurement, but another 334 "Thuds" would be lost in combat before the war's end.

Risner himself was shot down twice in F-105s over North Vietnam. The first time, in April 1965, he was rescued. The second time, in September 1965, he was shot down in an area near the Than Hoa Bridge, where he was captured and imprisoned by the North Vietnamese until 1973.

The American attacks against a variety of North Vietnamese bridges continued, and 25 of them were destroyed by the end of May 1965.

But the Thanh Hoa Bridge remained standing despite return attacks. The 750-pound bombs were simply inadequate to down the structure, and the North Vietnamese became expert in making emergency repairs.

The bridge was removed from the USAF target list when the "Route Package" system was initiated in November 1965. In the new system, the US Navy took over the attacks, with virtually the same lack of results, for the next three years.

The reason for the ineffectiveness was simple: The bridge was overbuilt and the bombs were understrength. Only 11 miles from the South China Sea, the bridge was often protected by bad weather, giving the enemy time to rebuild and strengthen it, adding eight concrete piers. At the same time, massive quantities of air defense supplies flowed in and vigilantly protected the area.

The exact strength of the five air defense regiments varied over time and from place to place, but each one usually had about 1,000 personnel operating about 36 medium or heavy anti-aircraft artillery guns. When surface-to-air missile batteries were provided, for a considerable period they added extra AAA batteries. Five air defense regiments at the time could have included anything from 150 to 200 AAA batteries of varying caliber, able to put up a dense defense.

Indestructible?

The combination of rugged structure and a powerful integrated air defense made it obvious a new and far more powerful weapon was needed.

"The apparent invincibility of the bridge; its cost in men, aircraft, and ordnance; its potential strategic importance; its symbolic value to the North Vietnamese—all served as an incentive for US aviators to find different techniques to destroy it," according to USAF's monograph, "The Tale of Two Bridges and the Battle for the Skies Over North Vietnam."

The personnel of the Air Force Armament Laboratory at Eglin AFB, Fla., worked hard to develop a solution.

A new "mass-focus" weapon weighing about 5,000 pounds was produced. Shaped like a huge pancake, eight feet in diameter and about 30 inches thick, it was designed to focus the force of its explosion along its axis—in both directions. Much too large to be dropped by a fighter, and with unpredictable ballistic qualities, it was intended to be dropped by parachute into the Song Ma. Planning called for it to float down the river to the Dragon's Jaw. There the metal structure of the bridge would set off magnetic detonators and explode the bomb.

A task force was set up at Eglin's Tactical Air Warfare Center. Established in 1963, the TAWC was designed to develop instruments and tactics of armament, night operations, combat support, and command and control.

The task force opted to use the versatile Lockheed C-130 Hercules transport and two crews from the 61st Troop Carrier Squadron at Sewart AFB, Tenn.

There were two crews: one led by Maj. Richard T. Remers and the second by Maj. Thomas F. Case. An array of specialists and technicians were deployed to examine how to drop the weapon, what parachutes to use, and how to ensure the weapon would navigate the river, subject as it was to its depth and current.

After intense training, the C-130s and their crews arrived at Da Nang Air Base in South Vietnam on May 15, 1966. Ten of the large mass-focus weapons were available, enough for two missions in what would become known as Operation Carolina Moon.

The operation depended on careful planning, skilful flying, and brave crews. Remers' crew was slated to make the first drop, entering North Vietnam at night and maintaining an altitude of no more than 500 feet.

A flight of two McDonnell F-4 Phantoms was scheduled for a diversionary attack on a highway 10 miles north of the bridge, just before the C-130 would drop its weapons. A Douglas EB-66 Destroyer provided electronic countermeasures protection.

Both aircraft commanders were confident the Hercules was strong enough to make the mission, but each had different ideas on crew safety. Intelligence revealed the North Vietnamese had greatly increased their anti-aircraft artillery capability at the bridge with the addition of five new AAA sites.

Weighing this, Remers felt that if the C-130 were too badly damaged, he should climb to altitude and bail the crew out. He decided that his crew would wear parachutes rather than flak jackets.

Case felt differently, believing that at low altitudes, the crew would be better off wearing flak jackets.

In the end, these decisions mattered little.

Just after midnight on May 30, Remers took off from Da Nang, flying just 100 feet over the water of the South China Sea until hitting his entry point on the coast of North Vietnam. In less than an hour he was "feet dry," heading up the Song Ma, under the guidance of two navigators, Capt. Norman G. Clanton and 1st Lt. William R. Edmondson. Two release points had been preselected, one two miles from the bridge, and one a single mile away.

Remers climbed to 400 feet, flying at 150 mph. The approach was without incident and he elected to use the second drop point. Just before the drop, the enemy opened up with heavy automatic weapons and anti-aircraft guns. Five of the mass-focus weapons were dropped, and Remers picked up speed as he dove back

A C-130 such as this one, taking off from a dirt strip in South Vietnam, was lost with all crew members in an attempt to deliver "mass-focus" bombs against the formidable bridge.

toward a 100-foot altitude and reversed his route to exit for an uneventful flight back to Da Nang.

Reconnaissance flights the following morning showed that the bridge still stood, and there was no evidence of the bombs.

The second mission was laid on for 1 a.m. on May 31. Case asked that Edmondson join his crew for the mission, feeling that his experience from the first mission might be invaluable. The same precautionary measures—diversion attacks and electronic countermeasures support—were supplied.

Finally, Success

Case's C-130 departed Da Nang at 1 a.m. May 31 as planned, but nothing more was ever heard from it. One of the diversionary F-4 crews saw AAA fire and a big explosion near the bridge at about the scheduled drop time. The other F-4 was shot down, presumably killing 1st Lt. Ned R. Herrold and Lt. Col. Dayton W. Ragland, who had spent two years as a prisoner of war in Korea. It was Ragland's 98th mission in Vietnam, nearly time for him to return home.

The next morning's reconnaissance mission revealed no damage to the bridge or any evidence of survivors. An extensive search was conducted, but nothing that could be positively identified as belonging to either Case's C-130 or Ragland's F-4 was found. Much later, the interrogation of a captured North Vietnamese sailor revealed that while four of the five mines from Remers' mission had exploded, they had not damaged the bridge.

With this tragic finale, Operation Carolina Moon concluded and its remaining personnel returned to the United States. Their experiment had not been successful, and many years passed before the remains of several of the missing Carolina Moon crew members were recovered.

In 1986, the remains of Case, 1st Lt. Armon D. Shingledecker, 1st Lt. Harold J. Zook, and A1C Elroy E. Harworth were returned to the United States for burial with honors. In 1998, the remains of A1C Phillip J. Stickney were returned.

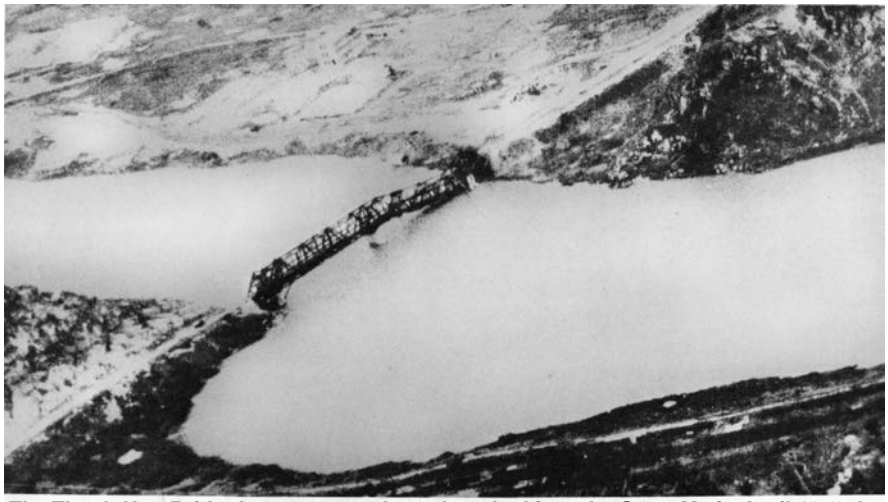
The other Carolina Moon C-130 crew members, Edmondson, Capt. Emmett R. McDonald, and SSgt. Bobby J. Alberton are still listed as missing in action, with a presumptive finding of death.

The two F-4 crew members shot down while flying the diversionary strike, Herrold and Ragland, are also listed as MIA, presumed dead.

Naval aircraft resumed the attacks and continued to go after the bridge until 1968, when the United States halted bombing strikes against North Vietnam. A wide range of aircraft launched different types of weapons—including the AGM-62 Walleye precision guided missile—with no significant effect.

But when Operation Linebacker commenced in 1972, both the Navy and Air Force were better equipped. Great progress had been made in the field of precision guided munitions, and these revolutionary weapons would ultimately bring down the Dragon's Jaw.

Air Force F-4 Phantoms from the 8th TFW used Paveway laser guided and TV guided bombs to attack the bridge on April 27, 1972. A section of the western end of the bridge was displaced and knocked into the Song Ma.



The Thanh Hoa Bridge's western end was knocked into the Song Ma in April 1972. In May, 2,000-pound and 3,000-pound laser guided bombs blasted it off an abutment.

A follow-up attack on May 13 saw 14 Phantoms dropping 2,000-pound and 3,000-pound LGBs. They knocked the Dragon's Jaw off an abutment and took the bridge out of action, although follow-on strikes were needed, as the North Vietnamese immediately went to work on repairing the bridge.

Final success occurred on Oct. 6, when four Vought A-7s from the carrier *America* attacked. Two were carrying the improved version of the Walleye, while two brought standard Mk 84 general-purpose bombs. They struck the center piling and broke the structure in half.

At long last, after seven years, 871 sorties, tremendous expenditure in lives, 11 lost aircraft, and a bewildering array of expended munitions, the Dragon's Jaw was finally broken. ■

Walter J. Boyne, former director of the National Air and Space Museum in Washington, D.C., is a retired Air Force colonel. He has written more than 600 articles about aviation topics and 40 books, the most recent of which is How the Helicopter Changed Modern Warfare. *His most recent article for* Air Force *Magazine, "The Influence of Airpower on the Marne," appeared in July.*

Verbatim

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By Robert S. Dudney

McCain on "Decisive" Airpower

"I've always been in favor of the use of additional airpower [in Libya]. The AC-130 gunships and the A-10 are unique assets the United States has. ... It's wide open spaces, and airpower can have a decisive role."***—Sen. John McCain (R-Ariz.), interview with the*** **Financial Times,** ***published July 5.***

No "Hollow Force"

"Even as the United States addresses fiscal challenges at home, there will be no hollow force on my watch. ... I do not believe in the false choice between fiscal discipline and a strong national defense."***—New Secretary of Defense Leon E. Panetta, e-mail message to US servicemen and -women, July 1.***

USAF and the Seven Dwarfs

"That first night, coalition airpower decimated the Libyan regime's ability to launch air attacks against its own population and stopped the armored columns advancing on Benghazi. By the end of March, our Air Force contributed over 65 percent of coalition sorties, providing more than 99 percent of all operational airlift, filling over 70 percent of the coalition's air-refueling requirements, and supplying 50 percent of the reconnaissance and 40 percent of the strike sorties."***—Gen. Norton A. Schwartz, USAF Chief of Staff, in statement, July 4.***

As He Has Before

"I advise you to withdraw, or everything you have will be destroyed. This people [can] convey the battle to the Mediterranean and can transmit it to Europe. ... Your homes, your offices, and your families can be legitimate military targets as you did make our offices and our houses and our children legitimate military targets."***—Col. Muammar Qaddafi, speech in Tripoli, Libya, July 1.***

Delayed Reaction

"The political penalties for cutting weapons systems and delaying reinvestment in equipment and infrastructure are close to zero for those in office today. But the penalty for being ill-prepared tomorrow ... can be measured in American lives lost. ... [Former Pentagon chief] Gates has said that he's already made the 'easy' cuts, yet there are serious questions whether some of them—such as reducing the number of F-22 fighters, Navy cruisers, missile-defense interceptors, and strategic delivery systems—leave America ill-prepared for a conventional conflict and erode the strong deterrent necessary to prevent it."***—Former Secretary of Defense Donald H. Rumsfeld,*** **Wall Street Journal,** ***July 1.***

Gates at the Bridge

"People in [the Pentagon] understand that we're going to have to make some contribution to getting the deficit down, but at the same time, the external factors that drive the size of our forces haven't changed at all. If anything, they are getting more worrisome."***—Then-Secretary of Defense Robert M. Gates, remarks in interview with Bloomberg News, June 29.***

Gates, a Second Opinion

"Bob Gates is likely to be remembered as the man who enabled the very thing he's warning against right now—namely, dramatic cuts in the modernization of our forces, the hollowing out of the United States military, and a weakening of the United States to project power and be a credible ally in an increasingly dangerous world. This is the irony of his now Hamlet-esque warnings. Much of this is a direct result of his own tenure."***—Frank Gaffney, Center for Security Policy, quoted in*** **Washington Times,** ***June 27.***

Come Home, America

"Over the last decade, we have spent a trillion dollars on war, at a time of rising debt and hard economic times. ... America, it is time to focus on nation-building here at home."***—President Obama, televised White House speech announcing the first troop withdrawals from Afghanistan, June 22.***

Airpower, and Only Airpower

"As globalization continues to give rise to more numerous and shared interests around the world—and as technology further enables ever-more-rapid rates of change—only airpower's ability to traverse vast distances with unmatched speed and unparalleled versatility can provide truly timely and high-confidence national responses."***—Gen. Norton A. Schwartz, USAF Chief of Staff, remarks to Global Air Chiefs Conference in Turkey, July 2.***

Our Man in Kabul

"President Karzai ... appears to be increasingly estranged not only from his NATO allies but also from reality. ... In a speech earlier this month, Karzai suggested to an audience of his countrymen that NATO forces were using nuclear weapons in Afghanistan. ... It will not be difficult to say goodbye to a man like this."***—Dexter Filkins, writing in*** **The New Yorker,** ***July 4.***

Smallness All Around

"If Americans were to hear Karzai's ingratitude as often as they were exposed to Anthony Weiner's private parts, US troops would be on their way out of Afghanistan next week."***—Leslie H. Gelb, president emeritus of the Council on Foreign Relations, in Daily Beast, June 20.***

John Wilkes Obama?

"The most protracted and least surreptitious assassination attempt in history."***—Columnist George F. Will's description of US intervention against Muammar Qaddafi in Libya, in the*** **Washington Post,** ***June 19.***

Cyber Life, Cyber Death

"Just as nuclear warfare was the strategic war of the industrial era, cyber warfare has become the strategic war of the information era, and this has become a form of battle that is massively destructive and concerns the life and death of nations."***—Senior Col. Ye Zheng and Zhao Baoxian, strategists in the Chinese People's Liberation Army's Academy of Military Sciences, as quoted in Reuters dispatch from Beijing, June 3.***

Entangling Alliance

"Ten years ago, US defense investment represented almost half of all defense expenditure in the whole alliance. Today it is 75 percent. ... The American people ask, and legitimately so, Why should we carry the heavy burden to ensure international peace and stability?"***—NATO Secretary General Anders Fogh Rasmussen, interview with*** **The Guardian,** ***June 16.***

2011-12 AFA

Schlitt

Faiferlick

The Air Force Association Nominating Committee met on May 6 and selected candidates to send forward for five national officer positions and three elective National Director positions on the Board of Directors. The committee comprises three most recent past Chairmen of the Board, one person selected by each of the two Vice Chairmen of the Board, two persons from each geographic area, and one person each from the Total Air Force, Air Force veterans, and aerospace industry constituencies. The slate will be presented to the delegates at the National Convention in Washington, D.C., in September.

Chairman of the Board

S. Sanford Schlitt, Sarasota, Fla., nominated for a second one-year term. Schlitt founded and led CyberPatriot, AFA's national high school cyber defense competition. He served for three years as Vice Chairman of the Board for Aerospace Education, chaired the Aerospace Education Council, and was a member of the Board's Executive Committee. Schlitt, a Life Member and Gold Wings Club and Thunderbird Society member, served as a Trustee for the former Aerospace Education Foundation and, after the merger with AFA, was on AFA's Board of Directors. He was a member of the afa21 Governance Team. He served on the AFA Constitution and Strategic Planning Committees, was Co-chair of the AFA-AEF Audit Committee, Chair of the AEF Audit Committee, and was on the AEF Nominating and Program Committees. Schlitt was commissioned in the Air National Guard, transferred to the Reserve, and served for 34 years, mainly in contracts management and acquisition. He retired as a brigadier general. He holds degrees from American University and also attended Squadron Officer School, Air Command and Staff College, Air War College, and the Leadership Institute at Eckerd College. He established or purchased and sold or successfully merged several businesses, also serving as Chairman of one firm and Board Member of a NASDAQ-listed company. Schlitt served on the staffs of Sen. Hubert H. Humphrey and Sen. Walter Mondale. He is Senior Managing Director of a mortgage investment trust with daily involvement in financial portfolio management.

Vice Chairman Field Operations

Justin M. Faiferlick, Fort Dodge, Iowa, nominated for a second one-year term. He is a Life Member and chartered the Fort Dodge Chapter and has served as Chapter President, VP, Secretary, and Treasurer and as a State VP and President. On the national level, Faiferlick was a National Director at Large; chaired the Membership Committee for two years; and served on the Transition Review Team, Nominating Committee, and Field Council and now chairs that council. Faiferlick was recognized as State and Region Member of the Year and has received the AFA Medal of Merit and Exceptional Service Award. In Iowa, he received the Governor's Volunteer Award and was one of the Top 40, under the age of 40, outstanding community leaders. Faiferlick received a bachelor's degree from Buena Vista University and a master's degree in management, with a concentration in organizational leadership, from American Military University. He started his military career as an enlisted member in the active duty Air Force. Now an officer in the Iowa Air National Guard, Faiferlick is the Director of Operations with the 133rd Test Squadron, with more than 20 years of total service.

Vice Chairman Aerospace Education

George K. Muellner, Huntington Beach, Ca., nominated for a second one-year term. He is a Life Member and has served as a National Director, member of the Compensation Committee, and on the Aerospace Education Council, leading development of the Aerospace Education Strategic Plan. He received the 1997 AFA Theodore von Karman Award. Muellner retired from Boeing in 2008 as President of Advanced Systems and had been VP-GM of Air Force Systems and President of Phantom Works. He served for 31 years in the Air Force, retiring as a lieutenant general, as Principal Deputy, Office of the Assistant Secretary of the Air Force for Acquisition. Key Air Force assignments included Program Executive Officer for the Joint Strike Fighter program and Deputy Chief of Staff for Requirements, Air Combat Command. Muellner flew combat missions in Vietnam and commanded the Joint STARS deployment during Desert

Nominees

Muellner

Garland

Vernamonti

Storm. He is past President of the American Institute of Aeronautics and Astronautics. He holds a bachelor's degree in engineering from the University of Illinois; master's degrees in engineering from the University of Southern California and from California State University; and an MBA from Auburn University. Muellner is an aerospace industry consultant.

National Secretary

Edward W. Garland, San Antonio, nominated for a first one-year term. A Life Member, he has been active in AFA since 1987 and has served as the Alamo Chapter President, Texas State President, Texoma Region President, and National Director. He has served on the Constitution, Membership, and Development Committees and on the Field Council. Garland now serves on the Aerospace Education Council. His awards include Member of the Year for the Alamo Chapter, both Civilian and Military Member of the Year for AFA Texas, the AFA Medal of Merit, Exceptional Service Award, and the Presidential Citation. Garland's military career included nearly 30 years of active duty and Reserve assignments as a pilot, flight instructor, operational staff member, and commander of the 433rd Airlift Wing. In his civilian career, he worked as an Air Force civilian employee in numerous engineering and senior management positions. He is currently a Senior Development and Cockpit Integration Engineer for a small business supporting the Air Force on several aircraft projects. Garland has a bachelor's degree in electrical engineering from Tulane University, a master's degree in systems management from St. Mary's University, and is a distinguished graduate from both ACSC and AWC.

National Treasurer

Leonard R. Vernamonti, Clinton, Miss., nominated for a second one-year term. An AFA member since 1964 and a Life Member since 1984, he has served as a Chapter, State, and Region President and was on the Board of Directors. He has been active at the national level since 1989, having served on the afa21 Field Structure Team, Field Council, and Constitution and Nominating Committees. He was Chairman of the Audit Committee and is currently Chairman of the Finance Committee. He has received the Exceptional Service Award and two Medals of Merit. Vernamonti's more than 40-year military and civilian professional careers have focused on management and finance. He was the Comptroller for all USAF ballistic missile programs and President, CEO, and CFO of a nonprofit with an operating budget twice that of AFA. He currently serves as a Senior Consultant to the aerospace industry, specializing in strategic planning, acquisition, and budget and cost analysis. Vernamonti has a bachelor's degree in economics from the Air Force Academy and a master's degree in systems engineering from the University of Florida. He is a graduate of the National War College and the Industrial College of the Armed Forces.

National Director East

Donald R. Michels, Lawrenceville, Ga., nominated for a three-year term. He was appointed to a one-year term as National Director, replacing Leonard Vernamonti, who became National Treasurer in 2010. Michels is Chairman of the Strategic Planning Committee and previously served as a member of the Field Council, 2009-2010. He is a Life Member, served as Southeast Region President for three years, and currently serves as Southeast Region Vice President for Leadership Development. Michels previously served as Georgia State Vice President and as Vice President for Programs for the Carl Vinson Memorial Chapter. Michels is a member of the Dobbins Chapter. He has received AFA's Exceptional Service Award and Medal of Merit and the Georgia State AFA Medal of Merit. He served for more than 40 years with the Air Force, retiring as a senior civilian executive in 2003 and as a senior officer in the Air Force Reserve in 2002. Following retirement from the Air Force, Michels worked as a Business Development Manager for a small business that supports DOD supply chain management activities, and as a consultant to aerospace defense companies. He has a bachelor's degree in management from Metropolitan State College, Denver, and a master's degree in logistics from Georgia State University.

The Nominating Committee submits four names—Rick Hartle, Donald Taylor, James Kurt Vogel, and Stephen Wood—for National Director at Large. Two will be elected.

National Director at Large

Rick Hartle, Layton, Utah, nominated for a first three-year term. An active member since 1998, he is a Life Member and was Chapter President when the Ute-Rocky Mountain Chapter was the Gross Award winner in 2003. He is Utah State Vice President and Utah Aerospace Education Foundation President. He served on the national-level Strategic Planning and Transition Constitution Committees. He has also chaired the AFA Focus on Defense committee. Hartle is a Senior Manager with a major aircraft manufacturer, responsible for growing its strategic systems business. He joined the company in 1980 after earning a bachelor's degree from New Mexico State University. He has continued education through leadership and executive development curricula. Hartle's community service activities include Past Chairman of the Top of Utah Military Affairs Committee, Vice Chairman of the Davis Area Convention and Visitors Bureau Board of Trustees, Board of Governors for the Davis Chamber, and Co-Chair of the St. Rose Capital Campaign. Hartle is an Air Force Memorial Foundation Charter Sponsor and a Wings Club and Thunderbird Society member.

Donald Taylor, San Antonio, nominated for a first three-year term. Taylor is President of an engineering firm in San Antonio, supporting Air Force engineering and logistics missions worldwide. He has served on AFA's Veterans/Retiree Council since 2007 as a Health Policy Advisor and serves as Chairman of the Greater San Antonio Chamber of Commerce's annual Celebrate America's Military week. A retired colonel, Taylor served in USAF's Medical Service for more than 27 years and retired as Vice Commander of Wilford Hall Medical Center. He has commanded military hospitals, including the Air Force trauma hospital in Balad, Iraq, in 2006. Taylor was Health Benefits and Policy Advisor to the Air Force Surgeon General and was instrumental in developing the Tricare for Life benefit with the retiree coalition and legislators. He has a bachelor's degree in architecture from the University of Texas, Arlington, and a master's degree in health policy from Penn State University.

James Kurt Vogel, Alexandria, Va., nominated for a first three-year term. He is the Director, J-5 International Affairs, National Guard Bureau, in Arlington, Va., where he develops, manages, and provides oversight for international activities for the National Guard. Vogel was previously the Deputy Director of Air, Space, and Information Operations for the Air National Guard at the National Guard Bureau. Vogel entered the Air Force through ROTC from the University of Cincinnati, where he earned a bachelor's degree in business administration in 1985. A veteran of Operations Just Cause, Desert Storm, and Deny Flight, Vogel logged 300 hours of combat and combat support time. He is a Command Pilot with more than 3,000 flying hours in KC-135 and C-40 aircraft.

Stephen G. Wood, Reston, Va., nominated for a first three year-term. Wood has been an AFA member for more than 30 years. He has served in many chapters and at the national level on committees to enhance membership and industry partnerships. Wood is Senior Vice President for Government Business for a major defense contractor. He joined the company in 2009. Before then, Wood served for more than 33 years in the Air Force, retiring as a lieutenant general, as Deputy Commander, US Forces Korea and 7th Air Force Commander, Republic of Korea. During his military career, he commanded units at many levels, including the Air Warfare Center and a numbered Air Force. He served twice as a USAF Legislative Liaison to Congress and was the Deputy Chief of Staff, Plans and Programs. During Operation Desert Storm, he flew 49 combat missions and later, during Operation Enduring Freedom, served as the Director of the Combined Air and Space Operations Center in Southwest Asia. Wood graduated from the University of Washington in 1974 and holds a master's degree in International Relations from New Mexico State University and a master's degree in International Security Policy from the National Defense University, Washington, D.C. ■

Michels

Hartle

Taylor

Vogel

Wood

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Cold War Sc

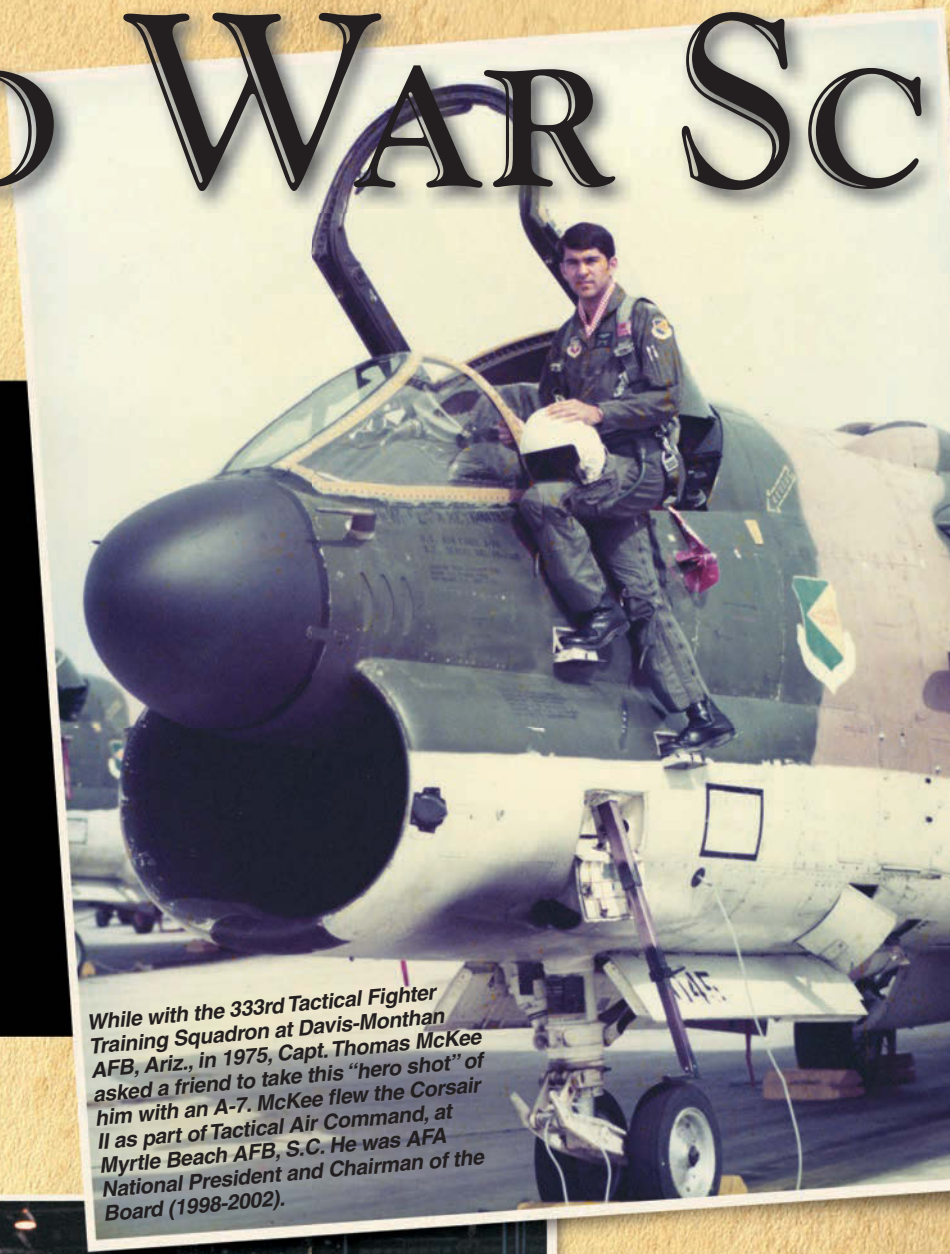
Compiled by Frances McKenney,
Assistant Managing Editor

The peace following World War II was short-lived. Soviet forces never went home, kept occupied areas under domination, and threatened free nations worldwide. By 1946, Winston Churchill had declared, "An iron curtain has descended across the continent."

Thus began a 45-year struggle between the diametrically opposed worldviews of the US and the Soviet Union. In 1948, the USSR cut off land access to free West Berlin, launching the first major "battle" of the Cold War: the Berlin Airlift.

Through decades of changes in strategy, tactics, locations, and technology, the Air Force was at the forefront. The Soviet Union was contained, and eventually, freedom won out.

Bentwaters. Bitburg. Clark. Loring. Soesterberg. Suwon. Wurtsmith—That so many Cold War bases are no longer USAF installations is a tribute to how the airmen there did their jobs.

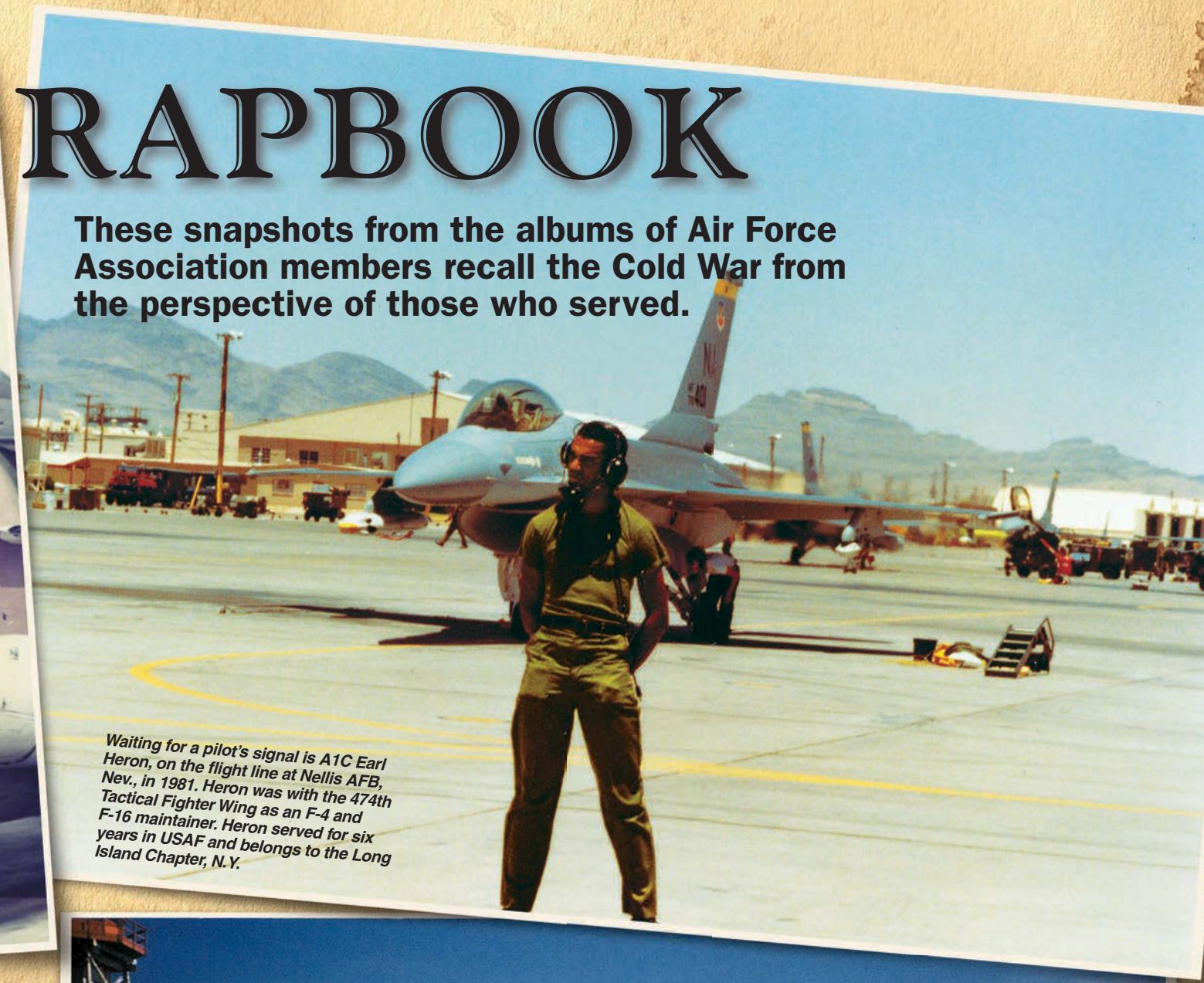


While with the 333rd Tactical Fighter Training Squadron at Davis-Monthan AFB, Ariz., in 1975, Capt. Thomas McKee asked a friend to take this "hero shot" of him with an A-7. McKee flew the Corsair II as part of Tactical Air Command, at Myrtle Beach AFB, S.C. He was AFA National President and Chairman of the Board (1998-2002).

Assigned to the 1st Strategic Reconnaissance Squadron, Beale AFB, Calif., RSO Maj. Thomas Veltri (right) and Maj. Duane Noll prepare for an SR-71 mission from RAF Mildenhall, UK, in the mid-1980s. Veltri's most memorable Blackbird sortie: "We lost an engine in the Baltic, north of Gotland Island, and ended up at 25,000 feet, with a dozen MiGs chasing us." Retired Lt. Col. Veltri is Government Relations VP for the Donald W. Steele Sr. Memorial Chapter, Va.

RAPBOOK

These snapshots from the albums of Air Force Association members recall the Cold War from the perspective of those who served.

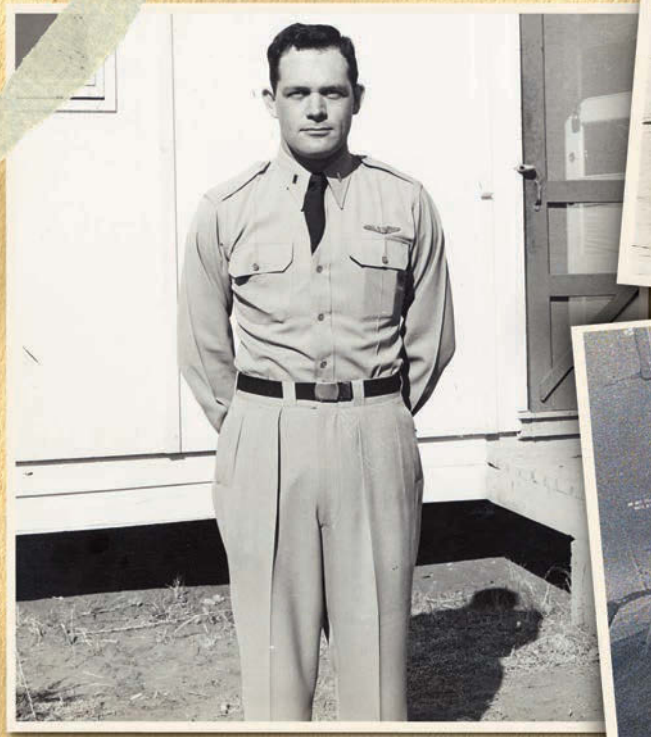


Waiting for a pilot's signal is A1C Earl Heron, on the flight line at Nellis AFB, Nev., in 1981. Heron was with the 474th Tactical Fighter Wing as an F-4 and F-16 maintainer. Heron served for six years in USAF and belongs to the Long Island Chapter, N.Y.

SSgt. Donald Goodwin shows off icons of an era: a B-47 and his brand-new VW in this 1956 photo at March AFB, Calif. He was with the 443rd Bomb Squadron as acting branch chief (with a flight line pass for the Bug). Eighty B-47s filled this flight line during the Cuban Missile Crisis, he recalls. Retired SMSgt. Goodwin belongs to the Palm Springs Chapter, Calif.

In this 1948 photo, 1st Lt. Gail Halvorsen shows how he drops candy attached to handkerchief parachutes to children on the ground in West Berlin. Halvorsen—who was nicknamed the Berlin Airlift "Candy Bomber"—sent this photo recently from Arizona, noting that the sacks shown at left held the official cargo in his C-54: coal. Retired Col. Halvorsen is a member of the Salt Lake City Chapter, Utah.

Sgt. August Manz (front row, third from left) was an electrical instructor for this B-50 training unit in 1949. Based at Chanute AFB, Ill., they traveled widely, instructing personnel in B-50 operations and maintenance. Mantz served 1947-1954 and belongs to the Shooting Star Chapter, N.J.



1st Lt. O. R. "Ollie" Crawford, instructor pilot, posed for this photo in Midland, Tex., about 1950. He was with an Air Force Reserve squadron. An AAF World War II fighter pilot, Crawford was in the Reserve until 1959. He joined AFA in 1946 and became its National President and Board Chairman (1990-1994).

James Jackson first served in the Merchant Marine. Next came hitches in the Marine Corps—this 1949 photo shows him working as an aviation ordnanceman on an F6F Hellcat—then he went on to an Air Force career (1955-1975). Retired MSgt. Jackson lives today near US Army Garrison Humphreys, South Korea.

Lt. Gen. Curtis LeMay, SAC commander, attends his daughter Jane's birthday party in 1951 at Offutt AFB, Neb. LeMay led Strategic Air Command from 1948 to 1957, building it into the premier Cold War bomber-missile force. Jane LeMay Lodge sent this photo, noting it was her 12th birthday. She is a member of the Orange County/Gen. Curtis E. LeMay Chapter, Calif.

Holiday greetings from Soesterberg AB, Netherlands: In 1954, 1st Lt. James Henry of the 512th Fighter Day Squadron sent this card to his parents back home in Nursery, Tex. His squadron mates had arranged the photo op and then designed this card. Those are F-86s flying past the windmill.

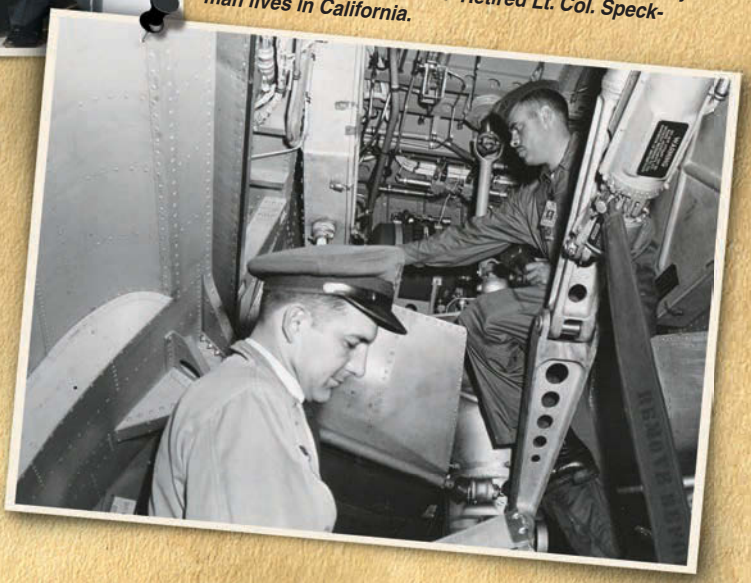
A2C David Cassidy found out in 1954 that the Air Force didn't always travel by air. When the 388th Fighter-Bomber Wing relocated from Clovis AFB, N.M., to Etain-Rouves AB, France, he crossed the Atlantic aboard the Navy transport General LeRoy Eltinge. Cassidy was an aircraft electrician. He is a member of the Savannah Chapter, Ga.

Wearing a cap in the squadron color of the 85th Bombardment Squadron, 47th Bombardment Wing, B-45 tail gunner E. Glenn Musser stands near the flight line, RAF Station Sculthorpe, UK, in 1955. He later flew in RB-66s at Shaw AFB, S.C. Musser belongs to the Blue Ridge Chapter, N.C.

M-1 at his side, helmet on his head, Air Force Academy cadet Norman Haller rides a bus to a field exercise at Lowry AFB, Colo., in 1956. Haller served until 1966 as an electronic engineer and navigator. He became a USAF civilian and later retired from the US Nuclear Regulatory Commission. He is VP of the Northern Shenandoah Valley Chapter, Va.

Just so they could take this photo, surgeon Capt. Lester Dragstedt Jr. (far left) asked this Royal Canadian Mounted Policeman to wear his full dress uniform when he came to the Goose Bay, Labrador, clinic for medical care in 1956. Dragstedt served in the Air Force 1955 to 1957. He is a member of the Gen. Charles A. Horner Chapter, Iowa.

In the wheel well, Capt. Roland Speckman (background) preflights a B-47E at Mountain Home AFB, Idaho, in the 1950s. He later transitioned to B-52s, flying SAC Chrome Dome missions from Amarillo AFB, Tex. On those 24-hour nuclear missions, "we kept one crew member napping in the down-filled winter sleeping bag rolled out over the flight deck," Speckman writes. "The bag was so used that it never was empty long enough to cool down." Retired Lt. Col. Speckman lives in California.

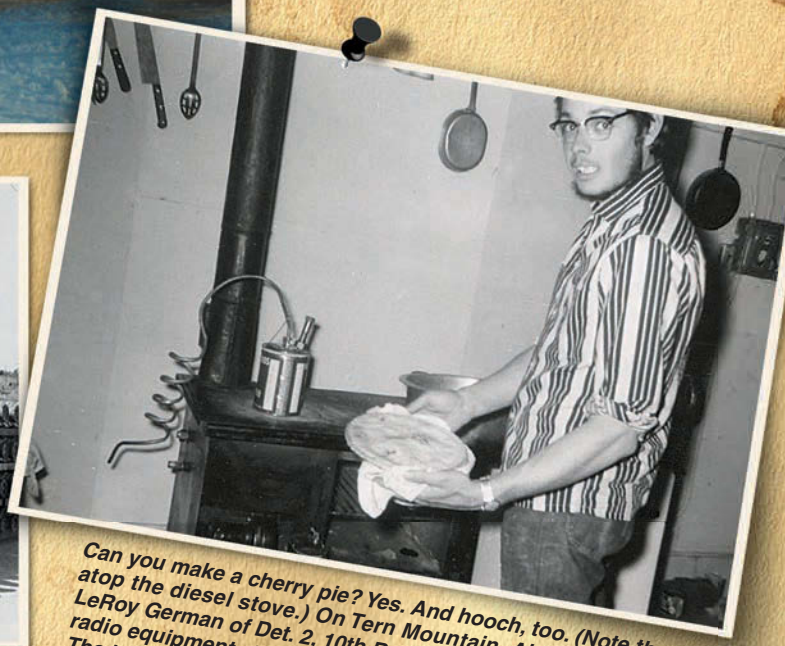


A2C John Eastman II leans against the barracks at Shu Lin Kou AS, Taiwan, in 1957. An Air Force Security Service linguist in Mandarin, he was with the 6209th Air Base Squadron, Det. 1, 6925th Radio Group Mobile. From this former Japanese World War II airstrip, he monitored radio traffic from mainland China. Eastman is a member of the Metro Rhode Island Chapter.

2nd Lt. Richard Baird deployed in 1956 with the 305th Bomb Wing from MacDill AFB, Fla., to Ben Guerir AB, Morocco. Shortly afterward, he snapped this photo from a KC-97. It shows a B-52 about to refuel from a KC-97, near Morocco, during Operation Power Flite. Gen. Curtis LeMay, SAC commander in chief, called this nonstop around-the-world flight a "demonstration of SAC's capabilities to strike any target on the face of the earth." Retired Lt. Col. Baird is a member of the Albuquerque Chapter, N.M.

Navigator 1st Lt. Richard Heitman took this 1957 photo showing snow removal from 93rd Air Refueling Squadron KC-97s, deployed from Castle AFB, Calif., to Elmendorf AFB, Alaska. The crew threw a knotted rope over the tanker's fuselage. Airmen on each end of the rope pulled it back and forth along its length. Retired Lt. Col. Heitman is from the Palm Springs Chapter, Calif.

In 1958, A2C Robert Ripley (left) and a co-worker take a break at the 546th Ammunition Supply Squadron depot. They had been stacking bombs in this open revetment north of Kadena AB, Okinawa. Ripley belongs to the Palm Springs Chapter, Calif.

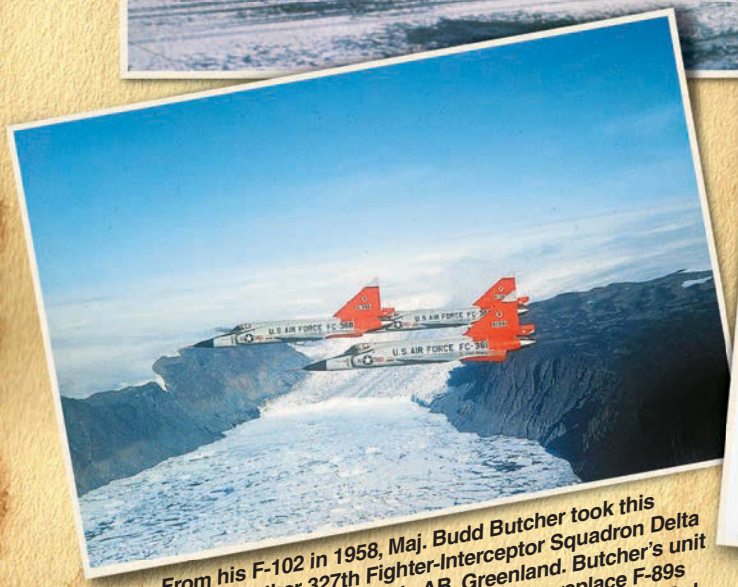


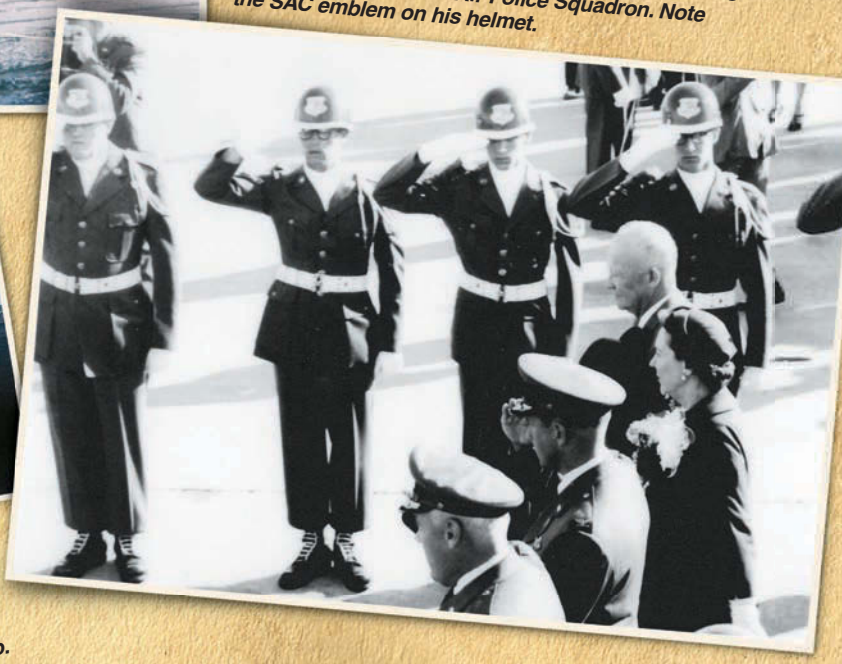
Can you make a cherry pie? Yes. And hooch, too. (Note the still atop the diesel stove.) On Tern Mountain, Alaska, in 1957, A3C LeRoy German of Det. 2, 10th Radio Relay Squadron, repaired radio equipment at this remote location on the Bering Sea coast. The two-man site relayed command channels for Alaskan radar facilities Cape Romanzof and Cape Newenham. German is a member of the Dobbins Chapter, Ga.

Lt. William Farrar photographed this B-36 Peacemaker, dominating the flight line at an open house at Ellsworth AFB, S.D., in 1957. He was assigned to a C-124 squadron and later served in the Reserve at Richards-Gebauer AFB, Mo. Retired Lt. Col. Farrar belongs to the Harry S. Truman Chapter, Mo.

1st Lt. Curtis Burns took this photo while preflighting this F-100 Super Sabre for Zulu Alert at Landstuhl, West Germany, in 1958. He was assigned to the 53rd Fighter-Day Squadron. Retired Maj. Burns is a member of the Aggieland Chapter, Tex.

A2C Donald Brooks (far right) salutes President Dwight Eisenhower and First Lady Mamie Eisenhower in 1958 at Schilling AFB, Kan. Brooks served in the honor guard for this Presidential visit. He was assigned to the 802nd Air Police Squadron. Note the SAC emblem on his helmet.





From his F-102 in 1958, Maj. Budd Butcher took this photo of other 327th Fighter-Interceptor Squadron Delta Daggers en route to Thule AB, Greenland. Butcher's unit was moving from George AFB, Calif., to replace F-89s in providing air defense and early warning. Retired Col. Butcher is a member of the Lance P. Sijan Chapter, Colo.

Raising a glass in a Cold War toast with Soviet military attaches is Capt. J. A. Saavedra (far right). He was assistant air attache and air technical liaison officer at the US Embassy in Paris, 1956 to 1960. Attaches gathered for monthly luncheons and for an annual black-tie like this one in 1959. Retired Col. Saavedra is a member of the Thomas W. Anthony Chapter, Md.

Aviation Cadet Franklin Sutter posed in front of a T-29 backdrop during navigator training at Harlingen AFB, Tex., in 1959. He served on a B-52 at 7th Bomb Wing, Carswell AFB, Tex., taking part in Chrome Dome missions. Retired Lt. Col. Sutter belongs to the Alamo Chapter, Tex. His kid brother, Joe, is pictured on p. 76.

B-47 aircraft commander Maj. Wilfred Martin walks in to his surprise birthday party at MacDill AFB, Fla., in 1960. He turned 36 that day. His wife sneaked a cake into the barracks, where Martin was in the middle of a seven-day alert with the 368th Bomb Squadron. Retired Lt. Col. Martin is from the Delaware Galaxy Chapter, Del.

An airplane general mechanic in 1961 with the 305th Organizational Maintenance Squadron, A2C Tim Donovan wore this B-58 Hustler patch while at Bunker Hill AFB, Ind. During the Cuban Missile Crisis, "we had 45 B-58s on the ramp," he writes. "Each and every one was 'locked and loaded.'" Retired MSgt. Donovan is a member of the Fort Wayne Chapter, Ind.

For a 1961 demonstration for President John Kennedy at Eglin AFB, Fla., Sgt. A. H. Loring helped load 500-pound bombs—26 of them—onto this F-105B. It was, he says, the heaviest bomb load for a single engine aircraft at that time. Retired TSgt. Loring is a member of the Snake River Valley Chapter, Idaho.

2nd Lt. Bill Cummings—shown here at his navigator's station on a B-52H in 1961—was at Wurtsmith AFB, Mich., during the Cuban Missile Crisis. The bombers "flew almost to Cuba" and back, to "be in the air, to be ready," he recalls. Cummings became a forward air controller in Vietnam. Retired Lt. Col. Cummings belongs to the Fort Wayne Chapter, Ind.

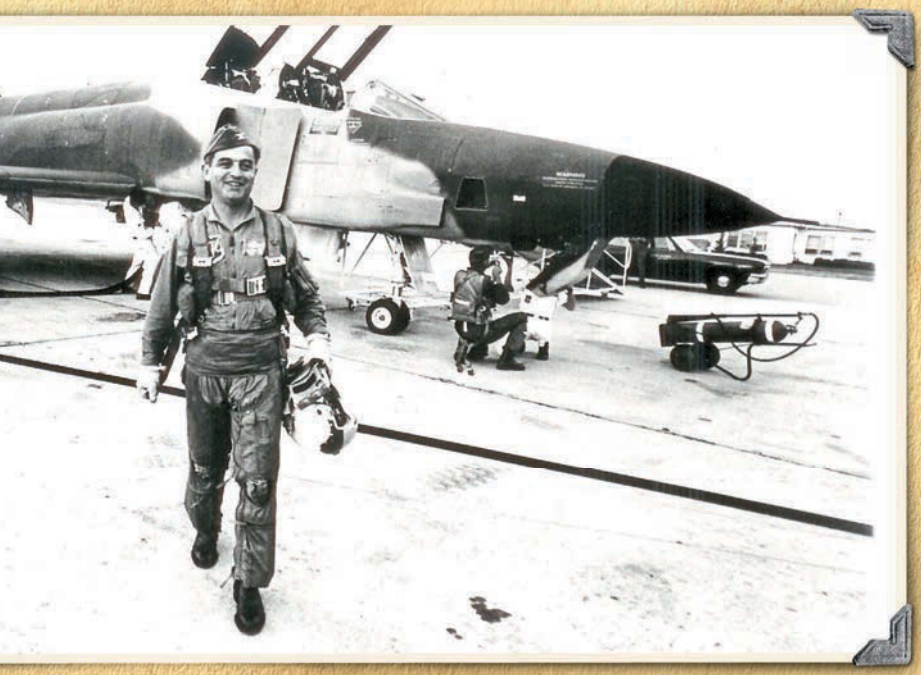
4080th Strategic Reconnaissance Wing members from Laughlin AFB, Tex., met Maj. Patrick Halloran (holding plaque) when his U-2 landed after this 1963 mission. They were noting the millionth foot of film taken over Cuba by U-2s. Another memorable flight: Coasting out from Cuba above 70,000 feet, Halloran's U-2 flamed out. Several air starts failed, yet he reached Eglin AFB, Fla., 250 miles away. Retired Maj. Gen. Halloran is a member of the Lance P. Sijan Chapter, Colo.

For this 1963 alert, Capt. Earl Peck (far left) and others on this B-52H were armed: Smith & Wesson .38-caliber revolvers in holsters—and six nuclear weapons. This crew was with the 19th Bomb Wing, Homestead AFB, Fla. Retired Maj. Gen. Peck is a member of the Waterman-Twining Chapter, Fla.

In 1964, A2C Andrew Rucci (left), of the 3902nd Air Base Wing, says good-bye to co-worker A3C Roger Wasdin outside the barracks at Offutt AFB, Neb. Rucci, an office administrator, was being reassigned to SAC's 4081st Strategic Wing at Harmon AB, Newfoundland, Canada. Rucci served seven years in the military and is a member of the Waterman-Twining Chapter, Fla.

2nd Lt. James Bridges (left) helps build a barbeque pit for the BOQ on Kume Jima, Okinawa, in 1964. A command and control weapons director, he was stationed with Det. 2, 623rd AC&W Squadron. What was he doing there? "Waiting for the Chinese Air Force," says retired Lt. Col. Bridges, now a member of the Austin Chapter, Tex.

Capt. Elmer Brooks (right), Atlas F missile combat crew commander, works at the underground launch control center, alternate command post, in York, Neb., in 1964. He was assigned to the 551st Strategic Missile Squadron. Brooks retired as a brigadier general, the assistant deputy undersecretary of defense for strategic and theater nuclear forces. He is from the Central Maryland Chapter.



Col. Robert Cardenas, 835th Air Division commander, steps away from an RF-4 at McConnell AFB, Kan., circa 1966. In 1970, he joined the secret contingency planning group Live Oak, in Mons, Belgium, developing responses in case the Soviets blocked access to West Berlin. Brig. Gen. Cardenas, whose service spanned 1939 to 1973, retired as chief, National Strategic Target List Division, at Offutt AFB, Neb. He belongs to the San Diego Chapter, Calif.

1st Lt. Hector Negroni stands next to an F-86H at San Juan Arpt., Puerto Rico, in 1965. It was during the Dominican Republic crisis, when the US sent troops to that Caribbean nation, threatened by civil war. Negroni says that Dominican Air Force P-51s landed at Ramey AFB, Puerto Rico, undetected. So the 198th Tactical Fighter Squadron, there, placed aircraft on alert. Negroni was at the time an advisor to the Puerto Rico ANG. Retired Col. Negroni is a member of the Gen. Charles A. Gabriel Chapter, Va.


Ten Years Combat Crew Duty

STRATEGIC AIR COMMAND

Capt Edward R Nystrom

In Recognition of Ten Years of Faithful and Dedicated Service
As a SAC Combat Crew Member

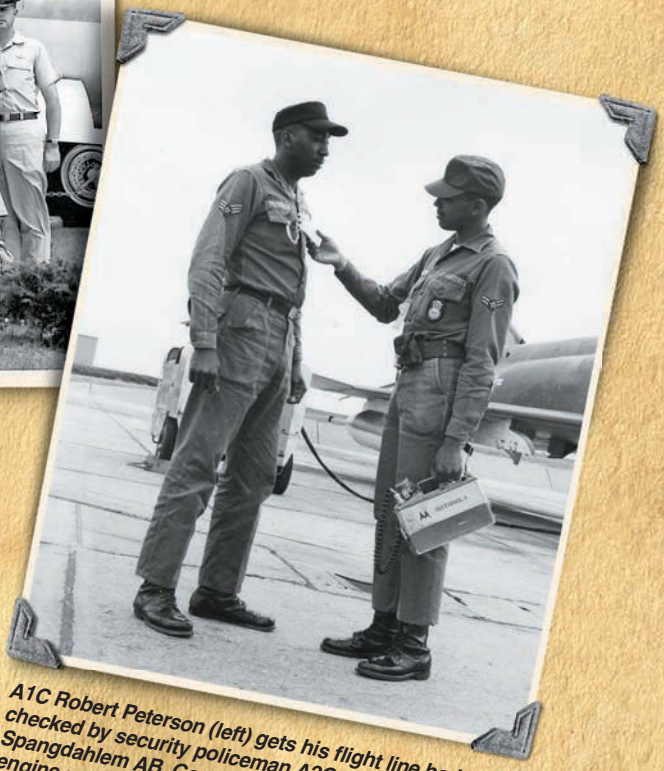
AUTHENTICATED BY:
EDWIN H. GARRISON, COLONEL, USAF
COMMANDER, 340 BOMB WG

JOHN D. RYAN
GENERAL, USAF
COMMANDER IN CHIEF

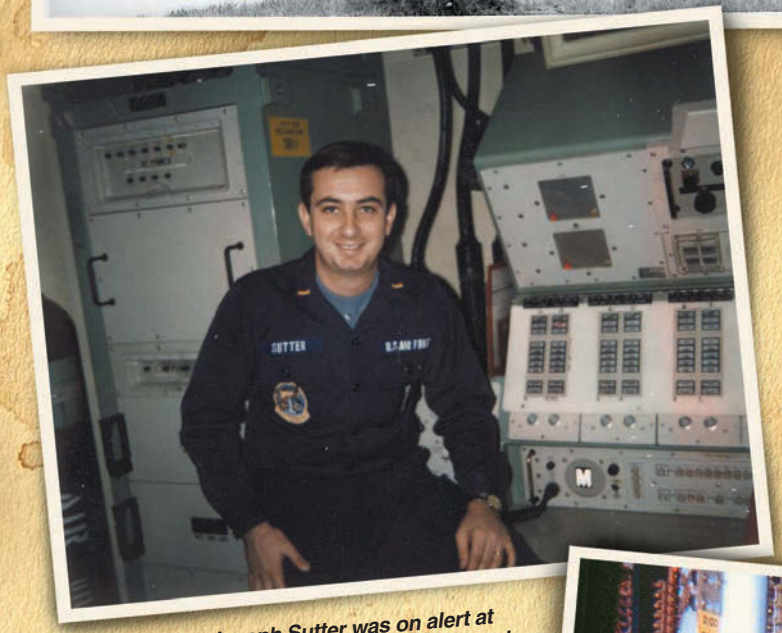
Thank you, Cold War Warrior: This 1965 certificate signed by Gen. John Ryan, SAC commander in chief, recognizes Capt. Edward Nystrom's combat crew duty. Nystrom served for 20 years, all with SAC. Retired Maj. Nystrom belongs to the Inland Empire Chapter, Wash.

Sam, you made the pants too long: 1st Lt. Barbara Brooks takes Arctic Sea survival training in 1966 at Blue Lake Park, Ore. The survival suit fit the man behind her in this photo, but when Brooks jumped into the water, her outfit ballooned like pontoons. A flight nurse, she served from 1962 to 1979. Barbara Brooks-Lacy was an AFA Northwest Region President and is a member of the Columbia Gorge Chapter, Ore.

Nicholas Abate stands fourth from the right, with other ROTC summer camp cadets at Plattsburg AFB, N.Y., in 1967. In the background is a B-47. Nothing says Cold War more than that, retired Col. Abate writes. He is VP Membership for the Donald W. Steele Sr. Memorial Chapter, Va.



A1C Robert Peterson (left) gets his flight line badge checked by security policeman A2C Richard Lightner at Spangdahlem AB, Germany, in 1967. Peterson was a jet engine mechanic with the 49th Tactical Fighter Wing. He served from 1962 to 1970 and is a member of the Flying Yankees/Gen. George C. Kenney Chapter, Conn.

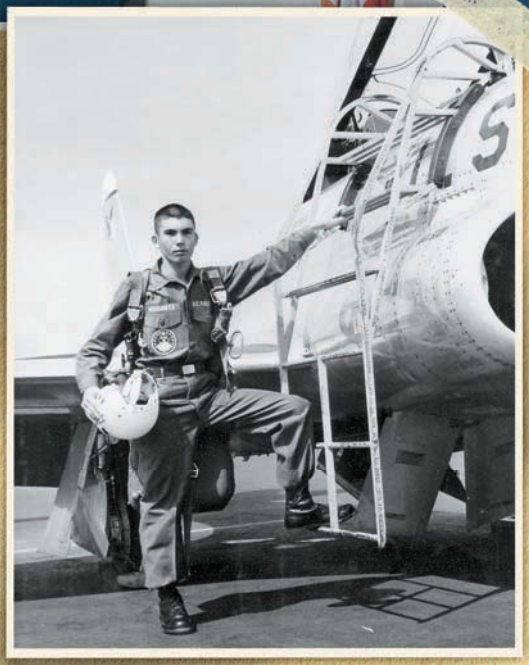


In 1969, 2nd Lt. Joseph Sutter was on alert at the Mike-01 launch control center of the 742nd Strategic Missile Squadron, 91st Strategic Missile Wing, based at Minot AFB, N.D. He was deputy missile combat crew commander. Sutter spent most of his 28 years on active duty with ICBM units. Retired Col. Sutter served as AFA Board Chairman from 2008 to 2010.

SSgt. Richard Wilson works on the telephone system at Wheelus AB, Libya, circa 1969. He was assigned to the 1950th Communications Squadron, supporting base, range, and long-haul communications. Retired SMSgt. Wilson is a member of the Seidel-AFA Dallas Chapter, Tex.

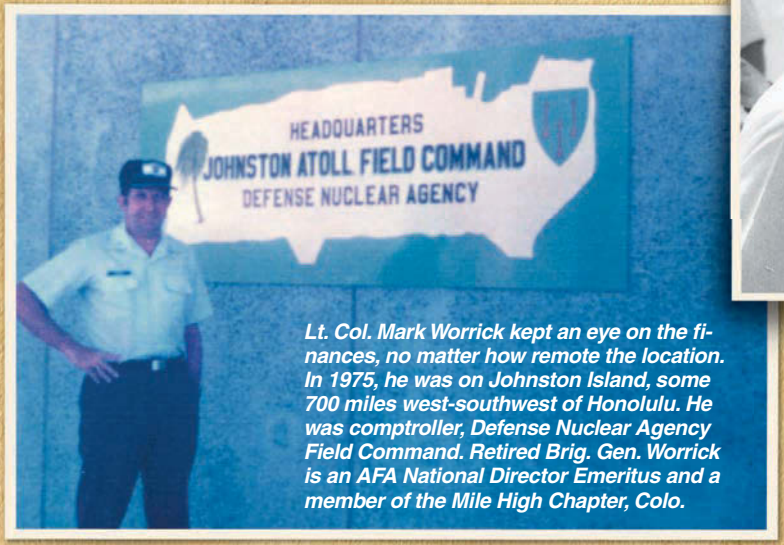
Today his signature block reads "Chief Master Sergeant of the Air Force #12," but in 1974, SSgt. Eric Benken was re-enlisting—for the first time—at Bergstrom AFB, Tex., with the 67th Reconnaissance Technical Squadron, 67th Tactical Reconnaissance Wing. Benken is a member of the Alamo Chapter.

The future head of Air Combat Command, 2nd Lt. John Corley marked graduation from pilot training at Reese AFB, Tex., with this 1974 photo in front of a T-38—"same airplane in use today," he notes. Corley's Cold War assignments included chief analyst for both the Advanced Tactical Fighter and for Tactical Air Command. Retired Gen. Corley is an AFA National Director and belongs to the Roanoke Chapter, Va.



Air Force Academy cadets will recognize the haircut. Cadet Michael Nishimuta stands next to a T-33 before his first jet aircraft orientation flight at the academy in 1969. He later flew Victor Alert in F-111Es from RAF Upper Heyford, UK. Retired Lt. Col. Nishimuta belongs to the Dolomiti Chapter, Italy.

When 2nd Lt. Suzann Chapman graduated from Officer Training School at Medina Annex, Tex., in 1972, her mother, Louise Chapman, pinned on the gold bars. Retired Maj. Chapman was a public affairs officer and is now Air Force *Magazine's special projects editor. She is a member of the Donald W. Steele Sr. Memorial Chapter, Va. Louise Chapman is a member of the Austin Chapter, Tex.*



Lt. Col. Mark Worrick kept an eye on the finances, no matter how remote the location. In 1975, he was on Johnston Island, some 700 miles west-southwest of Honolulu. He was comptroller, Defense Nuclear Agency Field Command. Retired Brig. Gen. Worrick is an AFA National Director Emeritus and a member of the Mile High Chapter, Colo.

Capt. John Handy says his C-130 didn't need skis to land on the ice runway during this January 1975 supply mission to Antarctica. It was summer. At the time, Handy was an exchange officer with No. 40 Squadron, Royal New Zealand Air Force. Retired Gen. Handy is former commander of US Transportation Command and Air Mobility Command.

In 1977, SMSgt. Joseph Hardy (left), superintendent of the 93rd Aerial Port Squadron, escorts soul singer Al Green—future Rock 'n Roll Hall of Famer—on a visit to Andrews AFB, Md. Hardy enlisted in the Army in 1963 and switched to the Air Force, serving nearly three decades total. Today, he is AFA Maryland State President, from the Thomas W. Anthony Chapter, Md.

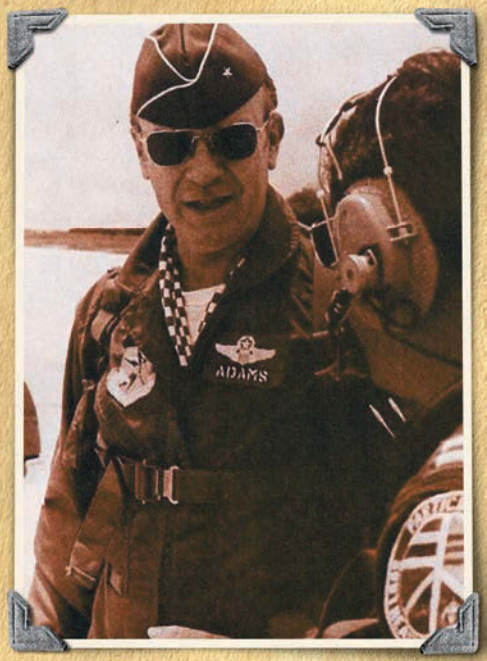
R. E. "Gene" Smith stands on the ladder of this T-38 at Columbus AFB, Miss. He had served in Air Defense Command and Tactical Air Command before being shot down over Hanoi in the Vietnam War. He was a POW until 1973. He later served as 14th Flying Training Wing operations director. Retired Lt. Col. Smith was AFA's National President and Board Chairman, 1994-1998.

At Chanute AFB, Ill., tech school in 1976, Amn. Jim Rossi stands inside a payload transporter van next to a Minuteman III Mk 12 re-entry system. He afterward reported to a missile maintenance team, 351st Strategic Missile Wing, Whiteman AFB, Mo. Rossi served four years on active duty, then joined the ANG. Retired TSgt. Rossi is from the Flying Yankees/Gen. George C. Kenney Chapter, Conn.

Maj. Buz Carpenter, 1st Strategic Reconnaissance Squadron, stands in front of an SR-71 at Beale AFB, Calif., circa 1979. He flew "on the periphery" of Cuba, China, and the Soviet Union. Note the fuel puddles on the ground behind him; he says maintainers at Kadena AB, Japan, wore raincoats to protect against fuel leaking down on them. Retired Col. Carpenter is a member of the Donald W. Steele Sr. Memorial Chapter, Va.

In 1977, special assistant and aide Capt. Robert Largent receives a farewell memento from his boss, Gen. David Jones, Air Force Chief of Staff. Largent served in strategic missile assignments and was AFA National President and Board Chairman, 2004-2008. Retired Col. Largent is a member of the David D. Terry Jr. Chapter, Ark. Jones, who became Chairman of the Joint Chiefs of Staff (1978-1982), belongs to the chapter named in his honor in North Dakota.

Jimmy Doolittle—an American hero for leading the 1942 raid on Tokyo—meets Maj. Gen. Jay Edwards, commander of Oklahoma City Air Logistics Center, on a stopover at Tinker AFB, Okla., in 1981. Doolittle was AFA's first President and Board Chairman. Edwards began his Air Force career in 1955 as an F-86D pilot with the 324th Fighter-Interceptor Squadron at Westover AFB, Mass., and Sidi Slimane AB, Morocco. He belongs to the Central Oklahoma (Gerrity) Chapter, Okla.



Brig. Gen. Christopher Adams directs an exercise at Andersen AFB, Guam, in 1979, testing the quick turnaround for B-52 conventional bombing operations. Bombers launched in one-minute intervals around the clock. Retired Maj. Gen. Adams is a former chief of staff for SAC and a member of the Fort Worth Chapter, Tex.

How cold was it? Minus 18 degrees, remembers then-SSgt. William Penny, the loadmaster bundled up in this photo at Goose Bay, Labrador, in 1983. Paradoxically, his C-141 in the background sits at the "hot pad," isolated because it held classified "explosives," Penny says. Retired TSgt. Penny belongs to the Waterman-Twining Chapter, Fla.

Retired CMSAF James McCoy was AFA National President and Board Chairman, 1992-1996. He had been SAC's first senior enlisted advisor. When he made this visit to the Berlin Wall in 1980, he was USAF's top enlisted leader. First erected in 1961, parts of the wall were topped with a pipe too large to grip. Some who died trying to escape from East Berlin were unbekannt, "unknown."

ANG 2nd Lt. Charles Nelson, just back from officer training in 1984, returns a salute from a fellow Guardsman, his brother, Sgt. David Nelson, at Joe Foss Field, S.D. Chuck Nelson, back then a personnel officer, was AFA National Treasurer (2000-2005) and is a member of the Dacotah Chapter, S.D.

Capt. Terry Walter, in "bunny suit" coveralls, had just climbed out of an engine intake when this photo was taken at Flesland AS, Norway, about 1981. She was OIC, 4th Aircraft Maintenance Unit, 388th Tactical Fighter Wing, Hill AFB, Utah. Lt. Gen. Terry Gabreski, was AFMC vice commander before she retired. She is a member of the Col. Loren D. Evenson Chapter, Fla.

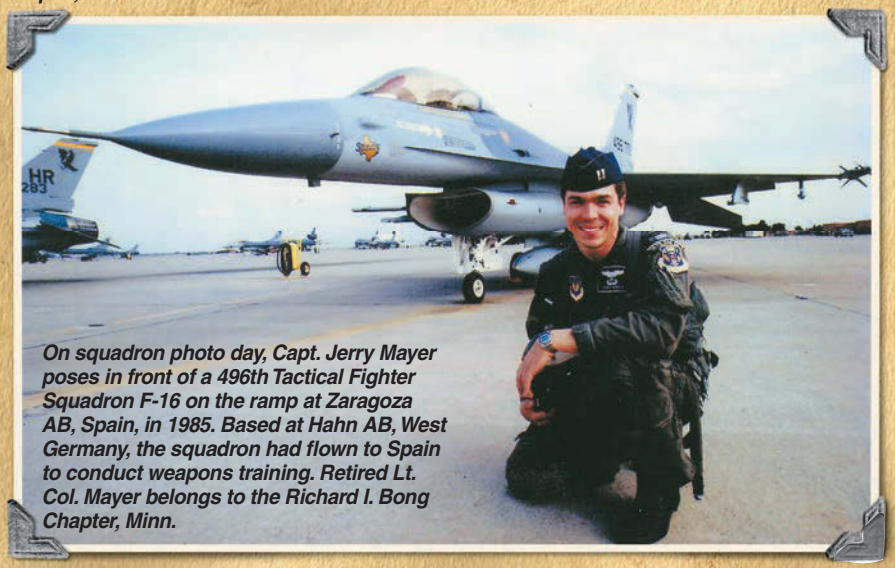
SSgt. John Schwendler was stationed with the 50th Tactical Fighter Wing, Hahn AB, West Germany, as a cost analyst. Now a retired technical sergeant, he is a member of the Frank Luke Chapter, Ariz. He took this photo of the Berlin Wall in 1982. An East Berlin guard tower is in the center of the photo. Those huge lights deterred escape, as did the second barbed wire-topped fence beyond the wall. Note the graffiti; there was none on the east side.

From the cockpit of an F-16, Col. Michael Ryan hands a binder of forms to a crew chief at Misawa AB, Japan, in 1985. Ryan was 432nd Tactical Fighter Wing commander at the time and points out that he flew the first F-16 into the base as part of a buildup in the Pacific in the Cold War. Ryan was USAF Chief of Staff (1997 to 2001) and is a member of the Charleston Chapter, S.C.

You get the dog, too: Lt. Col. Donald Peterson (right) takes command of the 525th Tactical Fighter Squadron, "The Bulldogs," at Bitburg AB, West Germany, in 1984. He says they had "scrambles at 2 o'clock in the morning, and we'd be airborne in five minutes." Lt. Gen. Peterson retired as USAF deputy chief of staff for personnel and became AFA's Executive Director and President-CEO, 2002 to 2007. The bulldog's name? Apex, after the Russian AA-7 missile.

One of their F-111's brakes seized on landing at RAF Lakenheath, UK, in 1985. A tire blew. Fire burst out. So that's firefighting foam covering the Aardvark in background and the shoes of Capt. James Jimenez (l) and Capt. Larry Smith, weapon systems officer. Retired Lt. Col. Jimenez is US consul at the US Embassy, Harare, Zimbabwe, and a member of the Gen. Charles A. Gabriel Chapter, Va.

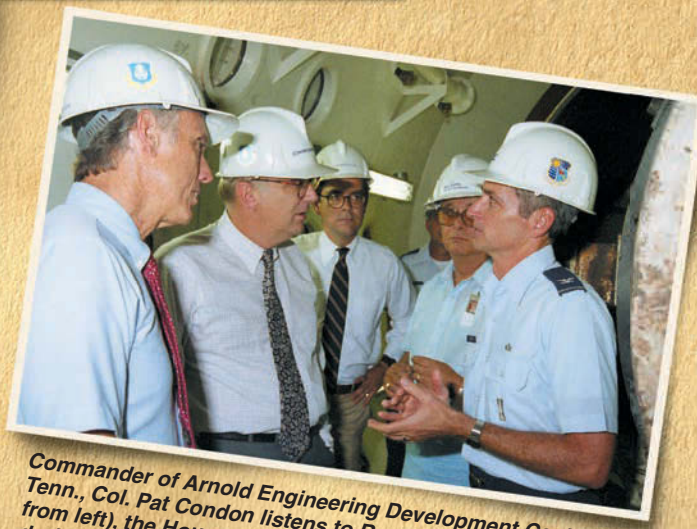
Lt. Col. Mary Mayer receives a Defense Meritorious Service Medal and Armed Forces Expeditionary Medal for her part in the 1989-1990 Operation Just Cause, which deposed Panama's dictator, Manuel Noriega. Mayer was chief of the Security Assistance Division at USSOUTHCOM. Retired Col. Mayer is AFA Oregon State President.



On squadron photo day, Capt. Jerry Mayer poses in front of a 496th Tactical Fighter Squadron F-16 on the ramp at Zaragoza AB, Spain, in 1985. Based at Hahn AB, West Germany, the squadron had flown to Spain to conduct weapons training. Retired Lt. Col. Mayer belongs to the Richard I. Bong Chapter, Minn.

Missile maintainer TSgt. Karl Kann—with MSgt. Tom Hirl behind him—stands in front of an F-106, armed with AIM-4s, on the flight line at Luke AFB, Ariz., in 1986. Assigned to the 102nd Fighter-Interceptor Wing, Otis AFB, Mass., Kann was at Luke for a missile competition. He retired as a senior master sergeant after 34 years of service and belongs to the Otis Chapter, Mass.

Lt. Col. Sandy Schlitt (left) chairs a 1986 meeting for the Defense Logistics Agency, as chief of staff for the Defense Contracts Administrative Services Region-New York. In the foreground: keynote speaker US Ambassador to the UN Vernon Walters. Schlitt served in the reserves for more than 34 years. Retired Brig. Gen. Schlitt is AFA's Chairman of the Board.



Commander of Arnold Engineering Development Center, Tenn., Col. Pat Condon listens to Rep. Les Aspin (second from left), the House Armed Services Committee chairman, during a 1986 tour of an ICBM rocket motor test cell. At left is US Rep. Jim Cooper (D-Tenn.). Aspin became Secretary of Defense in 1993. Cooper still serves in Congress. Retired Maj. Gen. Condon was AFA National President and Board Chairman, 2002 to 2006.

Lt. Col. Larry Carter (front row, center, yellow name tag) and his 79th Tactical Fighter Squadron aircrews and support staff crowd an F-111 in 1988 at RAF Upper Heyford, UK. Hardened aircraft shelters are in the background. Retired Col. Carter is president of the Montgomery Chapter, Ala.

SrA. Brian Thayer (far right), a KC-135A boom operator with the 43rd Air Refueling Squadron, Fairchild AFB, Wash., cuts it up with crew chiefs at Luke AFB, Ariz., in 1989. Thayer was at Luke for a SAC "business effort" TDY of tankers sent to bases for air refueling support. He is a member of the Snake River Valley Chapter, Idaho.

Lt. Col. Gordon Golden pokes out of an armored personnel carrier in 1989, while in the field with the 1st Armored Division, based at Ansbach, West Germany. He was commander of Det. 2, 602nd Air Support Operations Group, and the 1st AD air liaison officer. He spent 180 days a year in the field during this tour. Retired Lt. Col. Golden belongs to the Columbia Gorge Chapter, Ore.

Gen. John Chain Jr., one of SAC's last commanders (1986-1991), banters with Soviet officials visiting Offutt in 1990. Chain briefed them on what the US knew about Soviet weapons. When the visitors denied they had road-mobile missiles, Chain said, "Come up to my office, and I'll show you photos we took—last night." Retired Gen. Chain is from the Robert E. Huyser Chapter, Colo.

Inside stripes

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The STARS and STRIPES

AUTHORIZED UNOFFICIAL PUBLICATION FOR THE U.S. ARMED FORCES

Good morning!

Vol. 48, No. 206 Saturday, November 11, 1989 ★ 35¢ Italy and Sunday D 8693 A

'Berlin is again Berlin'

East Germany frees citizens to cross borders

From wire reports

BERLIN — Communist East Germany Thursday opened its borders to the West, including the Berlin Wall, saying that its citizens could travel or emigrate freely, in the most stunning announcement toward ending the East-West division of Europe since World War II.

Thousands of East German citizens immediately crossed to the West for the first time since 1961. Hundreds of people danced on the wall.

● East Berliners celebrate freedom — stories and more photos, Page 7
● AF hospital now "Freedom Hotel," Page 28

Late Thursday and early Friday, exultant East Germans coursed through Berlin Wall checkpoints. Others entered West Germany at other border crossings.

Revelers waved copies of Friday's edition of Bild Zeitung, the West Berlin tabloid newspaper. Its banner headline proclaimed, "The Wall is gone! Berlin is again Berlin."

Near Brandenburg Gate, East Germans raced through streams of police water cannon and were

East and West Berliners celebrate in front of a control station on East Berlin territory Friday morning.

Via TSgt. John Schwendler, USAF (Ret.)

In fall 1989, East Germany opened its borders, and in December 1991, the Soviet Union went out of existence, bringing the Cold War to an end.

CMSAF James Binnicker and a Russian soldier stand next to a Lada automobile in East Germany in March 1989. During the Cold War, US Military Liaison Mission teams and their Soviet counterparts gathered intelligence on each other in East and West Germany. USMLM was based at Potsdam House in East Germany.

Looking for more photos? You'll find them in a supplement on the Web at www.airforce-magazine.com, added to the Cold War Scrapbook page, with the August 2011 issue.

AFA National Report

natrep@afa.org

By Frances McKenney, Assistant Managing Editor

Smarter, Faster, at Lower Cost

The biggest crowd in its 32-year history turned out for the Focus on Defense Symposium, co-hosted by the Ogden Air Logistics Center and Utah AFA: the **Northern Utah Chapter, Salt Lake Chapter,** and **Ute-Rocky Mountain Chapter.**

During the day-long symposium in June, some 440 government, military, and defense industry representatives discussed how to aggressively go after efficiency initiatives, a challenge laid down by Defense Secretary Robert M. Gates last summer.

Guest speakers—led by Frank Kendall, the principal deputy undersecretary of defense for acquisition, technology, and logistics—provided perspectives on how the Air Force can achieve lower cost with the same performance; the same cost with improved performance; and improved effectiveness and efficiency.

AFA member Kevin J. Sullivan, a former Ogden ALC commander, and Walter W. Saeger of the Northern Utah Chapter, helped organize Focus on Defense and its two days of related activities.

AFA Chairman of the Board Sandy Schlitt speaks at a Focus on Defense event in Layton, Utah. The symposium attracted its biggest turnout in more than three decades.

More photos at http://www.airforce-magazine.com, in "AFA National Report"

Business Boot Camp

The **Col. H. M. "Bud" West Chapter** in Tallahassee, Fla., donated more than a thousand dollars in May to a program that assists disabled Iraq and Afghanistan war veterans become business entrepreneurs.

F. Randy Blass, director of the Entrepreneurship Boot Camp for Veterans with Disabilities program at Florida State University, had spoken to the chapter's dinner meeting last year. EBV begins online, followed by nine days of on-campus boot camp, and a year of ongoing mentorship afterward, all with the aim of guiding veterans to success as entrepreneurs and small-business managers.

The program originated in 2007 at Syracuse University and has since been incorporated into the business schools of seven other universities, including UCLA and Texas A & M.

Bud West Chapter Vice President Donna J. Dye was among those moved by Blass' presentation last year and volunteered to spearhead an effort to provide financial support from the chapter. After nine months of fund-raising, the chapter was able to present a $1,200 donation to Blass at the May meeting.

Selected veterans attend the entrepreneurship boot camp for free, with costs such as travel, lodging, and meals paid for by private donations.

The Bud West Chapter's funds helped carry out the June 9 to 17 EBV boot camp.

Big Navy

The **Southern Indiana Chapter's** May meeting featured a sister service.

Navy Capt. Charles S. LaSota, the commander of Naval Surface Warfare Center, Crane Division, spoke to the evening gathering about his 100-square-mile facility—located in southwestern Indiana—the Navy's third-largest installation. Its mission: engineering and sustainment of sensors, electronics, and electronic warfare and special warfare weapons.

Chapter President James E. Fultz said LaSota covered Crane's history, beginning in 1941, when it was a bomb and shell-loading and storage facility. It has evolved into an engineering center, with scientists, engineers, and technicians constituting more than 70 percent of its 3,000 Navy employees.

Too Big To Ignore

The **Tennessee Valley Chapter** in Huntsville, Ala., arranged some oversize publicity for CyberPatriot, AFA's cybersecurity competition for high-schoolers.

Working with a Community Partner, Lamar Advertising, the chapter arranged for five digital billboards to promote CyberPatriot in the greater Huntsville area.

Digital billboards have a vibrant light-emitting-diode (LED) screen displaying a message for several seconds before

moving on to another one. The chapter's CyberPatriot message runs as a public service announcement, on a space-available basis, at no cost.

The electronic billboards flash a two-sentence message: "Is Your High School Part of the National CyberPatriot Competition? For more info, go to www.uscyberpatriot.org."

Susan Mallett, aerospace education VP for AFA's South Central Region, said the chapter wants to expand this free advertising effort throughout Alabama. Thus the billboard emphasizes CyberPatriot, not a specific chapter, she pointed out.

The Tennessee Valley Chapter's CyberPatriot team of Robert J. Kuehn and Gary Connor have been leading this publicity campaign, with help from Mallett, who is from the **Montgomery Chapter (Ala.).** Outreach has involved e-mailing city and school officials and presentations to local organizations such as the board of education.

Academic Approach to Acquisition

Gen. Bruce K. Holloway Chapter members in Tennessee attended a presentation by the National Defense Business Institute at the University of Tennessee on May 3.

David Patterson, the institute's executive director, delivered the presentation.

Under the umbrella of the university's College of Business Administration, the institute provides research and studies to help create efficient and effective defense acquisition programs.

A retired Air Force colonel, Patterson is also a former principal deputy undersecretary of defense in the comptroller's office, and was a McDonnell Douglas executive as well.

Members of the East Tennessee Military Affairs Council and the Tennessee Veterans Business Association joined the chapter members for this event.

Reunion War Stories

When the World War II Eighth Air Force's 351st Bomb Group held its reunion in Virginia Beach, Va., in June, **Tidewater Chapter** members saw an opportunity for piggybacking.

Why not? From its station at Polebrook, UK, the 351st flew B-17 Flying Fortresses and is credited with more than 9,000 sorties. The unit roster in World War II included movie star Capt. Clark Gable and Medal of Honor recipients 2nd Lt. Walter E. Truemper and Sgt. Archibald Mathies.

So when Tidewater Chapter officer William M. Cuthriell Jr. read in *Air Force* Magazine that the highly regarded unit would be in Virginia Beach for its 35th reunion, he and chapter member Chip Moran set to work. Moran arranged for a memorial service for reunion attendees. It took place at JB Langley, Va. Moran also arranged for the base's

Honor Guard and band to take part in the 351st's reunion banquet.

The chapter organized a tour of Virginia Beach's Military Aviation Museum, owned by Community Partner Gerald Yagen. The museum's B-17 was in Canada at an air show, but Cuthriell reported that the reunion attendees nevertheless enjoyed seeing an old foe: the Fw-190.

To thank the chapter for its help on reunion activities, two 351st B-17 pilots, Richard G. Dinning and Clinton W. Hammond spoke at a chapter dinner meeting that weekend. Hammond showed the audience a D ring from his parachute and a piece of flak. Chapter members learned that B-17 crews sometimes held a lottery on missions: The winner was the crew of the aircraft returning home with the most flak and bullet holes.

The Flag: Teachable Moments

In May, **Central Florida Chapter's** aerospace education VP presented a history lesson to the students of a former AFA National Teacher of the Year.

Richard A. Ortega, who is the state aerospace education VP as well, taught a class at Riverside Elementary School in Orlando, Fla., about the history of the US flag. The fourth-graders' regular instructor is Barbara Walters-Phillips, who was the association's top teacher in 1995.

"Sorry to tell you," Ortega wrote later, "our K-12 students do not receive much training—if any—about the history of our US flag."

He rectified this by teaching the youngsters about the flag's background, beginning with Congress' approval of the stars and stripes in 1777. He explained that each star represents a state according to the date it was accepted in to the union. He involved the students in his lesson by teaching them how to fold and handle the flag.

The students then competed for a brand-new $2 bill by answering questions on topics Ortega had just taught. He in turn used the opportunity to explain the scene depicted on the reverse side of the $2 bill: the presentation of the Declaration of Independence.

More Chapter News

■ In Virginia, the **Gen. Charles A. Gabriel Chapter** awarded its AFA Top Cadet Award to Sarah Graupp, a senior at Chantilly (Va.) Academy. In the top two percent of 110 cadets in the school's AFJROTC unit, Graupp held the highest leadership positions in the detachment over the last two years, while maintaining a 3.988 grade point average and National Honor Society membership, reported Nancy T. Cribb, the chapter's communications VP. Graupp will attend James Madison University in Harrisburg, Va., where she will study chemistry on an AFROTC scholarship.

■ At Youngstown ARS, Ohio, in May, the **Steel Valley Chapter** presented several awards at a banquet. Brian Foutty, a math teacher at Trumbull Career and Technical Center in Warren, Ohio, received the Teacher of the Year Award, presented by Chapter VP Fred Kubli Jr. An AFJROTC cadet from the same school received the Outstanding Cadet Award from Kubli. Lindsay Keller will attend Bowling Green University this fall on an Army ROTC scholarship.

■ On Memorial Day on Long Island, N.Y., more than 250,000 people attended an air show. All that weekend, **Long Island Chapter** members, led by Chapter President Fred Di Fabio, manned an AFA display associated with it. "This is always a great opportunity to talk to the public and educate them and explain our mission and our programs on Long Island," commented Di Fabio. A B-25, B-29, B-17, and P-51 World War II warbirds, and other aircraft staged from the American Airpower Museum in Farmingdale. The chapter's display was located next to the Superfortress.

■ As home to Fort Huachuca, it's definitely an Army town, but in Sierra Vista, Ariz., in May, **Cochise Chapter's** Air Force members led the observance of Memorial Day, reports George L. Castle, chapter president. The chapter's communications VP, retired USAF Lt. Col. Gary M. Phillips, served as keynote speaker for the first service, sponsored by the local American Legion post. Retired USAF Col. Robert B. Strain delivered the main address at another service, organized by the Sierra Vista United Veterans Council.

■ For Memorial Day in the 50th State, **Hawaii Chapter** President Nora Ruebrook joined chapter members Col. Sam C. Barrett, 15th Wing commander at Joint Base Pearl Harbor-Hickam, and CMSgt. Craig S. Recker, the wing's command chief master sergeant, at the Honolulu Mayor's Memorial Day Ceremony at the National Memorial Cemetery of the Pacific. On behalf of AFA, they were among some 60 military and veterans organizations representatives who laid floral wreaths in tribute to more than 51,000 people interred at the cemetery.

■ By the numbers: The **Thomas W. Anthony Chapter** in Maryland calculated that in the past nine years, it has distributed 131,000 complimentary back issues of *Air Force* Magazine, most recently some 1,650 copies at the open house and air show held each May at Joint Base Andrews in Maryland. In addition, chapter members have provided the local Airman Leadership School and NCO Development Program with nearly 8,000 free magazines. ■

AFA Conventions

Sept. 17-18	**AFA National Convention,** Washington, D.C.
Sept. 19-21	**AFA Air & Space Conference,** Washington, D.C.

reunions@afa.org

Reunions

13th AF Veterans Assoc. Oct. 5-8 in Dayton, OH. **Contact:** Cliff Johnson, 1779 Wilmington Rd., Cedarville, OH 45314 (937-766-5398) (johnsonc@cedarville.edu).

39th Troop Carrier Sq and **777th TCS,** Pope AFB (1968-72). Oct. 6-9 at the Holiday Inn Dayton/Fairborn in Fairborn, OH. **Contact:** Ed Buyniski (513-241-2464) (ed@buyniski.com).

90th BG Assoc (WWII). Oct. 6-9 at the Marriott Tampa Westshore in Tampa, FL. **Contact:** Robert Tupa, 273 Wellington Cutoff, Wellington, NV 89444 (775-465-2930) (rjtipa@yahoo.com).

525th Fighter-Interceptor Sq, Bitburg, Germany. Nov. 4-6 in Fort Walton Beach, FL. **Contact:** Frank Litt (817-294-1136) (flitt@sbcglobal.net).

603rd AC&W, Germany (1962-66). Sept. 25-28 in Nashville, TN. **Contact:** William Chick (803-422-9486) (littlechick@msn.com).

907th Tactical Airlift Group. Sept. 10-11 at Wright-Patterson AFB, OH. **Contact:** louis.salerno@att.net.

Combat Talon, including all special operations units. Oct. 7-9 at the picnic grounds on Hurlburt Field, FL. **Contact:** Lee Hess (850-651-0353) (papasan@mc130.com).

MacDill AFB 12th TFW/15th TFW pilots (1962-67). Oct. 11-12 in Las Vegas. **Contact:** Frank Ely (936-588-0961) (frankely@consolidated.net).

Pilot Tng 55-J, Hondo. Oct. 10-12 in Hondo, TX. **Contact:** Jim Gibler (806-771-5018) (jgibler@nts-online.net).

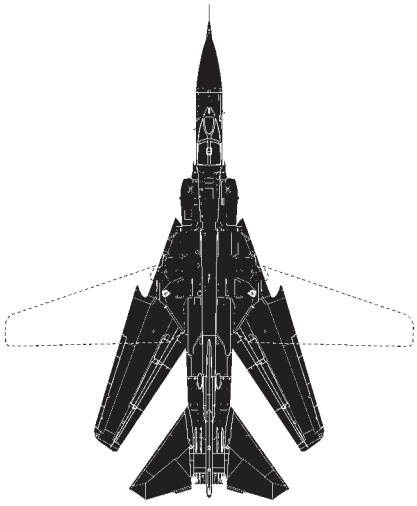
UPT 67-G, Williams AFB. Oct. 27-30 at the Crockett Hotel in San Antonio. **Contact:** Bill Obert (303-520-7643) (billobert2@yahoo.com).

Webb AFB, including student pilots and permanent party personnel. Oct. 7-9 at the Hangar 25 Air Museum in Big Spring, TX. **Contact:** Joe Hays (432-264-1999). ■

E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

Artwork by Zaur Eylanbekov

MiG-23 Flogger



The variable-wing MiG-23 was the most important Soviet fighter type for some 20 years. The Mikoyan-Gurevich design served as an interceptor with a ground attack capability, a fighter-bomber, and a trainer. The MiG-27 Flogger, basically the same design, was the dedicated ground attack version.

Design work began in the early 1960s. The single-engine MiG-23, with its swing-wing configuration, clearly borrowed from the US F-111 and F-4. Designed to replace the delta-wing MiG-21, the Flogger (its NATO designation) is deemed to be a Soviet third generation fighter. Its high-mounted wings have a dog tooth design and can be varied in sweep from 16 to 45 to 72 degrees. The wings have leading and trailing edge slats, with upper surface spoilers used in place of ailerons. The lines of the fuselage vary from model to model but are essentially conical except where engine air intakes are located. The complex landing gear is designed to operate from rough fields. Over time, the MiG-23 incorporated successive new generations of radar and missiles.

The first Soviet MiG-23s entered operational service in 1971, while the last were not retired until 1998. The export Flogger engaged in many air battles, scoring some victories and suffering some significant losses. They were found in the inventories of Soviet allies around the world. Variants engaged in combat in Egypt, Eritrea, Iraq, Iran, Libya, Angola, and Syria. Most recently, the Libyan regime of Muammar Qaddafi has used them to attack rebel forces.

—Walter J. Boyne

This aircraft: Soviet Air Force MiG-23UB—*Bort 01*—as it appeared in the mid-1990s when it was assigned to the 929th Flight Test Center, Vladimirovka AB, USSR.

A frontal view of a MiG-23 with fully swept wings.

In Brief

Designed, built by Mikoyan-Gurevich in the USSR ★ first flight April 10, 1967 ★ crew of one (two in trainer) ★ number built some 5,000 ★ **Specific to MiG-23MF:** one Tumansky R-29 turbojet engine ★ armament one 23 mm cannon, variety of missiles such as R-3R, R-3S, AA-7, AA-8, AA-10, AA-11, AA-12 ★ load several 1,100-lb bombs ★ max speed 1,550 mph ★ cruise speed 550 mph ★ max range 1,600 mi ★ weight (loaded) 44,315 lb ★ span 46 ft 9 in (forward), 26 ft 9 in (swept) ★ length 55 ft 2 in ★ height 14 ft 4 in.

Famous Fliers

Notables: G. E. Bulanov, A. V. Fedotov, N. N. Ivanov, A. I. Kapustin, G. M. Kurkai, V. B. Maksimenkov, V. E. Menitsky, V. F. Novikov, P. M. Ostapyenko, N. I. Petukhov, V. S. Prantsky-avitchus, E. M. Shastun, A. F. Sidorenko, O. G. Smirnov, E. N. Tcheltsov. **USAF (YF-113):** Robert Bond, John Manclark, Herbert Carlisle. **Other:** El al-Masry, Syrian Air Force.

Interesting Facts

Used by USAF (YF-113) for test purposes ★ suffered heavy losses to Israeli Air Force in 1982 Bekaa Valley War; to USAF in 1991 Gulf War ★ crashed into a house in Belgium in 1989, killing one man ★ developed in parallel with a STOL variant ★ equipped with periscope in rear cockpit (trainer) for taxi, takeoff, approach, landing ★ designed to use beyond visual range missiles ★ built in more than 30 variants ★ used by 38 air arms ★ nicknamed "Rakshak" (Defender) in India Air Force and "Cheburashka" (a Russian cartoon character) by some Soviet pilots ★ flew in 1989 Gulf of Sidra fight with US Navy Tomcats, with two MiG-23s lost.

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