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Journal of the Air Force Association

AIR FORCE MAGAZINE

THE F-35

Lightning's Ready to Rumble!

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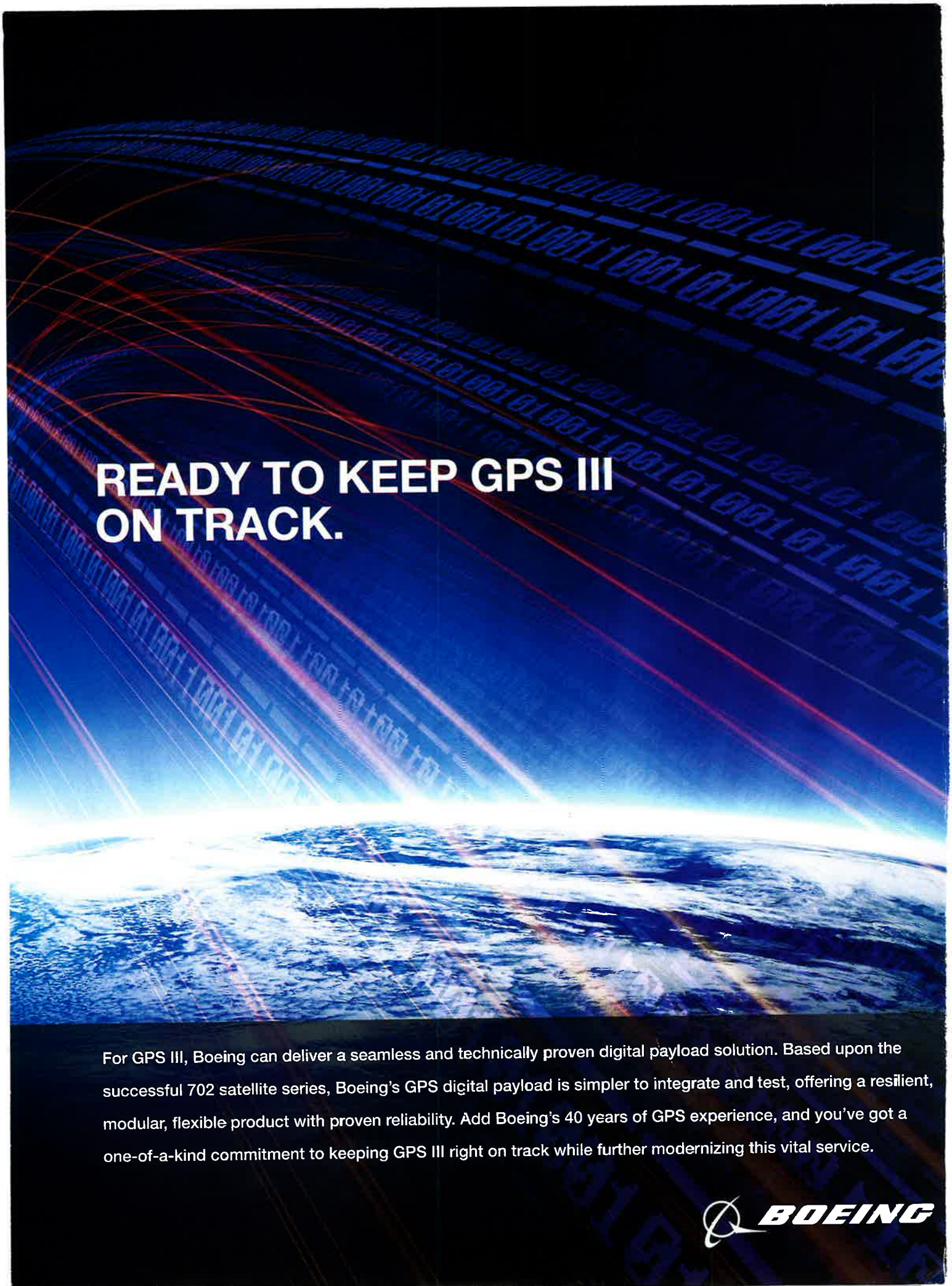
Pilot Training

Rescuing Goldfein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AIR FORCE MAGAZINE
September 2016, Vol. 99, No. 9

FEATURES

About the cover: F-35s fly over the water near Eglin AFB, Fla. See "F-35 Lightning Unleashed," p. 52. USAF photo by MSgt. John R. Nimmo Sr.

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1501 Lee Highway
Arlington, VA 22209-1198
Tel: (703) 247-5800
Telefax: (703) 247-5855

afmag@afa.org

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By Adam J. Hebert, Editor in Chief

21st Century Peace Through Strength

When the Cold War ended, the US lost focus on its strategic nuclear mission. The national security establishment never seriously questioned the value of the nuclear deterrent, but after 1991, what was once the crown jewel of the US defense establishment was neglected. Conventional threats and wars in the Middle East and South Asia dominated the Pentagon's attention, planning, and funding.

The airmen and sailors responsible for America's nuclear triad of intercontinental ballistic missiles, nuclear-capable bombers, and boomer submarines persevered in their missions as attention and resources went elsewhere.

Long-developing problems were vividly brought to light when the Air Force accidentally flew nuclear weapons from North Dakota to Louisiana aboard a B-52 in 2007. USAF and the Defense Department instituted numerous organizational and institutional changes to refocus on the nuclear mission. Key moves included the 2009 creation of Air Force Global Strike Command, which unified USAF's two-thirds of the triad under a single major command, and the creation of a two-star "A10" assistant chief of staff position with a nuclear focus.

USAF must begin modernizing its nuclear weapons and delivery systems.

More needed to be done, however, as demonstrated by a cheating scandal among ICBM officers in 2013. USAF recently took additional steps to ensure the nuclear mission receives support commensurate with its importance. Last year the AFGSC commander position was elevated to a four-star billet, with Gen. Robin Rand being the first full general to lead Global Strike Command. The Air Staff A10 was similarly upgraded to a full three-star deputy chief of staff position, held by Lt. Gen. Jack Weinstein. As Weinstein said in an interview, these changes mean USAF's nuclear heads are now on par with other top Air Force leadership and are "no longer the junior people in the room."

Changes are also from the bottom-up. Wing-level airmen say they see increased manning, new investment, and a clear "nuclear first" attitude throughout the Air Force. For example, USAF's nuclear-capable B-2 and B-52 bomber crews report that nuclear missions come first. Major quality of life and career-path improvements are being put in place in the ICBM fields, making missile duty a more attractive specialty for young airmen.

Why should we care so much about a category of weapons that haven't been used in 71 years, and that hopefully will never be used again? Because a safe and effective deterrent keeps the peace. During the first half of the 20th century, approximately 30 million people died because of World War I. Just two decades later, World War II was an even larger and deadlier conflagration, claiming perhaps 60 million lives.

Given humankind's propensity for violence, it was natural to fear what would come next—especially since the nuclear weapons that brought an end to WWII in the Pacific were the most destructive weapons ever conceived. But something interesting happened. The nature of warfare unexpectedly shifted, as proxy wars and insurgencies largely replaced the force-on-force combat of the past. Nuclear weapons are so awe-inspiring, so unlike any other tool of warfare, they fundamentally change the way nations view survival.

For deterrence to be effective, it requires a credible capability, the will to use it, and an enemy's awareness of those elements. As Henry A. Kissinger noted in 1961, "Deterrence is a product of those factors and not a sum. If any one of them is zero, deterrence fails."

All is therefore not well with the US deterrent. While much has been done on the organizational and personnel fronts, USAF's nuclear systems are geriatric and quickly sliding toward obsolescence. Most were purchased or last comprehensively modernized in the 1970s or 1980s. "We always say the Minuteman [III ICBM] was built in the 1970s, as if that made it acceptable," said Maj. Gen. Michael E. Fortney, AFGSC vice commander, in a recent interview.

Today, the Air Force needs a new Ground-Based Strategic Deterrent (GBSD) to replace the Minuteman III and 1960s ICBM infrastructure, for the stability the dispersed system offers. USAF needs the stealthy B-21 bomber to access targets anywhere on Earth and recapitalize an ancient bomber force. It needs a Long-Range Standoff (LRSO) cruise missile to extend the range of its bombers, overcome advanced defenses, and replace outdated AGM-86B Air Launched Cruise Missiles. It needs a modernized B61-12 warhead so the US can have reliable nuclear gravity bombs in the future.

This begins to look like a laundry list, but it reflects the fact that nuclear modernization largely halted 30 years ago. Each of the aforementioned new weapons or systems will play a key role in the overlapping, resilient nuclear capability that keeps the US arsenal a viable deterrent. Russia and China are modernizing their nuclear arsenals, and improved anti-access, area-denial capabilities are making it increasingly difficult for older US systems to deny enemies sanctuary.

Deterrence has worked for decades with a triad of complementary nuclear systems. Would the deterrent work without them? We don't know, and it would be foolhardy to find out.

Nuclear modernization bills will compete for dollars with numerous other high-profile modernization efforts over the next decade, and there will undoubtedly be calls to cancel the strategic programs because they are supposedly unnecessary, unaffordable, or threatening world peace.

USAF's nuclear modernization plans must remain on track. If there is one thing Russia, China, Iran, and North Korea understand, it is that a credible US arsenal can destroy their nations and their regimes. Deterrence may be a harsh calculation, but it has compelled nations large and small to tread carefully for seven decades and counting. ✪


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Letters

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Yom Kippur's Nickel Grass

On p. 61, reference was made to replacement F-4 Phantoms from Seymour Johnson Air Force Base *["The Yom Kippur Airlift," July, p. 56].* Additional F-4s were from Nellis AFB [Nev.].

Late on a Saturday flying day, eight crew members from the 414th Fighter Weapons Squadron were called into the squadron commander's office. Lieutenant Colonel Gardecki told us to go home, get passport, clothes, and dopp kit—and don't ask any questions.

At approximately 1700, four jets (brand-new "slatted" F-4E models with TISEO) took off on a still unknown mission, refueled over Oklahoma City, destination Seymour Johnson Air Force Base. We were met by the DO, then-Col. Bill Kirk (later USAFE/CC).

Next steps remained unknown for a few more hours as we were on again, off again for next launch.

Finally after a fitful night of sleep, we took off for Lajes Field, Azores. Next stop still unknown.

Early the next day, we got our final orders—Israel, Hatzor Air Base, (if I recall correctly). We were intercepted by Israeli fighters (call sign Lemon Speed) and led to our final destination.

As we taxied off the runway and stopped in the de-arming area, Israeli ground crew jumped on the back of the airplane and attached Star of David decals to our tail.

We pulled into parking spots and as engines were winding down, arming crews were already loading bombs.

We were taken to squadron operations and greeted warmly by local fighter crew [personnel]—one of whom was Eitan Ben Eliyahu, later CSAF of IAF. By the time we were bused to lunch, their new F-4s were launching on combat missions.

Within a matter of a couple of hours we were on one of those C-5s now loaded with a couple of key pieces of former enemy defense systems, courtesy of IAF. We were back in squadron by Tuesday morning. What a cross-country!

Col. Tom Owens,
USAF (Ret.)
Arlington, Va.

I was a loadmaster at Dover in the 3rd MAS and was on either the first or second C-5 to land at Lod. My recollection is that we were first but the 436th AW history claims it was Maj. Josh Hinson's crew. I was crewed with Maj. Tedd Griffith, and we went out from Dover on the same airplane with Hinson as a deadhead crew and were supposed to take it on to Lod from Lajes. However, the airlift command post put both crews in crew rest for some reason and we departed late the next afternoon. However, we were in a Travis airplane for some reason—I think it was because several C-5s had arrived at Lajes and the airplane we came in on was blocked.

At any rate, when we left Lajes, no C-5s had landed at Lod and possibly no C-141s. I remember Major Griffith telling us in the briefing that the Arabs were threatening to shoot us down. I was really pissed and said so because we had no parachutes. I had served two tours in Southeast Asia and a couple of TDYs from TAC on C-130s and had a lot of combat missions, including over North Vietnam and Laos and was not happy. We picked up an IAF escort as we passed near Egypt and there were no incidents.

The reason I am writing this is because of the statement that the airplane was offloaded by hand. No, it wasn't. While there were no USAF air freight personnel and no K loaders there yet, we were met by El Al airline personnel with airline loading equipment. The cargo was ammunition on pallets and they pushed them onto their equipment and hauled them off. Nothing was "offloaded by hand." I'm pretty sure we were the first C-5 into Lod because the description fits our experience. We took off from Lajes just before dark and arrived at Lod around midnight local time. We loadmasters never left the airplane but El Al stewardesses "gave" us sandwiches, soft drinks, and coffee. I put "gave" in quotes because we learned later that the airline charged the US for all of its services and the trinkets and other things they gave us. We all got key chains with the Star of David on them and the officers got roses.

I don't remember how many trips I made into Lod but I made at least one more and probably two or three. One was in daylight. I was surprised to see cotton growing at the airport. On one trip the crew I was with picked up a load of classified cargo—captured Soviet vehicles and a radar van. We took them to Dover then on to Nellis after crew rest. It was an interesting experience but except for the bit about the threats to

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shoot us down, uneventful. Incidentally, our pilots were on the same frequencies with Soviet transports going into Egypt and Syria and they were talking back and forth on discreet frequencies. The Soviet pilots were as concerned about somebody being shot down as we were.

Sam McGowan
Missouri City, Texas

■ *Sam McGowan is no doubt correct about how the first C-5 into Lod was unloaded. "By hand" is a shorthand reference that goes back for years in various reports, probably meant to mean that the 40K loaders were not there. Among other accounts, a 1989 Airpower Journal article, published by MAC's Airlift Operations School—used the phrase "by hand" to describe the unloading. A fact sheet currently posted online by the Air Mobility Command Museum says the airplane was "unloaded manually by Israeli civilians and MAC crew members." It is useful to have McGowan's more precise and accurate explanation.—*JOHN T. CORRELL

At the start of the war, the missile command at Redstone Arsenal, Ala., immediately established a command post operating 24 hours a day in support of the war. I represented transportation, working 12 hours a day, while another

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member worked the night shift. Our only objective was shipping missiles to Israel. Shipments went smoothly with a couple of exceptions as follows.

We shipped 14 Hawk missiles in one aircraft. The pallets slid in as part of the bed of the aircraft. But pallets would not hold all the missiles so after they were loaded the remainder of the missiles were placed on top of the load and tied down. Although overloaded, the C-141 aircraft managed to carry the shipment to its destination without a problem.

There was also a requirement for 123 TOW missiles. The summer before, Israeli personnel had training [in] firing these missiles, at Ft. Benning, Ga., but they still needed the instruction manuals. While these missiles were being flown out, I found that the instruction manuals had also been shipped but by surface means. Going across by ship, they would not be delivered to Israel before the war was over. I had another manual shipment prepared and delivered to Robins AFB, Ga., where they were then flown to Wright-Patterson AFB, Ohio. An El Al aircraft destined for New York bypassed there and landed at Wright-Patterson, picking up the manuals. They arrived in Israel before the missiles got there.

When the war was over, before all of our pilots had left Israel, Golda Meir called them to a meeting and proclaimed that our shipments were delivered to Israel faster than the Russians delivered their support materials to Egypt and Syria, which was a major factor in Israel winning the war.

Maj. David N. Baker,
USAF (Ret.)
East Moline, Ill.

John T. Correll's article highlighted the role of strategic airlift to support Israel during Operation Nickel Grass. As he stated, Military Airlift Command (MAC) "was now expected to produce an instant airlift, even though its aircraft and crews were committed to other purposes." What Mr. Correll did not address was how the MAC missions were backfilled. I was a C-130E pilot at the time, stationed at Dyess AFB, Texas. Our wing was tasked to provide airlift for the missions that MAC was using the C-141 and C-5 to fly essential armaments and supplies to Israel. I specifically remember flying a mission to the Naval Base at Adak, Alaska, since the C-141s normally assigned to that mission were engaged in Operation Nickel Grass. So in no small measure the C-130 Hercules also provided airlift in support of Israel in her hour of need. I'm most happy to say I was part of that mission.

Col. Jon S. Meyer,
USAF (Ret.)
Baltimore

A significant part of the airlift operations was not mentioned, probably because at the time that portion of airlift was under the operational control of Strategic Air Command (SAC).

I was an E-4 (sergeant), KC-135A crew chief at the time and on Saturday afternoon, Oct. 13, KC-135A Stratotankers from Pease AFB, N.H., and Plattsburgh AFB, N.Y., started preparations to deploy to Lajes. Around midnight, the SAC tankers left CONUS for Lajes. My tanker (59-1498, now an R model stationed at Bangor ANGB, Maine) carried the operational staff for the tanker ops, so we were the first in (and last out). When we arrived at Lajes, the ramp was just about empty. Lajes was actually in the process of phasing down as it had been deemed unnecessary, so we parked at the fuel pits (made the most sense for the tankers) and started tanker operations immediately.

CONUS tankers ferried the Israeli-bound F-4s and A-4s (some factory-fresh from McDonnell Douglas in St. Louis) out of Seymour Johnson. Our Lajes-based tankers picked them up mid-Atlantic and escorted and refueled until they were passed over to the tankers out of Torrejon (Spanish Tanker Task Force) and the TJ task force got them close enough to pass them off to Ben Gurion (Tel Aviv) Airport for transfer to the Israeli Air Force. I later learned from a McDonnell Douglas pilot that before they got out of a maintenance debrief on the aircraft, the national star had been painted over and the Star of David stenciled on the sides and wings of the jets, and they were already being refueled and loaded with ordnance for the combat mission.

MAC started arriving a day or two after SAC got to Lajes. C-5s, C-141s were coming in and rapidly taking over the ramp. Many of us were fresh out of tanker operations in SEA as part of the Young Tiger Tanker Task Force so we gave the code name to the SAC operation as Young Camel TTF. We even developed a stencil of a camel with a KC-135 boom for a tail with a mission to "tag" as many MAC aircraft as we could. Billeting space became scarce and MAC and SAC crews shared the little space that was left in the old barracks/dorms. My small dorm room was set up with two bunk beds and all were filled. Upon return from a fighter-drag mission, the tankers were recovered and refueled at the fuel pits and then we'd tow the mission-ready aircraft down to the other end of the ramp to free up parking for the MAC aircraft.

Missions went on for about 10 days, and we started to wrap up the SAC operations. As we prepared to leave, the command staff was deep in meetings and word on the flight line was we were going to stay. The deployed commander and my OMS commander (Lt. Col. Leroy Gibbons) came out to my aircraft and dispelled the rumor and said we were headed back to Pease, but that the SAC fleet was going to Defcon 3.

By the time we landed at Pease, the entire KC-135A and FB-111A fleet was "cocked" on alert. Every tanker had a

Senior Staff Changes

RETIREMENTS: Maj. Gen. Leonard A. **Patrick,** Maj. Gen. Martin **Whelan.**

NOMINATIONS: To Be Lieutenant General: Jerry D. **Harris Jr.,** Jerry P. **Martinez. To Be ANG Brigadier General:** Michael J. **Feeley.**

CHANGES: Maj. Gen. Kenneth T. **Bibb Jr.,** from Vice Cmdr., 618th Air Ops. Center (Tanker Airlift Control Center), AMC, Scott AFB, Ill, to Cmdr., 618th Air Ops. Center (TACC), AMC, Scott AFB, Ill. ... Maj. Gen. Stephen A. **Clark,** from Dir., Force Structure, Rqmts., Resources, & Strat. Assessments, SOCOM, MacDill AFB, Fla., to Dir., Strat. Plans, DCS, Strat. Plans & Rqmts., USAF, Pentagon ... Brig. Gen. Brian **Robinson,** from Cmdr., 618th Air Ops. Center (TACC), AMC, Scott AFB, Ill., to Dir., Ops., AMC, Scott AFB, Ill.

COMMAND CHIEF MASTER SERGEANT CHANGES: CMSgt. Ramon **Colon-Lopez,** from OSAF, Manpower & Reserve Affairs, Pentagon, to Command Chief, AFRICOM, Stuttgart, Germany ... CMSgt. Eric D. **Neilsen,** from Command Chief, Jt. Spec. Ops. Air Component-Central, Al Udeid AB, Qatar, to Command Chief, NATO Spec. Ops. Forces, SHAPE, Mons, Belgium. ✪

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full wartime fuel load (188K pounds) and every Aardvark loaded with a full load of AGM-69 SRAM (short-range attack missile). I remember Gibbons telling us to go back to the barracks and repack to redeploy. Within a day or so, we started to stand down and started the task of defueling all the tankers to an operational mission load and the removing SRAMs from the FB-111As. Going tanker to tanker, we pit defueled by running one engine and using the air refueling pumps to transfer the fuel back to the storage area. I was deeply impressed by the manner in which we deployed and supported the effort, something that has rarely been cited in articles about this early venture into the "sandbox."

Roll ahead to 2007. I assumed command of the 439th Aeromedical Evacuation Squadron at Westover ARB, Mass. My operations group commander jokingly said he hired me because he never met anyone who flew those Yom Kippur missions. My wife told him it really just meant I was old.

Col. Charles R. Tupper,
USAF (Ret.)
Edisto Island, S.C.

Excellent article. In October 1973 F-4s also went from the 33rd TFW at Eglin AFB, Fla.

I was a buck sergeant crew chief still living in the dorms when at 3 a.m. there was banging on the doors. "Recall, recall," we were told. Don't shower, don't shave, don't pack a bag. Just get dressed and get to the flight line as quickly as possible. We hung three tanks on every F-4 on the ramp, did an engine run for fuel transfer checks, refueled them, and got every plane that could be finished in the phase dock on the line and hung three tanks on them. After the sun came up, paint shop came out to the ramp and painted over the unit ID letters on the vertical stabilizers (ED at the time) on every plane. Later that afternoon all our planes departed. We never saw those F-4s again. We were never told where they went, but watching the news, it was not hard to guess where they ended up.

Joel Blue
Biloxi, Miss.

There is a caption error on p. 60 of the excellent July issue. The artillery piece being unloaded is not a 155 mm howitzer. It is an M107 175 mm self-propelled gun. With a maximum range of 32 kilometers, the M107 was capable of supporting Israeli forces maneuvering to encircle the Egyptian Third Army on the west bank of the canal from positions on the east bank.

Lt. Col. Dan Hudson,
USA (Ret.)
Salt Lake City, Utah

First Is First

Your "Airpower Classics" piece on the F-35 Lightning II (*Air Force Magazine,* July, p. 88) credits Lt. Col. Eric Smith as being the first USAF F-35 pilot. That honor is not rightfully his. The first USAF pilot to fly the F-35 was Lt. Col. James Kromberg, who first flew the F-35 on 30 January 08. He was the third overall pilot to fly the F-35, following Lockheed pilots John Beesley and Jeff Knowles, and the only USAF pilot to fly AA-1, the first SDD F-35. Six other USAF pilots also flew their first flights in the F-35 prior to Lieutenant Colonel Smith—Lt. Col. Hank Griffiths on 23 April 10 (10th F-35 pilot), Maj. Matt Hayden on 26 May 10 (12th F-35 pilot), Maj. Scott McLaren on 16 August 10 (14th F-35 pilot), Lt. Col. Leonard Kearl on 23 February 11 (18th F-35 pilot), Maj. Steven Speares on 22 April 11 (20th F-35 pilot) and me (USAF Civil Service test pilot) on 2 June 11 (23rd F-35 pilot). Lieutenant Colonel Smith first flew the F-35 on 27 June 11, making him the eighth USAF pilot and the 25th overall F-35 pilot. Please give credit where credit is rightfully due.

Lt. Col. Vince Caterina,
USAF (Ret.)
Palmdale, Calif.

Still Bringing Them Home

Your "Letters to the Editor" section of *Air Force Magazine* often brings information to light that expands and illuminates previous articles.

In the case of the letter from retired Maj. Vern Pall in the July 2016 issue, it includes information that is so false that I am compelled to respond *[p. 6].*

He states that when President George Bush came into office (elected in 2000), he "terminated" the MIA recovery program in North Korea.

In fact, the program continued in operation until mid-2005, when it was temporarily put on hold by SECDEF Rumsfeld because the US recovery teams' safety was in danger.

The program continues today, albeit with more emphasis on South Korean recovery teams— teams that returned US remains as recently as April of this year.

Col. Ron Sable,
USAF (Ret.)
Tucson, Ariz.

Bird's Eye View

I love watching air shows *["Thunderbirds," July, p. 44].* The last one I attended was painful as it was in Smyrna, Tenn. (formerly Sewart Air Force Base), on my home turf. Oddly, the same day an Air Force Thunderbird also went down, thankfully with less tragic results. It was also the No. 6 jet. I know it's dangerous flying in such close formation and the concentration must be exhausting, but I know those pilots love to do it for the enormous pride and satisfaction, as well as the public accolades and for what they represent to the taxpaying public.

Well, it got me to thinking when the colorful fuselage of the F-16 jet was contrasted against the green vegetation surrounding its crash landing site. I mean no disrespect for tradition, but I think it's time for a change in color scheme for the USAF Thunderbirds, as a new replacement aircraft is being considered. Frankly, the present Thunderbird color scheme has always reminded me more of a "circus type" hype. It looks like it belongs to something that ought to include "clown" pilots. Lest I tick off the entire Air Force chain of command, which is not my intent, I just wanted to get somebody's attention.

If I had to pick between the Navy Blue Angels and the USAF Thunderbirds, I'd have to go with the Blue Angels, from a purely aesthetic point of view. Their gold on blue color scheme is really sharp. So my proposal is simply to change the Thunderbird color scheme to silver on blue. After all they are still the cardinal colors of the United States Air Force. I think it would give the Navy a run for their money!

Another selling point is the view the public gets. Those Blue Angels can be seen amid the sky and clouds very well. The Thunderbird color scheme is tough to see sometimes, depending on the level of humidity in the air and prevailing cloud cover.

The Air Force has always been in the forefront of maintaining its high public image. I'd say it's one of the best. So it's not going against tradition as much as it is embracing change, just like when that stupid enlisted rank insignia, denoting non-NCO status was changed to a "meatball with wings" and then

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changed back to its distinctive original design. That star in the middle of the blue ball with those inverted stripes is one of the reasons I enlisted!

Rick Courtney
Nashville, Tenn.

As usual an excellent article on the T'Birds, but note that the T'Birds flew over Atlantic City and not Ocean City, N.J., and the full F number for the Super Sabre before the F-105B was F-100C and after the 105 was F-100D. The past and present photos of the T'Birds will always reflect the total dedication of the officers and enlisted members to demonstrate the full capabilities of USAF's inventory of fighters.

John Maene Jr.
Hawthorne, N.J.

Numbers Don't Lie

Got a real chuckle out of the comparison of F-22 versus golf courses (183 F-22 to 194 golf courses) *["Air Force World: By the Numbers," July, p. 16].* And then chuckled again at the snippet "Trimming From the Top" *["Air Force World," p. 14]* about the CSAF's unsuccessful attempt to cut 15 three-star generals and only getting at eight. I participated in a couple of similar efforts during my career, with little success as well. But the real eye-opening belly laugh came when I got to the "Chart Page: Where the Generals Are" listing the top 10 locations outside the Pentagon *[p. 19].* How about this for a numbers comparison: Number of Active Duty aircraft at these 10 bases versus number of GOs at those locations? Including Langley and Randolph skews the data towards the planes, but how many AD aircraft does USAF have at Scott, Wright-Patt, Ramstein, Lackland, Peterson, Hickam, Ft. Meade, or Maxwell? Of course those locations house significant headquarters but comparing planes to GOs there may help illustrate why the force has significantly reduced force structure and airmen but not so much the generals. Maybe USAF could try just a little bit harder to "trim from the top."

Col. John Campbell,
USAF (Ret.)
Crossville, Tenn.

Moody's Blues

I really enjoyed reading the article on Moody Suter and the programs he advocated and gave life to *["Wingman: The Visionary Moody Suter," July, p. 76].* Such a visionary leader whose training forums saved lives in future conflicts via Red Flag, the Aggressor program, and the Warrior Prep Center in Europe.

I was the first Aggressor controller assigned to the 527th Tactical Fighter Training Aggressor Squadron at RAF Alconbury in '76 and experienced the fruits of his labors firsthand. I also had the privilege of welcoming "Snake" Clark to the 527th as a fellow Aggressor controller, and he became a future visionary himself.

Lt. Col. Bertram Pryor,
USAF (Ret.)
Norman, Okla.

No Excuse

Thanks for including my letter to the editor, "Bubbles? Well, That's Perfect," p. 9 *[August].*

However, my first name is Otha not Otto, my last name is Vaughan not Vaughn, I received my USAF commission through AFROTC, so it should be USAFR (Ret.), not USAF (Ret.).

I guess I am nitpicking but everybody always spells my name wrong.

Otha H. Vaughan Jr.
Huntsville, Ala.

Correction

In our August issue, p. 8, we ran a letter entitled "Faint Praise for Stalin," but neglected to include the writer's rank. Albert Weeks is a second lieutenant, USAFR (Ret.), and was a 21-year-old navigator on B-17s—later B-29s—preparing to fly missions over Japan when the war ended.—THE EDITORS

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Forward Deployed

By Jennifer Hlad

Incirlik and Diyarbakir air bases back in business; Third F-35 squadron at Luke; North Korean missile lands in Japanese waters ....

ANTI-ISIS OPERATIONS FROM TURKEY

US flight operations against ISIS in Iraq and Syria resumed from Incirlik and Diyarbakir air bases in Turkey, after being "intermittent" for several days following a July 15 coup attempt in the country, a defense official told *Air Force Magazine*.

The Turkish government had closed its airspace to all military aircraft, effectively halting air operations at Incirlik and other bases in the country after the coup attempt. Two Turkish F-16s had threatened the Turkish president's airplane during the military's attempt to wrest control, locking radars on the plane and other aircraft that were protecting him en route to Istanbul, Reuters reported.

Roughly 8,000 police officers and 6,000 judicial and military personnel, including Turkish general officers, have been suspended or detained, after the Turkish president, Recep Tayyip Erdogan, promised to get rid of the "virus" that sparked the fighting, the BBC reported.

Screenshot from a USAF video

Operations against ISIS continued unabated.

Joint Chiefs Chairman Marine Gen. Joseph F. Dunford Jr. told reporters aboard his aircraft July 17 that he had not seen "any indication" that the coup was going to happen.

"It was surprising to me that it occurred, but gratifying to me that the army didn't respond and they continue to respect civilian leadership," Dunford said, according to a DOD news release. The country "bounced back pretty quickly," he added.

Dunford called the US-Turkey relationship "broad: politically, economically, and from a security perspective," and said that the border between Turkey and Syria is key to isolating the battlefield in Syria.

The Air Force has been launching manned air strikes against ISIS from Incirlik since August 2015. In April, the spokesman for Combined Joint Task Force-Operation Inherent Resolve said more combat aircraft and capabilities had become available for the fight against ISIS, including B-52s, A-10s, and Marine Corps EA-6B Prowlers deployed to Incirlik.

Despite the closure of the key Turkish bases, US Central Command was able to adjust flight operations elsewhere so it would not impact the campaign against ISIS in Iraq and Syria, the defense official said.

US and coalition forces conducted 12 air strikes in Syria and 11 in Iraq on July 17, according to the Department of Defense. The strikes in Syria destroyed ISIS oil wellheads and 22 ISIS fighting positions, while the strikes in Iraq hit several ISIS tactical units and destroyed mortar systems, fighting positions, tunnel entrances, and two ISIS headquarters buildings.

Incirlik ran on backup power for several days after the coup attempt but was able to sustain operations, the official said. Base officials worked with Turkish allies to restore commercial power following the disruption, the official said. Commercial power was finally restored to the base on July 22.

Air Force Secretary Deborah Lee James said July 26 that although base operations had returned to normal and the relationship with Turkish troops on base was no problem during the July 15 attempted coup, there was not enough reserve fuel to power the entire base.

That meant nonmission-critical buildings were not powered. US airmen needed to prioritize those areas of the base receiving power during the outage, which forced airmen to sleep on cots in their work places because those were the only places with air-conditioning.

"The biggest hardship was the lack of A/C," James said. Once airspace was reopened to military aircraft, the base continued with operations striking ISIS targets, fighting through the ongoing power outage. "People were doing well" during the outage, James said.

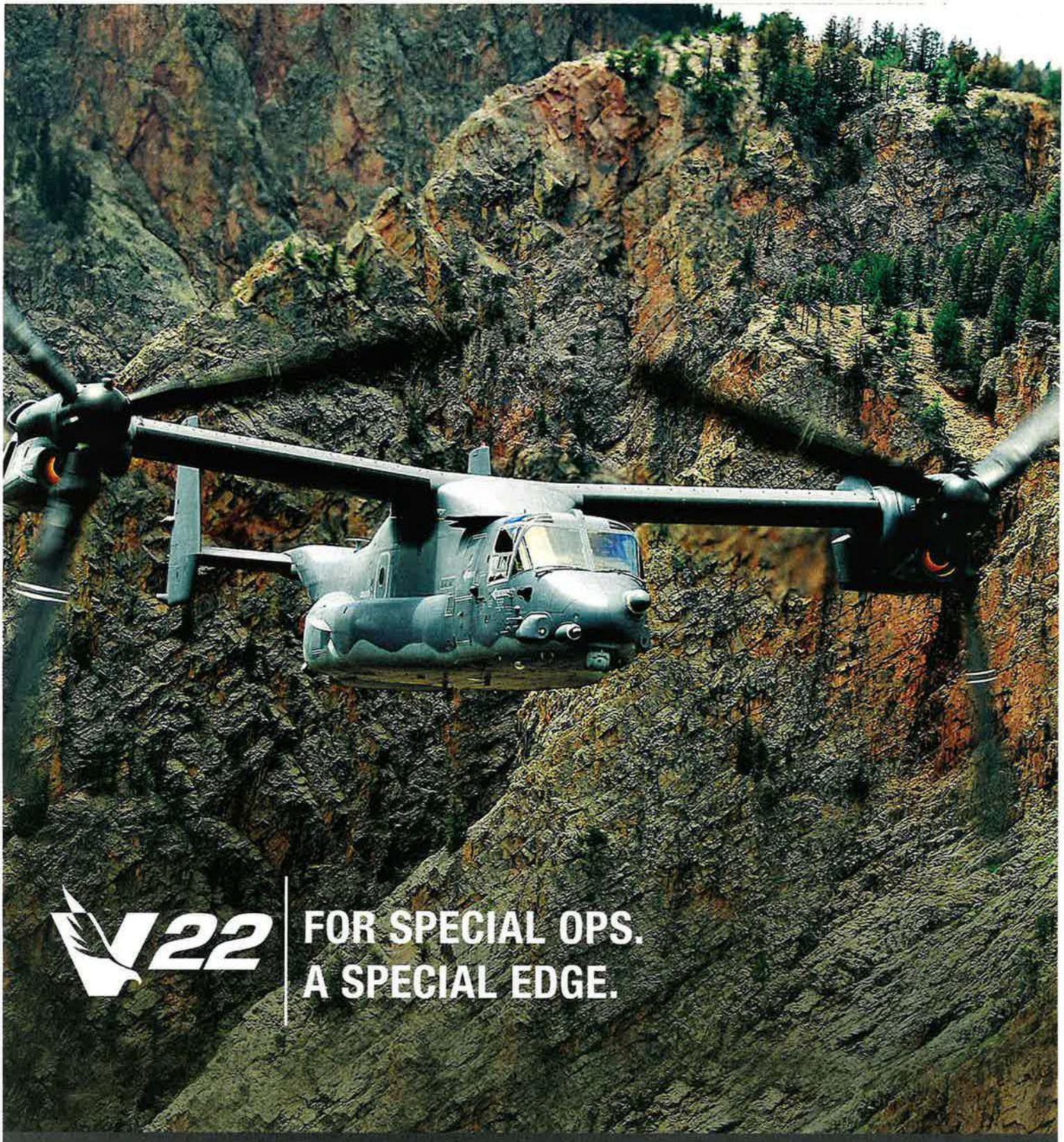
No Defense Department personnel were harmed during the attempted coup or in its immediate aftermath, the defense official said. Although top officials did not anticipate the Turkish coup attempt, instability in the NATO ally's territory was not a complete surprise.

The US government in September 2015 paid for the families of US troops stationed at Incirlik or the US consulate in Adana, Turkey, to fly out of the country. In November 2015, EUCOM announced travel restrictions to Turkey for all service members, civilians, and dependents.

Those restrictions remain in place as the command considers the appropriate reaction to the security situation there, the defense official said.

LUKE'S NEW F-35 TRAINING SQUADRON

Luke AFB, Ariz., now has three F-35 squadrons, Air Force officials announced. Lt. Col. Matthew Vedder took command of the new unit—the 63rd Fighter Squadron—Aug. 1 at a



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ceremony on the base's flight line. The squadron will train American and Turkish F-35 pilots as part of the partnership between the two countries; the pilot instructors will all be American.

Vedder previously served as director of operations for the 62nd Fighter Squadron, which also trains international F-35 pilots at Luke.

By 2022, Luke is scheduled to have six F-35 squadrons and 144 jets. The 62nd FS transitioned from the F-16 to the F-35A in June of 2015, making it the second F-35 training squadron at the Arizona base. Luke's first F-35 training squadron, the 61st FS, stood up in October 2013.

Col. Benjamin W. Bishop, commander of the 56th Operations Group, said at the ceremony the 63rd has "a distinct heritage" and has been part of the 56th Fighter Wing since World War II.

Turkey plans to buy 100 F-35As, according to Lockheed Martin. Lockheed Martin in November 2015 announced it would develop and integrate the Turkish SOM-J medium-range cruise missile onto the country's Lightning IIs.

A-10S OVER ESTONIA

Eight A-10s, a KC-135, and more than 200 airmen from bases around the US and Europe recently deployed to Estonia for training as part of Operation Atlantic Resolve. The A-10s, from 442nd Fighter Wing at Whiteman AFB, Mo., arrived at Amari AB on July 25 for the two-week exercise. The A-10s also trained with British, Estonian, Lithuanian, and Latvian joint terminal attack controllers during the exercise.

Two A-10s and two British RAF Typhoon FGR4s flew over Tallinn, Estonia, as part of the demonstration of capabilities. Eight A-10s successfully landed on and took off from a highway in the northeastern European country, practice for when the aircraft are forced to land on alternative runways, Col. Gregory A. Eckfeld, vice commander of 442nd Fighter Wing, said in a press release.

The participation of the KC-135 Stratotanker, from the 185th Air Refueling Wing of the Iowa Air National Guard, marked the first time airmen and aircraft from the wing participated in a forward training deployment in Estonia, according to the wing. Airmen from the 442nd Medical Squadron and the 442nd Civil Engineering Squadron also were in the exercise.

USAF photo by SrA. Missy Sterling

A KC-135 refuels an A-10 over Estonia.

DPRK LAUNCHES MISSILES

North Korea on Aug. 3 launched ballistic missiles, with one becoming the first to land in or near waters controlled by Japan. The medium-range missile flew about 620 miles, making it the longest North Korean launch so far, the Associated Press reported. Japanese Prime Minister Shinzo Abe said the launch was a "serious threat" to his country and called it an "unforgivable act of violence."

US Strategic Command said it had detected two missiles, but one exploded almost immediately. South Korea's Office of the Joint Chiefs of Staff said North Korea's actions showed the country's desire to "directly and broadly attack neighboring countries." Officials from the US, the Republic of Korea, and Japan quickly came together to condemn the launches as a provocative act and to push for more cooperation to deter the threat from unstable, unpredictable North Korea.

The US, represented by Christopher Johnstone, DOD principal director for East Asia, spoke with Brig. Gen. Cheol-Kyun Park, the deputy director general of the International Policy Bureau for the Republic of Korea Ministry of National Defense, and Koji Kano, the principal director of the Defense Policy Bureau of the Japanese Ministry of Defense. The officials said the launch, among other recent ballistic missile launches, are "provocative acts that represent a flagrant violation of United Nations Security Council Resolutions and a serious threat to peace and stability," according to a Pentagon readout of the conference.

The countries discussed possible further cooperation to deter the missile threats, following an agreement last month between the US and South Korea to deploy a Terminal High Altitude Area Defense (THAAD) missile system on the Korean Peninsula.

AFCENT BOSS TALKS PRIORITIES

New Air Forces Central Command boss Lt. Gen. Jeffrey L. Harrigian recently visited the 380th Air Expeditionary Wing in Southwest Asia to meet the airmen and reinforce AFCENT's priorities in the war against ISIS.

Harrigian took command of AFCENT July 22 and visited the wing Aug. 1. The new commander said delivering airpower, defending the region, and developing partnerships are "pretty straightforward" priorities for everyone from himself to the youngest airman.

Harrigian said the Combined Forces Air Component is made up of 20 countries with "tremendous capabilities" and must be strong to succeed at the mission. The 380th AEW flies strike, ISR, command and control, and aerial refueling missions in northeast Africa, the Middle East, and central and south Asia.

The wing's efforts have had an impact on ISIS, Harrigian said. "A significant amount of momentum has occurred where we've been able to get after the financing, the communication, command and control, that the enemy has tried to leverage, and we've taken that away from them," he said. ✪

Jennifer Hlad is a freelance journalist based in the Middle East and a former Air Force Magazine *senior editor.*

T-X

95

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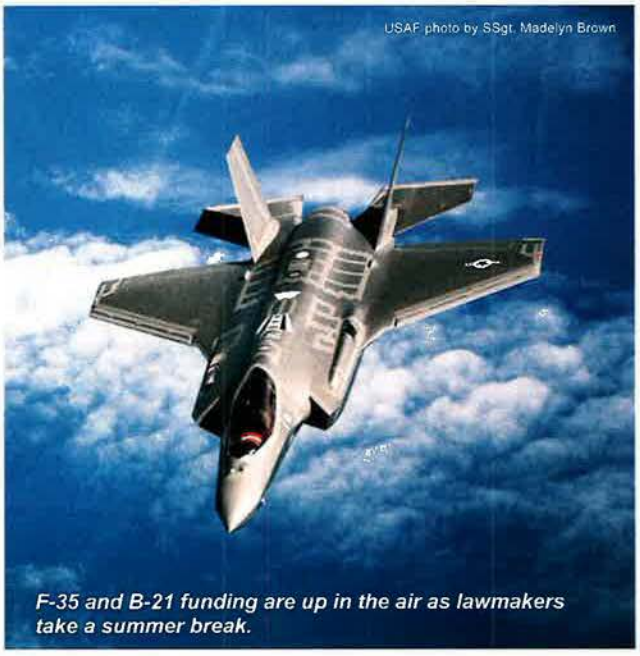
By Megan Scully

Election-Year Headwinds for USAF Modernization

Congress left town for a seven-week summer recess with government funding for the next fiscal year still very much up in the air and the fate of major military programs like the newly operational F-35 strike fighter and next generation B-21 stealth bomber hanging in the balance.

When lawmakers return to Washington this month, the clock will be ticking down to Fiscal 2017, which begins Oct. 1.

The budget is certainly on the agenda for the few weeks Congress is in session before departing for another lengthy pre-election recess. But the best the government can realistically hope for is a stopgap measure to keep agencies running until lawmakers return for the lame-duck session in November.



F-35 and B-21 funding are up in the air as lawmakers take a summer break.

With gridlock the order of the day in Washington, the Pentagon has grown accustomed to operating under a continuing resolution for at least the first few months of each fiscal year. But an unusually divisive election year has left many in Washington wondering whether lawmakers will be able to complete a massive spending bill late this fall—or will lawmakers just punt and leave the hard work up to the next Congress?

Much will depend on the outcome of the election itself.

If Republicans lose the Senate, they will want to complete work on the Fiscal 2017 spending bills before they are in the minority in January. If the GOP maintains a Senate majority, there is much less urgency to their completing work on the bills before January or February. This would put a major crimp in Pentagon planning.

Under a continuing resolution, the Pentagon is funded at the same topline as the previous year. That's not a problem this year for the department, whose overall funding levels are more or less the same in 2016 and 2017.

However, there is an issue with individual pots of money—particularly for programs scheduled to ramp up but stuck at the previous year's funding levels.

Now, Congress could stipulate some exceptions—or "anomalies"—in a continuing resolution, giving some programs more money than they otherwise would receive. Those are generally few and far between.

"If you make too many exceptions in a CR, it reduces the pressure to actually pass an appropriations bill," says Todd Harrison, a budget analyst at the Center for Strategic and International Studies.

The B-21, still in its infancy, is perhaps the program that would be hit hardest under a long-term CR.

The budget for long-range strike—much of which is earmarked for beginning engineering and manufacturing development of the B-21—is supposed to grow from $1.5 billion to $2.2 billion between 2016 and 2017. Under a CR, however, the closely guarded program would not see this 50 percent year-over-year funding growth. The bomber's development program would be stuck at the lower 2016 level.

The exact spending plans for the next bomber, which could cost upward of $100 billion, are not known, but a significant funding shortfall this early in development would almost certainly prompt schedule delays and, potentially, cost overruns down the road.

Meanwhile, the budget for the multiservice F-35 program was projected to decrease from 2016 to 2017, from $11.6 billion to $10.5 billion, thanks to caps on defense spending. The services bought 68 of the strike fighters this year and expect to procure five less in 2017.

But lawmakers anxious to upgrade the military's aging fighter fleet found creative ways to add F-35s to the defense spending bills to meet unfunded requirements outlined by the services.

The Senate's version of the spending measure adds four additional F-35s for the Navy and Marine Corps and another $100 million for advance procurement for the Air Force's F-35As.

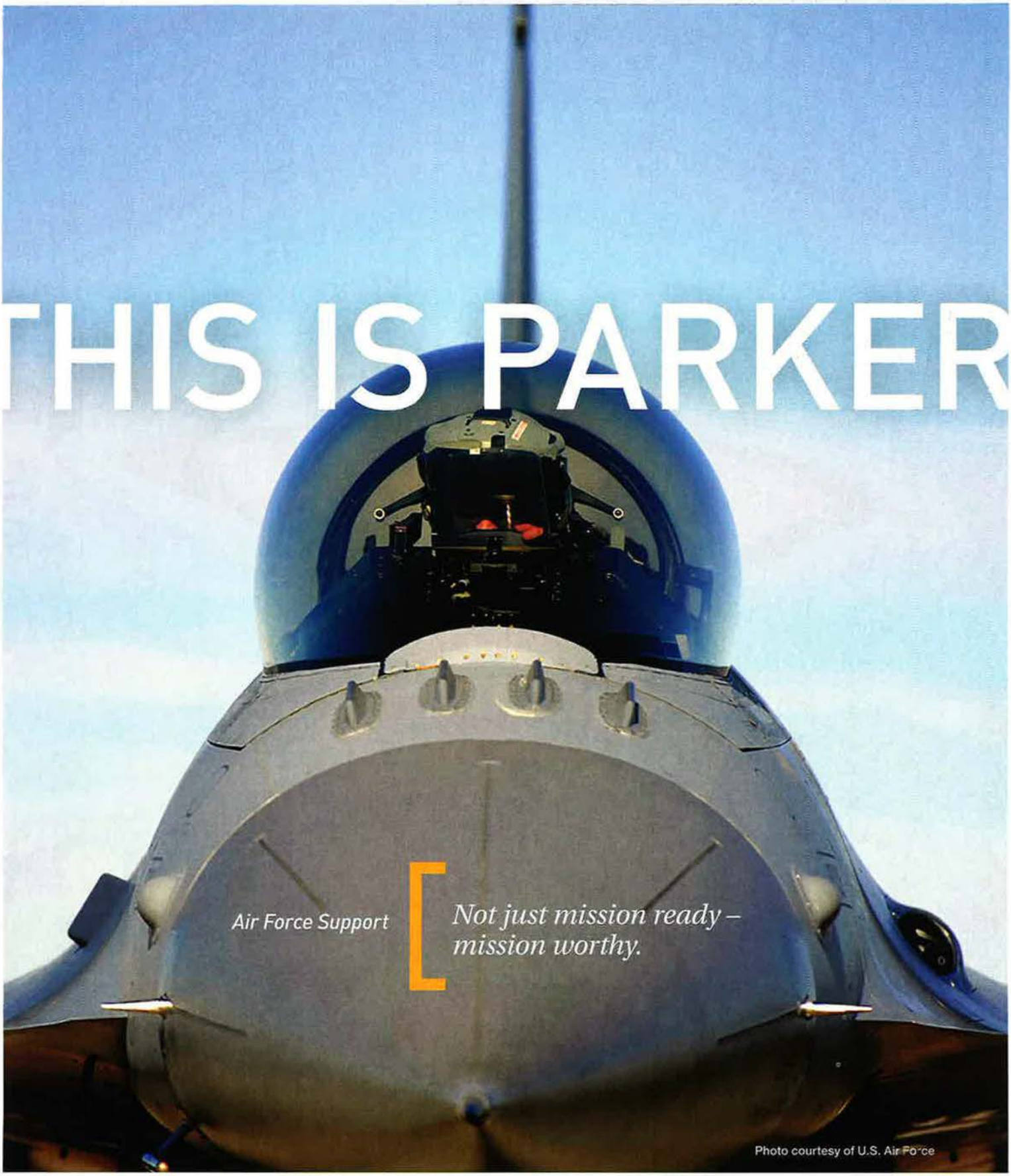
The House-passed bill is much more generous, boosting the program even further, adding 11 F-35s—including five for the Air Force—to the Pentagon's request for 2017.

Until there is resolution to the budget process, the Pentagon will not know whether it will be buying the 63 F-35s requested for next year, the 74 funded in the House bill or, perhaps most likely, something in between. That makes planning extraordinarily difficult, particularly as the Obama Administration finalizes its final budget request, to be sent to Capitol Hill at the start of the next Administration.

Even as lawmakers remain firmly divided over how to proceed and become increasingly distracted by the upcoming elections, Harrison says he is optimistic there will be some kind of a deal on the 2017 budget this fall. Just don't expect it before Thanksgiving.

"This type of deal is not likely to take shape until the last minute," he says. "We are going to go right up to the cliff, biting our fingernails." ✪

Megan Scully is a reporter for CQ Roll Call.



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A KC-135R tanker from the 6th Air Refueling Wing at MacDill AFB, Fla., flies a training mission over central Florida. The refueler can take off at a gross weight of up to 322,500 pounds.


USAF photo by MSgt. Keith Reed
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The F-35A Is Operational

The Air Force's top leadership celebrated its newest operational aircraft at the fighter's first main operational base. "The F-35 will soon become the quarterback of the joint force," Air Force Chief of Staff Gen. David L. Goldfein said during an Aug. 5 ceremony at Hill AFB, Utah. The event celebrated the declaration earlier that same week that the F-35 has reached initial operational capability.

Hill is home to the 388th Fighter Wing and associated Reserve 419th Fighter Wing that are the first to fly the aircraft operationally.

Air Force Secretary Deborah Lee James said there is still work to do as the F-35 moves toward full operating capability, including keeping costs down so the Air Force can continue to strive for the total fleet goal of 1,763 aircraft.

(For more, see "F-35: Lightning Unleashed," p. 52.)

Flexing the Nuclear Muscles

The Air Force on Aug. 1 sent five nuclear-capable bombers on simultaneous nonstop flights from the continental US in the Polar Roar exercises. This was one of the biggest flexes of its nuclear might, US Strategic Command announced.

The aircraft—one B-52 from the 2nd Bomb Wing at Barksdale AFB, La.; two B-52s from the 5th Bomb Wing at Minot AFB, N.D.; and two B-2s from the 509th Bomb Wing at Whiteman AFB, Mo.—flew three different routes.

One B-52 flew from Nellis AFB, Nev., to the North Sea and Baltic Sea and back to Barksdale; two Minot B-52s flew around the North Pole and Alaska; and the Whiteman B-2s flew over the Pacific Ocean to Alaska's Aleutian Islands. These missions were supported by Canadian and US fighter aircraft, along with NATO partner aircraft in Europe. Some of the aircraft also conducted inert weapon drops at the Joint Pacific Alaska Range Complex, STRATCOM said.

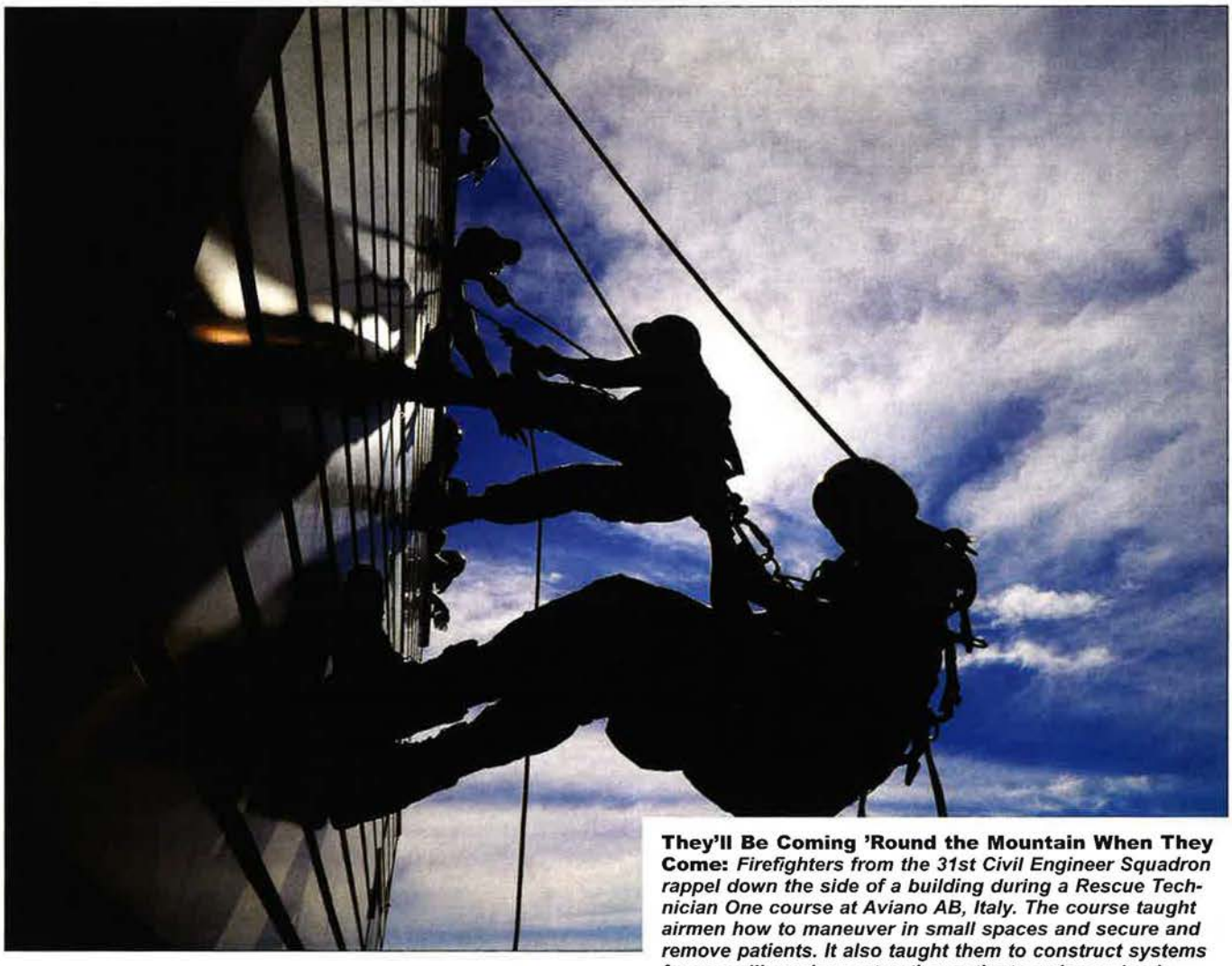
No CAS Permission Slip

While it's "the right thing to do" for top Air Force leaders to explore a possible cheap-to-buy-and-operate close air support aircraft for "permissive environments," Air Combat Command chief Gen. Herbert J. "Hawk" Carlisle isn't so sure such a program would be a good investment.

Polar BUFF: ***A B-52 flies near the North Pole during Polar Roar, a strategic deterrence exercise. See "Flexing the Nuclear Muscles."***

USAF photo by SrA. Joshua King

By Brian W. Everstine, Pentagon Editor



USAF photo by SrA. Areca T. Bell

They'll Be Coming 'Round the Mountain When They Come: ***Firefighters from the 31st Civil Engineer Squadron rappel down the side of a building during a Rescue Technician One course at Aviano AB, Italy. The course taught airmen how to maneuver in small spaces and secure and remove patients. It also taught them to construct systems for rappelling when extracting patients or heavy loads from difficult-to-access areas such as the mountains near Aviano.***

"I wonder," Carlisle told reporters at the Pentagon on Aug. 2, whether "in five, seven, 10 years, ... will there be any such thing" as a permissive environment? He said Russia's loss of multiple helicopters in Syria to unsophisticated weapons is an indication of "where we're going." State-sponsored terrorists, he said, "have access to state-sponsored weapons," and a low-tech CAS airplane might arrive just in time to be irrelevant.

Air Force Opens Next GPS III Contract Battle

The Air Force officially requested bids for the next GPS III satellite launch, giving SpaceX and United Launch Alliance until Sept. 19 to bid for the 2019 mission. Under the request, posted Aug. 3, the Air Force will award a firm-fixed-price contract that covers launch vehicle production, mission integration, and launch operations.

The Air Force in June released a draft request for proposals to industry to collect input before the final request was released, attempting to avoid a repeat of the April contract award where United Launch Alliance didn't bid.

Keeping F-22s Modern

It is critical to continue F-22 modernization to keep the fleet capable to sustain air superiority in the future, especially with the Raptor line staying closed, Air Combat Command boss Gen. Herbert J. "Hawk" Carlisle said.

Speaking at a House Armed Services subcommittee hearing on July 13, Carlisle said F-22s have shown their combat capability in Operation Inherent Resolve by targeting ISIS with Small Diameter Bombs and by penetrating "airspace that other airplanes couldn't." It is critical to continue to upgrade the capability of the 183-aircraft fleet. This includes taking lessons learned from the F-35, such as increasing the maintainability of the F-22's low observable skin.

Because the F-22's production line will in all likelihood stay closed, Carlisle said he wants to upgrade the F-22s assigned to the 43rd Fighter Squadron at Tyndall AFB, Fla., to combat-capable.

From Assurance to Deterrence

The requested quadrupling of European Reassurance Initiative funding will allow the US presence to change its role from assurance to deterrence, USAF Maj. Gen. David W. Allvin, the director of strategy and policy for US European Command, told lawmakers July 13.

"The first two years of the [ERI] were largely focused on assurance; ... however, as we continue to see a malign influence and a Russia acting to upset international norms, we have transitioned beyond purely assurance. We are planning and executing activities designed to serve as a stronger deterrent to Russian aggression," Allvin told the House Armed Services Committee's panel on oversight and investigations. Allvin said the increased funding will allow for more US troops, exercises with NATO and other allied nations, and pre-positioned equipment.

USAF May Need More Than 100 B-21s

Air Force Global Strike Command boss Gen. Robin Rand said his command needs a "minimum of 100" B-21s, but indicated strongly that it should have more of the Long-Range Strike Bombers to perform all of its missions.

"When asked to give my best military advice, I've said we should draw the line at 100 B-21s. Not a single one below that," Rand told an AFA Mitchell Institute for Aerospace Studies forum on July 28. "What I haven't been clear on is what is the ceiling on that, because we're working our way through that."

Estimates of how many B-21s would be needed have ranged from 80 to 100. "I've been very clear at what the floor should be," Rand said. While others may think differently, as AFGSC commander, "we need a minimum of 100."

The current number of strategic bombers, he said, is 156, a combination of the aged B-52s that are likely to be phased out and 20 of the newer B-2s.

Continued on p. 28

European Allies Want More US Air Force

US allies in Eastern Europe are growing increasingly concerned about "snap exercises" by Russia and are pushing for the US to make increased funding to work alongside them permanent, Air Force Secretary Deborah Lee James said.

James recently returned from visiting eight European countries, including the Baltic states and Ukraine, to focus on how the Air Force can assuage allied concerns about the increasingly threatening stance of Russia in the area, particularly following the country's incursion into Crimea.

"Those closest have the greatest concerns" about Russia, James said July 26, noting those are the countries making the NATO commitment of spending at least two percent of their gross domestic product on defense spending.

ANG photo by SSgt. Lealan Buehrer

Smoke and Mirrors: ***Airmen from the Illinois Air National Guard's 182nd Security Forces Squadron emerge from concealment smoke during training. The exercise taught the fire team communication and movement skills for combat.***

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US Central Command Operations: Freedom's Sentinel and Inherent Resolve

Casualties

As of Aug. 17, 24 Americans had died in Operation Freedom's Sentinel in Afghanistan, and 23 Americans had died in Operation Inherent Resolve in Iraq and Syria.

The total includes 45 troops and two Department of Defense civilians. Of these deaths, 15 were killed in action with the enemy, while 32 died in noncombat incidents.

There have been 118 troops wounded in action during OFS and 16 troops in OIR.

Obama Says ISIS Adapting to Survive

The continued momentum in fighting ISIS and loss of territory in both Iraq and Syria is forcing the group to change tactics in a way "very difficult to detect and prevent," President Barack Obama said during a Pentagon briefing Aug. 4. Obama highlighted the amount of land retaken from the group as more than 14,000 air strikes have hit the group's capitals of Raqqa and Mosul. "The decline of [ISIS] in Syria and Iraq appears to be causing it to shift to tactics we have seen before," Obama said, highlighting high-profile terror attacks in Iraq and Syria and throughout Europe. The National Security Council discussed ways to continue "the most precise air campaign in history," he said. The coalition has flown about 100,000 sorties since Operation Inherent Resolve began in 2014, though more will be needed as the ground forces continue to put pressure on the group. Obama highlighted 560 troops sent to help build an airfield near Qayyarah in Iraq and turn it into a logistical hub as Iraqi forces push toward Mosul.

AFRICOM Details Libya Strikes

US Africa Command on Aug. 4 began detailing its new campaign of air strikes at the request of the Libyan Government of National Accord, outlining exactly what the US aircraft had in its sights near the city of Sirte.

In air strikes on Aug. 1, the first day of Operation Odyssey Lightning, US aircraft hit one T-72 tank, two military support vehicles, an enemy fighting position, one T-55 tank, and two pieces of heavy engineering equipment. Aircraft on Aug. 2 hit one rocket launcher, one piece of heavy engineering equipment, and one pickup truck with a mounted recoilless rifle.

On Aug. 3, an air strike hit one pickup truck with a mounted recoilless rifle. The strikes were outlined in an AFRICOM news release, which closely resembles how US Central Command has announced its air strikes on ISIS targets in Iraq and Syria. AFRICOM also released a video of the air strike on the T-72 tank, showing a precision strike destroying the vehicle with buildings nearby.

CENTCOM: 14 Civilians Killed in Six US Air Strikes

US Central Command found six air strikes in Iraq and Syria resulted in the deaths of 14 civilians, according to the results of several civilian casualty investigations announced in early August.

The six strikes, carried out between July 28, 2015, and April 29, 2016, are in addition to the investigations into recent reports of civilian deaths CENTCOM previously announced.

Investigations found that:

- On July 28, 2015, a strike on a senior Khorasan Group advisor near Idlib, Syria, killed three civilians when their vehicle "appeared in the target area after the coalition aircraft released its weapon," according to a CENTCOM news release.
- On Feb. 15, 2016, three civilians were killed by a strike on an ISIS staging area near Al Qaim, Iraq.
- On Feb. 16, 2016, one person was injured along the side of the road when a coalition aircraft struck an ISIS vehicle near Ar Rayhaniyah, Iraq.
- On April 5, 2016, three civilians were killed when a coalition aircraft struck an ISIS financial storage facility.
- On April 26, 2016, one civilian was killed when a motorcycle "unexpectedly appeared in the target area after the US aircraft had already released its weapon" at an ISIS checkpoint in Sharqat, Iraq.
- On April 29, 2016, four civilians were killed in a targeted strike on Neil Prakash, an ISIS external operations facilitator, in Mosul.

Anti-ISIS Defense Ministers Discuss Increased Efforts

The defense ministers and representatives of all the nations fighting ISIS are looking to increase their efforts to destroy the group and build on local ground forces' momentum, including the killing of more than 20 ISIS operators who were planning external attacks.

Almost 40 defense ministers and other officials from the nations contributing to the counter-ISIS fight convened at JB Andrews, Md., on July 20 to review how they can do just that.

This is a critical moment and an important opportunity "to build on our momentum and deliver [ISIS] the lasting defeat it deserves," US Defense Secretary Ashton B. Carter said during a press conference at Andrews.

The meeting comes as the coalition builds on progress combating ISIS, but also at a time when allied nations—such as France—are reeling from ISIS-inspired attacks like the Bastille Day attack in Nice, France. The coalition needs to defeat the "parent tumor" of ISIS in Iraq and Syria, defeat the group in other areas where it has spread such as Libya, and protect the homeland of the US and allies, Carter said.

A Failure to Calibrate

A failure to correctly calibrate a ground control station led to an MQ-9A Reaper crash in the US Central Command area of responsibility in November 2015, Air Combat Command investigators found.

During an intelligence, surveillance, and reconnaissance mission, the remotely piloted aircraft—assigned to the 432nd Wing at Creech AFB, Nev., and operated by the 138th Attack Squadron at Hancock Field ANGB, N.Y.—sustained a starter generator failure and was diverted to an alternate launch and recovery element (LRE), according to the abbreviated investigation report.

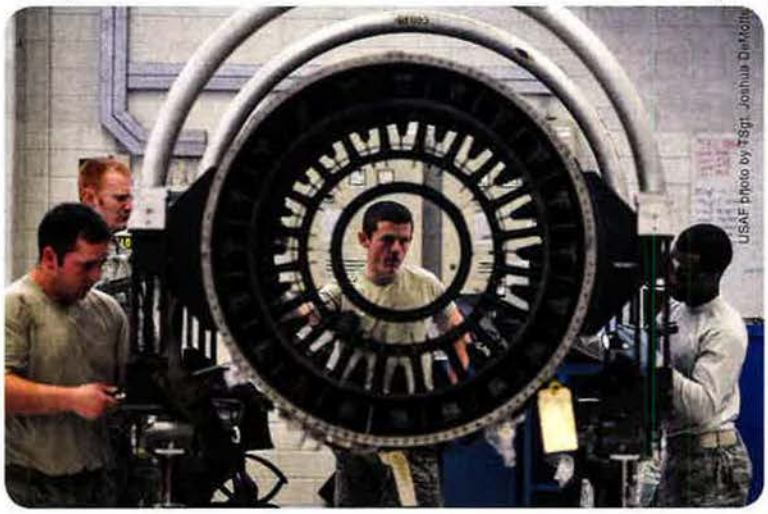
But the alternate LRE attempted to assume control of the aircraft without calibrating their equipment to fly an MQ-9A. The aircraft then entered a reverse-thrust mode, stalled, and lost altitude, causing all three flight control assemblies to fail. The mission control element, a pilot and instructor pilot, regained control of the aircraft, but it was no longer fully controllable and was impossible to land.

The instructor pilot then purposely crashed the aircraft in a remote, undisclosed location. Loss of the RPA is estimated at $9.9 million, and the wreckage was not recovered. There were no fatalities or damage to private property.

By the Numbers

4,000

The total shortfall of maintainers currently in the Air Force. The service said it plans to erase this shortage by 2019 as long as Congress funds a requested manpower increase. Col. Pat Kumashiro, a maintenance expert on the Air Staff, said the service wants to access an additional 1,500 to 2,000 maintainers a year and retain experienced maintainers.



In the Middle of It: ***Airmen from the 52nd Aircraft Maintenance Squadron at Spangdahlem AB, Germany, work at the only F110 engine overhaul facility in US Air Forces in Europe.***

Bones Return to Guam

Lancers headed to Guam for the first time in 10 years, as US Pacific Command replaces the nuclear-capable B-52s with conventional B-1s as part of the continuous bomber presence mission.

B-1Bs from Ellsworth AFB, S.D., touched down in late July at Andersen AFB, Guam, replacing B-52s from Minot AFB, N.D. The deployment includes 300 airmen. The B-1 fleet has recently undergone a large-scale upgrade program, which forced the Air Force to return the aircraft from its continuous presence in the Middle East.

The deployment marks the first time B-1s have deployed to Guam since April 2006 and the first time they have deployed to Andersen while aligned under Air Force Global Strike Command.

Air Force Allows Special Tactics Cross-Training

The Air Force is now allowing airmen to be released from their current jobs and attempt to cross-train into special tactics, provided they meet the standards for the new career fields.

The move, which comes from an April 25 policy memorandum, is an attempt to fill critically manned career fields in the special tactics community, such as special tactics officer, combat rescue officer, combat controller, pararescue, and special operations weather, according to a July 26 news release.

The new policy also lets airmen join the tactical air control party and air liaison officer career fields, though those require prior service in the conventional force. The airmen will now be able to cross-train to special tactics regardless of the manning levels in their prior career field. Under the new policy, an airman who does not pass initial qualifications for the special tactics career field will be reinstated into prior career field "without any prejudice," the release states. ✪

Russia Vital But Not Trustworthy

US officials continue to condemn Russia's actions to support the Syrian regime, though President Barack Obama said there might not be an alternative to working with Russian leaders to reduce the violence in that country.

Obama, speaking Aug. 4 at the Pentagon following a meeting of the National Security Council, said Russia's actions to support Syrian President Bashar al Assad raise "very serious questions about their commitment to pulling the situation back from the brink." The US is prepared to work with Russia if that country can shift its focus to solely defeating ISIS, but "so far Russia has failed to take the necessary steps."

The country has been supporting "a murderous regime" and the US needs to be skeptical if it tries to broker an agreement with Russian President Vladimir Putin. "I'm not confident that we can trust the Russians or Vladimir Putin, which is why we have to test whether or not we can get an actual cessation of hostilities," Obama said. "That includes an end to the kinds of aerial bombing and civilian death and destruction that we've seen carried out by the Assad regime."

A few days before the President's comments, Defense Secretary Ashton B. Carter said he is "enthusiastic" about the possibility of working with Russia in the fight against ISIS, but he too acknowledged that Russia is "a ways" from "that frame of mind."

Secretary of State John F. Kerry recently visited Moscow to discuss closer cooperation against ISIS, and those negotiations are continuing.

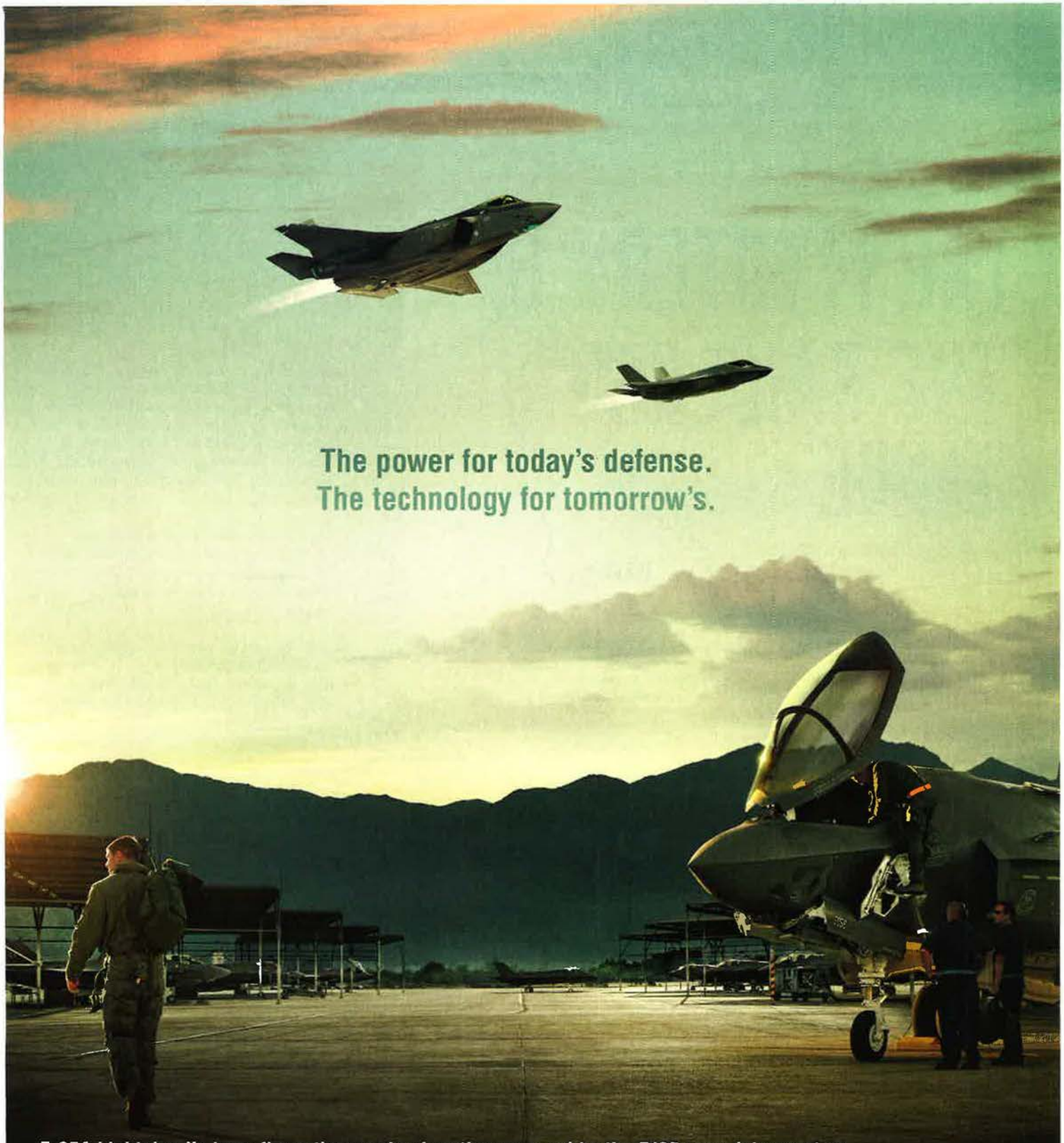
Marine Gen. Joseph F. Dunford Jr., Chairman of the Joint Chiefs of Staff, said any possible agreement with Russia would include "specific procedures and processes" to protect US operational security.

This is a problem. Dunford said he is "aware of state actors, to include Russia," that have attempted to penetrate Defense Department networks.

Cybersecurity experts have accused Russian hackers of targeting myriad public and private US networks.

Carter emphasized that the State Department's ongoing negotiations with Russia are "not based on trust. They are based on a transaction and on mutual interest."

In the meantime, the US military's only contact with Russia is focused on safety in the skies over Syria, Dunford said during the July joint press conference with Carter.



F-35A Lightning IIs have flown thousands of sorties powered by the F135 propulsion system, developed from the highly successful fifth-generation engine for the F-22 Raptor. Pratt & Whitney partners with customers around the world to provide sustainment solutions that keep the F-35 Lightning II dependable and affordable. We are proud to power today's most advanced fighter aircraft. Now we are advancing engine technology to provide the next generation of fighter engines for tomorrow's defense needs. Learn more at **www.pw.utc.com**.

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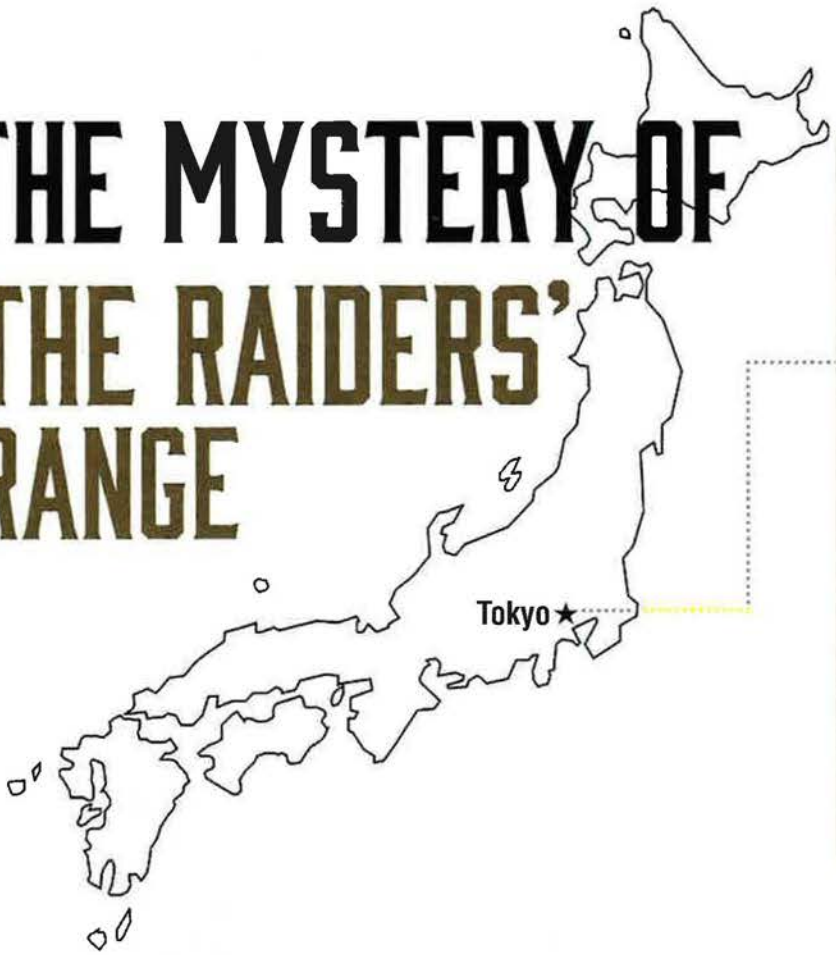
THE MYSTERY OF THE RAIDERS' RANGE



The exact distance of the April 18, 1942, Doolittle raid from the carrier *Hornet* to the targets in Tokyo has always been a matter of debate.

There are numerous contradictory but seemingly authoritative distances stated. Using sources ranging from Lt. Col. James H. "Jimmy" Doolittle's autobiography to after-action reports and even messages from Japanese ships, one finds estimates ranging from 600 miles to 824 miles. This is no rounding error.

Why the discrepancies? For one, some sources look at the distance from the carrier to Japan, some from *Hornet* to Tokyo, and others from the carrier to the intended targets.

Units of measurement also posed problems. In 1990's *The Doolittle Raid,* Carroll V. Glines quotes a memo Doolittle wrote to Gen. Henry H. "Hap" Arnold, commander of

600

Duane Schultz's *The Doolittle Raid*

645

1st Lt. Kenneth Reddy, copilot, aircraft 11

650

Adm. Chester Nimitz's after-action report

1st Lt. Thomas Griffin, navigator, aircraft 9

Robert Kane's "The Doolittle Raid: A 65-Year Retrospective," *Air & Space Power Journal,* spring 2007

National Museum of the US Air Force

C. V. Glines' "An American Hero," *Air Force Magazine,* November 1993

768

Gen. Hap Arnold's memo

770

Air Force Magazine calculation, 2008

By Gideon Grudo, Digital Platforms Editor

US Army Air Forces during World War II. In it, Doolittle emphasized that "all distances will be in statute miles."

Statute miles are those measured on ground. In navigation, however, it is common to use nautical miles, which are 15 percent longer than statute miles. In other words, 700 statute miles is the same distance as 805 nautical miles, but sources frequently failed to specify what miles they were using. When former *Air Force Magazine* Editor in Chief John T. Correll researched the raid he found 16 different sources presenting the distance in some sort of miles.

Below, we visualize the distances in generic miles. How far did these men—"truly American heroes," in the words of recently retired Chief of Staff Gen. Mark A. Welsh III—actually travel to their destination? We will probably never know.

Staff illustration by Mike Tsukamoto

800

- April 20, 1943, War Department announcement
- Ted Lawson's *Thirty Seconds Over Tokyo*
- Wesley Craven and James Cate's *The Army Air Forces in World War II, Volume 1*

810

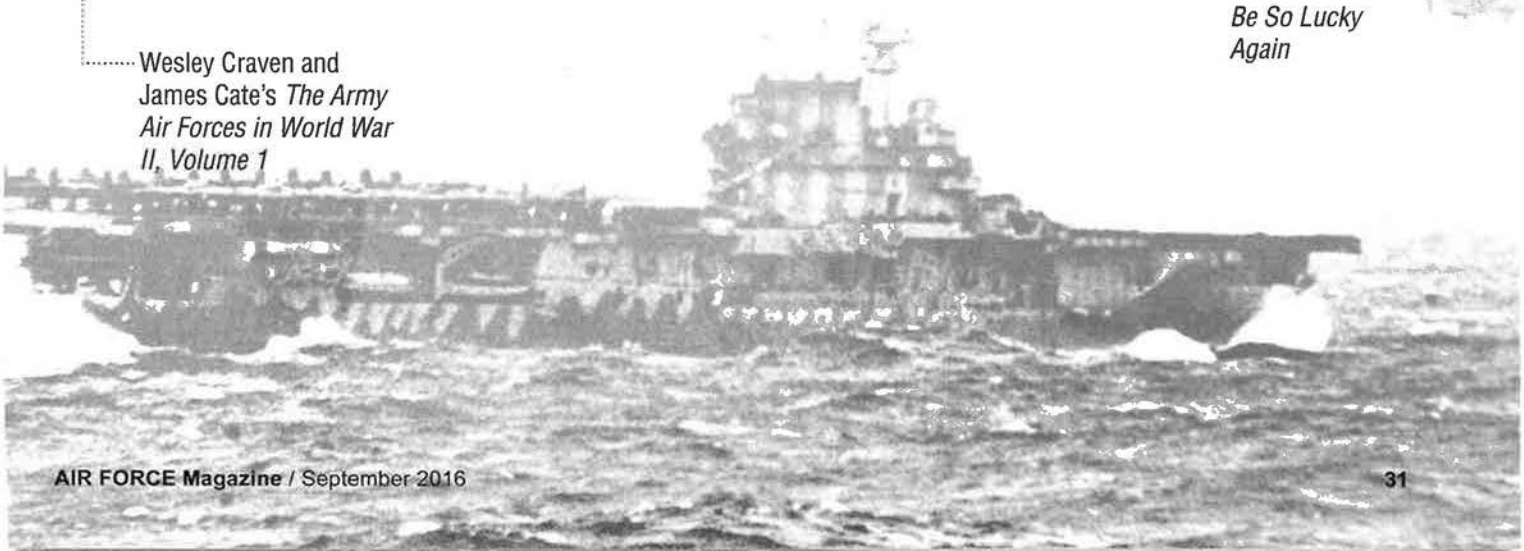
- 1st Lt. Edgar McElroy, pilot, aircraft 13

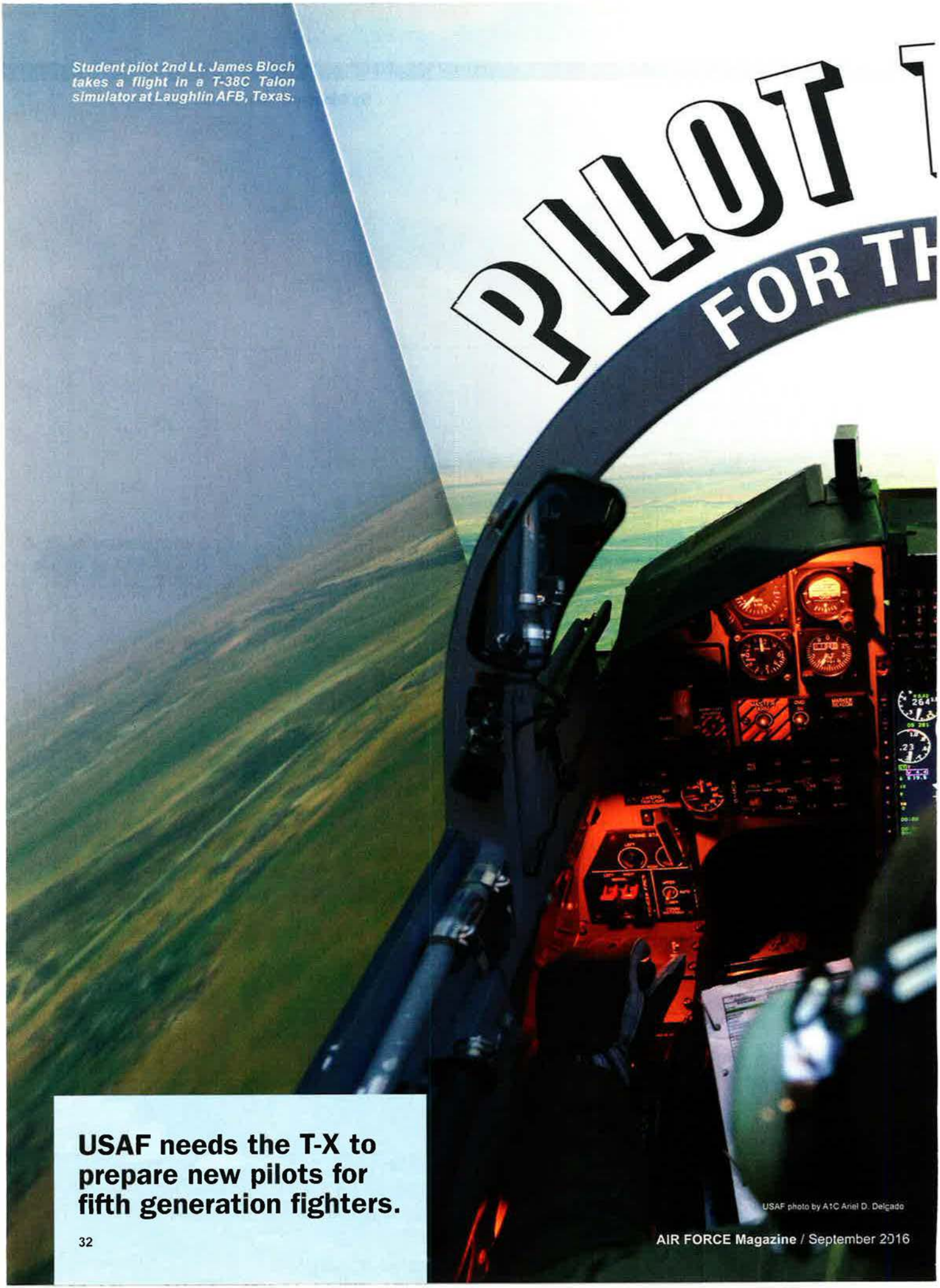
811

- Message from Japanese picket boat (Schultz's *The Doolittle Raid*)

824 **[miles]**

- Doolittle's after-action report
- Doolittle's autobiography, *I Could Never Be So Lucky Again*





Student pilot 2nd Lt. James Bloch takes a flight in a T-38C Talon simulator at Laughlin AFB, Texas.

USAF photo by A1C Ariel D. Delgado

USAF needs the T-X to prepare new pilots for fifth generation fighters.

RAINING E FUTURE

By Brian W. Everstine, Pentagon Editor

The Air Force is expanding its pilot training pipeline to overcome an insatiable demand for experienced pilots for both cockpit and staff positions. This surging demand, combined with newly robust competition for military pilots from commercial airline recruiters, has led to a shortage of Air Force fighter pilots. But USAF is forced to grow its pilot production on the back of an aircraft that is decades old and has little room to modernize—and while the service is prioritizing a new generation of remotely piloted aircraft operators.

The main training aircraft, the T-38 Talon, has trained Air Force pilots for more than 50 years. Air Education and Training Command says it is too old and falls short on two-thirds of the advanced training requirements needed for fighter pilots getting ready to fly the service's newest fighters: the F-22 and F-35. USAF is placing a large bet on its next generation trainer, dubbed the T-X, and current pilots in training are spending more time in simulators to make up the training capability gap.

"This is a classic case of what a service Chief is faced with, which is, 'How do I ... get the right balance between capability, capacity, and readiness?'" Air Force Chief of Staff Gen. David L. Goldfein said during his June confirmation hearing. "And there are trades that we make. And so when we look at, for

USAF photo by SSgt. Larry E. Reid Jr.

An unidentified pilot climbs into the cockpit of an F-22 Raptor in Southwest Asia for an Operation Inherent Resolve mission. The T-38 no longer meets USAF's advanced training needs.

instance, bringing on the new trainer aircraft, that's one of the trades that we have to make to push that to the right, until 2024. And so that's going to require us to keep the T-38 flying longer. And it's just one of the inevitable trades you have to do."

"UNTIL THE T-X IS IN PLACE, THE TRAINING GAPS CREATED BY USING A THIRD GENERATION TRAINER FOR FIFTH GENERATION AIRCRAFT WILL REMAIN."

Air Education and Training Command in early 2016 laid out the challenges ahead for training the next generation of pilots.

"Tomorrow's airmen will have to outthink and outperform our nation's adversaries," AETC Commander Lt. Gen. Darryl L. Roberson said in the introduction to the command's 2016 Strategic Plan. "They will develop innovative solutions for future challenges because of the education and training they earned."

AETC needs to get "state-of-the-art" capability in the virtual constructive environment, so pilots can train in a high-threat environment and be focused on training so much to the point where they can't tell they're "not out flying in the airplane for real," Roberson told *Air Force Magazine* in September 2015.

The command is projected to train 1,230 pilots in Fiscal 2016 from about 1,400 entries, said Col. Samuel P. Milam, AETC's deputy director for intelligence, operations, and nuclear integration. But this isn't enough. Air Combat Command alone projects it will be short more than 700 fighter pilots by the end of Fiscal 2016.

"The average age for the T-38s is now over 45 years old, and it has very little capability for growth," Milam said. "The Air Force is getting everything it can out of the T-38C, both in systems capability and training processes. However, until the T-X is in place, the training gaps created by using a third generation trainer for fifth generation aircraft will remain."

One of the biggest shortfalls is simple mission capability. In Fiscal 2015, just 62.7 percent of the service's 446 T-38Cs were available at any given time, with just 52.8 percent of the broken ones fixed within 24 hours. The T-38 depot at Hill AFB, Utah, has increased its workload to produce 176 Talons in Fiscal 2015. One of the biggest programs, the Pacer Classic III structural modification, is a $240 million program to extend 150 T-38s to fly until 2029.

SUPERB DEPOTS

"Quite frankly, there's only one reason we have aircraft still flying after 50 years. It's because of the quality of the individuals we have at our depots that keep them flying," Goldfein said during his confirmation hearing, speaking not only of the T-38 but of other aircraft, such as the B-52 and KC-135, in the Air Force's fleet.

Even with this work, the T-38's availability is still limited.

Pilots in Specialized Undergraduate Pilot Training at AETC go through four phases: Introduction to Flight Training, Preflight Training, Primary

Flight Training, and Advanced Flight Training.

The first phase is largely procedural training, with 18 hours of flight.

In the next two phases, a pilot flies 86.6 hours in a T-6A Texan II, plus 45.7 simulator hours.

In the last phase, pilots move on to specialized airframes for advanced flight.

Mobility pilots, for example, fly 77.7 flight hours in a T-1A Jayhawk, focusing on refueling and airdrops, with 53.6 simulator hours.

Helicopter pilots fly 105 hours in a TH-1H Iroquois honing skills such as night vision device operations, with 36 simulator hours.

Fighter pilots fly 95.5 hours in a Talon and 39.5 hours in a simulator.

The fighter pilots heavily rely on simulators because of the T-38's shortfalls in advanced training. The process is broken down into 18 tasks, and 12 of those need simulation because of the gaps in capability of the T-38. The areas where the T-38 is up to the task are basic air-to-ground training, basic cockpit resource management, preparation and planning, mission debrief, energy efficiency, and human systems integration, Milam said.

But the shortcomings are apparent in advanced flying. A fighter pilot cannot use a T-38 to train for a high angle of attack or a higher thrust-to-weight ratio in basic aircraft control. Simulation software is needed for emergency procedures because of a gap in diagnosing emergencies. A pilot needs to simulate normal procedures because a gap in the T-38 learning system "creates negative skill transference," Milam said. Advanced cockpit resource management training is not possible because of a gap in data fusion and a lack of sensors. Basic air-to-air training is needed in a simulator because of a lack of sustained high-G capability and fly-by-wire controls. Same with advanced air-to-air because the T-38 isn't capable of "relevant" fourth and fifth generation air-to-air skill sets.

USAF photo by A1C Melissa Peterson

USAF photo by Airman 1st Class Sidney Archer

T-38 IS JUST TOO OLD

The T-38 cannot handle advanced air-to-ground because it lacks the right data link and it doesn't meet new FAA guidance system requirements. It cannot fly formation training, being incapable of night formations, formation in all weather situations, and beyond-visual- range formations. Anti-ice deficiencies and high-density altitude takeoff and landing limitations inhibit all-weather training. Lastly, the T-38's cockpit itself doesn't fit certain pilot physical measurements, referred to as Anthropometric Cases 1-7. This is all in addition to the limited operational availability of the aircraft.

The need for training experience in high-threat environments and for pilots to be ready to fly fifth generation fighters immediately is driving the acquisition process for the T-X. Roberson, speaking at AFA's Air & Space Conference in September, said the award for the T-X will not only be based on the flight performance but also on the contractor's ability to build high-fidelity simulators.

To make sure contractors are ready and able to provide their best entrants for the contest, Roberson said AETC is working to be as transparent as possible on what it wants in its new trainer.

Above left: Contractor Ray Gutierrez, an aircrew flight equipment instructor, runs through training on emergency parachute use with a 435th Fighter Training Squadron student. Left: Maj. Jason Bianchi (l) gives 2nd Lt. Duston Obrien, a pilot in training, a preflight briefing at JBSA-Randolph, Texas.

Top: Maj. Todd Salzwedel (l) demonstrates final check procedures to an RPA instrument qualification student before his first orientation flight in a T-6 Texan II. Above: The T-50A is Lockheed Martin's offering for USAF's T-X trainer. Above right: Raytheon's version, the T-100.

In February, the Air Force responded to about 300 questions from industry on the design for the fighter and the need for simulation. The level of communication was "unprecedented," Roberson said. The formal request for proposal has not been released for the T-X, but AETC wants to keep industry informed as a way to save costs on the final contract.

"The bottom line now is we are working with industry in a transparent way that allows us to do things and bring costs down, to get the product everyone wants to build and receive," Roberson said at AFA's Air Warfare Symposium in February in Orlando, Fla.

AETC is the lead for the program, and the command wants to "educate Air Force senior leadership" to make sure it remains on track, with a contract award expected in 2017. The service wants to reach initial operational capability by 2024, and AETC needs to establish requirements beyond that day and "the right balance between live, virtual, and constructive training methods," the command said in its strategic plan.

AETC has built the requirements for the T-X to expose pilots to some skills earlier, but the focus of undergraduate training is still "on events, not tactics," Milam said. AETC considered the ability to off-load certain syllabus events from the formal training units once a pilot finishes training and is assigned to a unit, but it would not be possible to fully use one airframe, the T-X, to train pilots on skills that could vary based on the aircraft they are ultimately assigned to.

"As an example, the T-X requirements include night vision device capabilities," Milam said. "The intent is to train night vision basics earlier in the student progression from [undergraduate pilot training] to the [formal training unit], but not to train night vision tactics that will be particular to each follow-on airframe."

The demand for new and different pilot training for manned aircraft is coming as the service faces a dramatic change in how it is manning remotely piloted

AETC HAS DOUBLED THE NUMBER OF PILOTS TRAINING TO FLY REMOTELY PILOTED AIRCRAFT.

aircraft cockpits on the ground. USAF is confronting a large-scale deficit in RPA pilot manning, and AETC has overhauled how it trains Predator and Reaper pilots to fill an insatiable demand for intelligence, surveillance, and reconnaissance across all combatant commands.

In April 2015, the Defense Department limited the number of combat air patrols the Air Force is responsible for—to 60, from 65—to build up the training pipeline. In response, AETC has doubled the number of pilots training to fly remotely piloted aircraft, on track to graduate 290 by the end of 2016 and a goal of graduating 384 by the end of 2017. The RPA pilot class is now 24 students, up from just 12 before the change, Roberson said.

AETC is taking pilots straight from the Air Force Academy and Reserve Officers' Training Corps, with a greater need for RPA pilots than any other aircraft type in the service. Air Combat Command is calling for $3 billion in additional funding to pay the pilots and to allow for continued training once they are assigned to an operational unit. The formal training unit mission itself is moving from ACC to AETC, as the education command is introducing new ways to "attract, recruit, and double production for RPA pilots and sensor operators" to meet the need for ISR.

Gen. Mark A. Welsh III said before he retired recently as Air Force Chief of Staff that he had already seen "dramatic changes" in the RPA pilot career field, with the shortfall of 250 pilots expected to be halved by the end of Fiscal 2016.

Enlisted airmen are also getting into ISR flight, with the first class of non-officers beginning training to fly the RQ-4 Global Hawk this September. The first two enlisted pilot classes will be part of a "beta phase" before training is opened to more airmen, ACC Commander Gen. Herbert J. "Hawk" Carlisle said in June.

ALLEVIATING THE RPA STRAIN

The service will eventually have 100 enlisted pilots on the Global Hawk to alleviate the strain on the RPA community, with officers largely focusing on the armed Predator and Reaper fleet.

Weeks before Welsh left office, he went to the US Air Force Academy's graduation in Colorado Springs, Colo. There has been a stereotype that pilots are averse to flying RPAs, that they would rather be in the cockpit of a fighter, Welsh told *Air Force Magazine* during an exit interview. But now, "some of the cadets who are going to RPAs just can't wait to get there."

"They're excited about it," he said. "They grew up thinking about RPAs. We have officers in the Air Force now who have degrees in RPA operations and RPA maintenance. ... They are the ones who are going to take this remotely piloted aircraft community writ large and drag it through the rest of the 21st century. Who knows where this is going?"

For more than 14 years, Air Force pilots have operationally concentrated on counterinsurgency and counterterrorism missions, flying in permissive environments focused on intelligence gathering and close air support. This brought RPAs to the forefront of a new generation's thought process, but the "international landscape" is changing once again, AETC's strategic plan says. The current training program, and especially the current training fleet, is falling short of what is needed to counter future threats, such as the rise of China and Russia. The need for advanced training is coming at a time of budget restrictions, encouraging the service to "use technology in new and innovative ways," such as simulation, AETC's strategic plan states.

"Whether it's live, virtual, constructive training that blends actual and simulated flying, or tailored technical training and professional military education concepts, we will identify and use technology to help us succeed," the plan says. "Our ability to exploit technology to recruit, train, and educate the force will help guarantee our airpower advantage in the future."

The strategic plan lays out changes the command must make to ensure this is a reality, including possibly starting all over. In the near term, the command is conducting a "clean-sheet" analysis of its flying training enterprise to "identify and correct" gaps in training and to increase pilot production.

The fighter pilots of tomorrow get the bulk of their training in a cockpit built to train pilots in the early 1960s. Raptor and Lightning II drivers are training in the same jets used to train F-4 drivers.

Thanks to the importance being placed on T-X, that shouldn't be the case for too many more years. ✪

NASA's famous "Balls 8" NB-52B mothership, carrying the X-15 experimental aircraft, is chased by a T-38A. The Talon first flew in 1959.

By Robert S. Dudney

Making of a Fighter Pilot

"The reason I decided to be a fighter pilot is because they said that I couldn't. It motivated me to just say, 'You know, this is wrong, and I'm going to be a part of proving that it's wrong."—***Rep. Martha McSally (R-Ariz.), retired USAF colonel and A-10 pilot, who said she originally wanted to become an Air Force doctor,*** **Washington Post,** ***Aug. 2.***

Smells Like Munich

"The Israeli defense establishment believes that agreements have value only if they are based on reality. They have no value if the facts on the ground are opposite to the ones the agreement is based on. The Munich Agreements didn't prevent World War II and the Holocaust because their fundamental assumption—that Nazi Germany can be partner to any agreement—was false, and because world leaders ... ignored clear statements made by Hitler and other Nazi leaders. [Iran] clearly and publicly declares that its goal is to destroy the state of Israel, and a US Defense Department report released this year asserted that it is the foremost supporter of global terrorism. ... Agreements like the one signed between the world powers and Iran only undermine the unwavering battle that has to be waged against terror states like Iran."—***Statement by Israel Defense Ministry, after President Obama claimed Israel now sees merit in his nuclear deal with Iran, Aug. 5.***

Article 5 Nonsense

"I hope that Donald Trump retracts it [a recent statement casting doubt on US obligations to defend NATO allies]. If Russian tanks moved into a Baltic republic, and then you decided to review whether they were meeting their expectations, the Russian tanks would be at the Baltic Sea before you could get the file."—***John Bolton, former Ambassador to the UN under President George W. Bush, interview in*** **The Hill,** ***July 21.***

Double Trouble

"The F-35 is the best air-to-air airplane in the world, except for the F-22. The F-22 is the best air-to-ground aircraft in the world, except for the F-35."—***USAF Gen. Hebert J. "Hawk" Carlisle, head of Air Combat Command, remarks to reporters, July 11.***

Quiet Crisis

"[USAF faces a] growing shortage of fighter pilots. That shortfall is expected to grow from 500 to more than 700 pilots by the end of this fiscal year, a 21 percent gap between what we have and what we need to meet the requirements of our commanders around the world. ... The Navy and Marine Corps are facing parallel challenges as the commercial airline industry embarks on a prolonged hiring wave. ... Aside from an airline hiring surge, there are other reasons for the Air Force's pilot shortfall, from dramatically reduced flying hours for the high-end fight as a result of Pentagon budget cuts to a perceived falloff in quality of life when they return from deployments overseas. Make no mistake, this is a quiet crisis that will almost certainly get worse before it gets better."—***Op-ed by Deborah Lee James, SECAF, and Gen. David L. Goldfein, Chief of Staff,*** **DefenseOne.com,** ***July 14.***

Scattering Cockroaches

"We all know there will be a terrorist diaspora out of the caliphate, as military force crushes the caliphate. Those thousands of fighters are going to go someplace. Our job is to spot them and stop them before they come to the United States to harm innocent people. ... As the caliphate is crushed, the so-called Islamic State will become more desperate to demonstrate its continued vitality, and that will likely [take] the form of more asymmetric attacks, more efforts at terrorism."—***FBI Director James Comey, hearing of the House Homeland Security Committee, July 14.***

Trans-ition

"We have transgender members in the military services today. We believe that we have the same [medical-care] obligation to them that we have to our other service members. Allowing these transgender individuals to serve openly does not bring new medical problems into the military. It brings these medical problems into the open and enables us to treat them in a way that promotes the readiness of the force."—***Pentagon spokesman Eric Pahon, on new DOD policies for medical services for transgender troops,*** **Washington Times,** ***July 14.***

Out of Mind

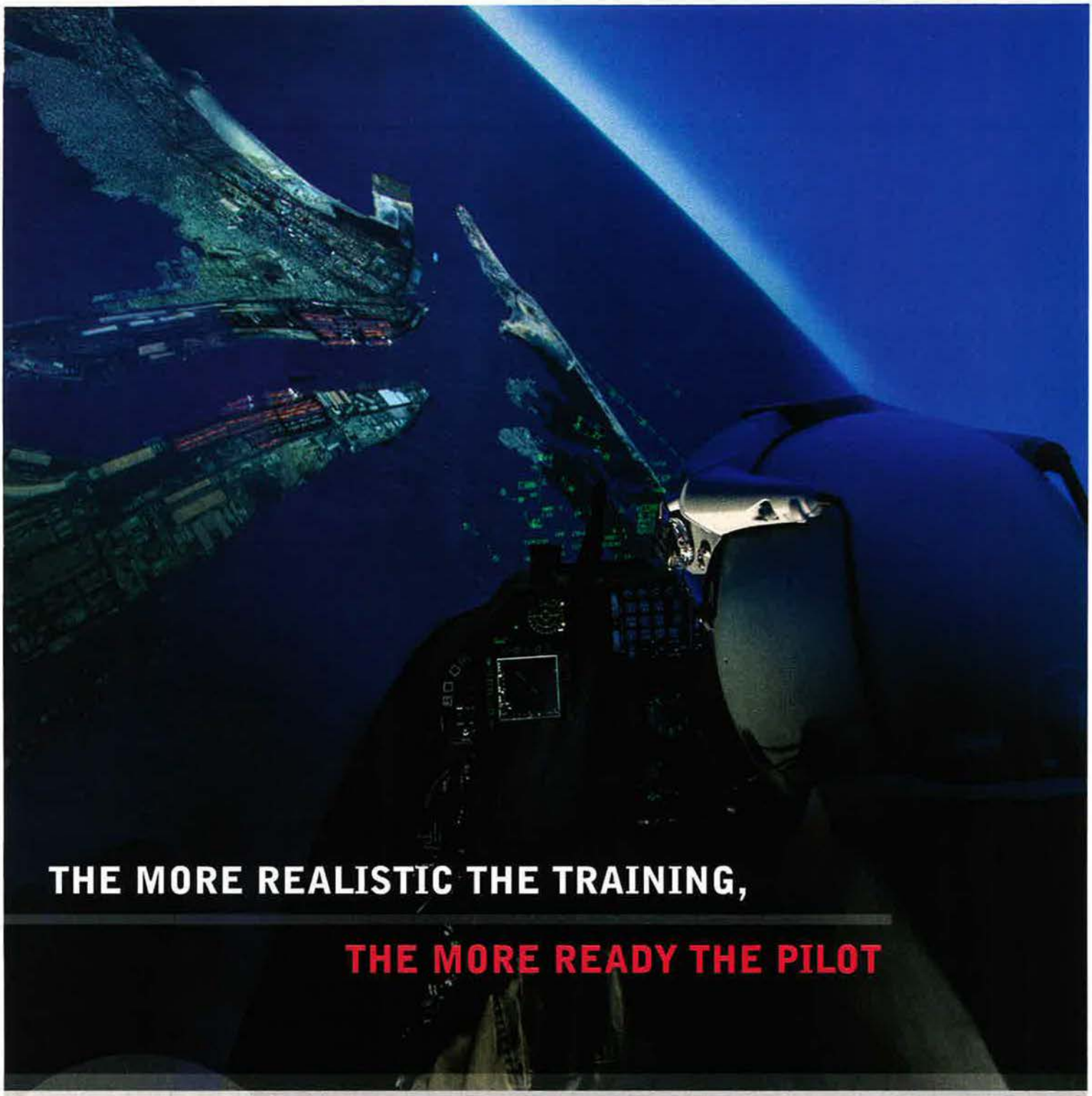
"Ten or 20 years from now, instead of having big expensive aircraft or drones, you can have hundreds or thousands of inexpensive [mind-controlled] ones you deploy in an area. Even if you lose half of them, you can still achieve your goals. ... We are adding more degrees of freedom and more capabilities."—***Panagiotis Artemiadis, Arizona State University's Human-Oriented Robotics and Control Lab, on development of RPAs flown by pilots using mind-control technology,*** **Washington Post,** ***July 12.***

Going Gray

"These [nuclear missileer] officers are trusted with the most destructive weapons in our inventory, and the responsibility they face is enormous. For many years, we counted on lieutenants to do this mission, and that created some problems. This is going to be the final step to creating a more senior crew force out in the field. ... They're going to become more senior. You're going to have more captains than before, more majors, and more lieutenant colonels than you currently have."—***Zannis Pappas, manager of Air Force 13N nuclear and missile operations career field, on USAF's plan to put more-experienced officers in nuclear crews,*** **Air Force Times,** ***July 20.***

The Road Not Taken

"At least two [rebel Turkish air force] F-16s harassed Erdogan's plane while it was in the air and en route to Istanbul. They locked their radars on his plane and on two other F-16s protecting him. Why they didn't fire is a mystery."—***Unidentified "former military officer," on failed military attempt to overthrow Turkish President Recep Tayyip Erdogan, Reuters dispatch, July 18.***



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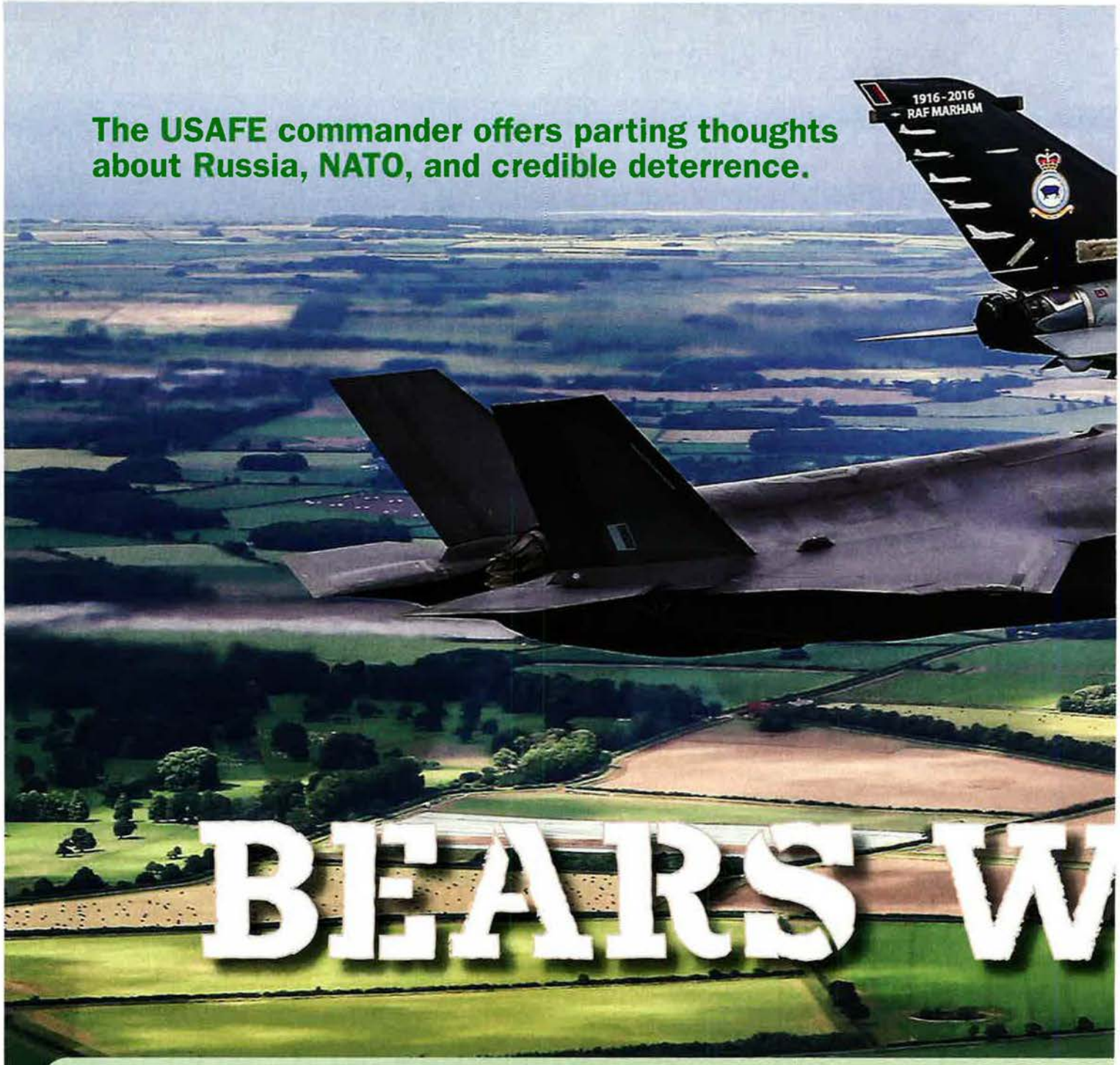
The USAFE commander offers parting thoughts about Russia, NATO, and credible deterrence.



BEARS W

WHETHER or not the situation between the US and Russia amounts to a new Cold War, Russia's steady buildup of forces on its border with NATO, and its actions and rhetoric in the past few years, demand a constant rethink of US and NATO military posture in Europe—particularly with regard to air forces.

The focus in Europe should shift to airpower, Gen. Frank Gorenc, who retired in August after three years as chief of US Air Forces in Europe, said in an interview with *Air Force Magazine*.

Since the NATO Summit in Wales two years ago, much of the reaction to Russia's adventurism has focused on land forces, Gorenc said, but "we've been carefully putting in the air perspective and the air proponency" to ensure a combined-arms posture that's ready and responsive.

Part of that is to go back to the basics, Gorenc said: to train heavily and demonstrate solid, full spectrum capability in strike, air superiority, command and control, and intelligence, surveillance, and reconnaissance. That's already happening as part of the "increased reassurance initiatives," the multibillion dollar US effort to rotate more forces to Europe and conduct more readiness drills.

The basics are being married with new capabilities, Gorenc went on. "For two years in a row, we brought F-22s over" from the US to demonstrate rapid deployment, operations from austere or unprepared airstrips, and the ability to fly from one base and recover at another.

"The combination is a holistic approach" toward demonstrating that NATO can, in fact, roll back Russia's formidable air defenses if necessary. It's important for deterrence, Gorenc said, that NATO demonstrate "our commit-

British Ministry of Defense image by Cpl. Paul Oldfield

An RAF F-35B, flanked by a British Tornado, flies to its new home at RAF Marham, UK.

ATCHING

By John A. Tirpak, Editorial Director

ment to establishing superiority in the air," without which nothing is possible. Russia may have the ability to create an air defense wall, but "I have the capability to address [it]," Gorenc said.

F-35'S EXPONENTIAL EFFECTS

In February, Gorenc told reporters at AFA's Air Warfare Symposium that the F-22 deployments were calculated to both remind Russia of USAF's ability to field fifth generation fighters as well as the beginning of a process to familiarize NATO allies with the F-22 and the F-35, which some NATO allies will deploy in Europe before the US does. In April, he told defense reporters in Washington the F-35 will provide an "exponential" increase of NATO's capabilities versus Russia.

Regarding the chilly relationship between Washington and Moscow, "I don't exactly equate it to a Cold War footing," Gorenc said in the interview, "but what we do see is a Russia that perceives itself as a 'great power.' ... And so we are rightfully treating what happened in Europe as a change that has to be accommodated."

He was referring to Russia's war with Georgia, its illegal annexation of Ukraine's Crimean Peninsula, and its ongoing shadow war in Ukraine. He also pointed out that Russia has heavily fortified its air defenses along the NATO front and has made threatening comments and gestures toward some NATO republics formerly in its sphere of influence.

"From the Barents Sea to the Baltic Sea to the Black Sea to the Mediterranean," Russia has built deep and overlapping anti-access, area-denial systems, Gorenc said. His turn of phrase was reminiscent of Winston Churchill's "From Stettin in the Baltic to Trieste in the Adriatic" Iron Curtain speech 70 years earlier. These new

USMC photo by Cpl. Kelly L. Street

USAF photo by SrA. Gustavo Castillo

Above: An F-22 Raptor taxis down the runway past a Romanian IAR-330 helicopter at Mihail Kogalniceanu AB, Romania.

Russian defenses are "the single most concerning thing that I see as an airman," Gorenc said.

The A2/AD systems, which Gorenc said feature modern, long-range surface-to-air missiles and advanced interceptor aircraft, are clearly meant "to neutralize any kind of conventional deterrence that we develop through adaptation in NATO." Russia has willingly shown off new aircraft and new missiles in European-area exercises and has used new systems—like long-ranged conventional cruise missiles—in the Syrian conflict, he noted.

You can't have deterrence if nobody knows about it, so Russia wants everybody to see these new systems. Their exposure is meant to "create a buzz about some of the capability improvements they have," Gorenc said, adding, "they are ... relatively impressive."

Russia launched a volley of new Kalibr cruise missiles against anti-regime targets in Syria last fall. Their use was not necessary—anti-regime forces generally don't have air defenses—but they demonstrated the Kalibr's ability to make a precision attack from more than 900 miles away—well beyond what Western analysts had previously thought.

"We have been able to learn a lot from what we saw—and what we're continuing to see—in their conflict in Syria," Gorenc pointed out.

Although the air defense systems particularly are tough, mobile, and lethal, they are not impenetrable, Gorenc said. However, it will take a concerted effort to achieve freedom of movement for NATO forces if direct conflict erupts between NATO and Russia.

Though the Russian weapons themselves are on display, their full capability requires some guesswork, as NATO tries to divine the degree of training the Russian crews have with these systems and what their tactics, techniques, and procedures are, Gorenc said. But "we don't take it for granted, whatsoever."

NATO is already shifting from a policy of "responsiveness" to "deterrence," a theme struck at the July NATO Summit in Warsaw. Russia and NATO have been increasingly matching each other, Gorenc said. "From the air perspective, in and around NATO, we've seen a pretty consistent pattern with them," he explained. The Russians "react in a linear way to anything we're doing." If NATO has an exercise, Russia will mirror it in a "you do this, we'll do that" manner.

What's new, though, is that Russia has been calling "snap exercises" that don't mirror NATO wargames. These

NATO photo by Giordano Paletti

Above: Gen. Frank Gorenc (l), USAFE commander, and Maj. Gen. Rumen Radev, commander of the Bulgarian air force, on the flight line at Graf Ignatievo AB, Bulgaria.

SSgt. Del Williams, a crew chief, changes a tire after NATO training exercise Arctic Fighter Meet 2016 at Bodø Main Air Station, Norway.

are sudden, unannounced exercises that look like actual attack or invasion preparations. These snap exercises are worrisome, "particularly to Alliance members on the East side of NATO," Gorenc said.

"RAPID X"

What it all adds up to, he continued, is that the security environment in Europe is changing, and the US and NATO will have to adapt to that. The role of airpower will play a big part in any military solution, he said.

At the AFA symposium, Gorenc said the European Reassurance Initiative would fund extended F-15 deployments to Europe, as well as interoperability and airfield improvements, particularly in Eastern Europe. These will include facilities for fuel and munitions storage and potentially runway lengthening.

At the meeting with defense reporters in Washington in April, Gorenc said he's launched an initiative called "Rapid X." It will see sharply increased deployments of as few as four aircraft to austere airfields for refueling, rearming, and relaunching, to be recovered at yet another airfield. This approach is to "create challenges for any potential adversary" and "make the adversary's problem that much harder." There are hundreds of airfields in Europe that could be used in this way, he said.

Part of the holistic approach of combined arms, Gorenc said, is to make sure that the basics are funded. He acknowledged that in the aftermath of NATO's 2011 Libya operation, NATO allies ran short of munitions and had to borrow from US stocks. With many NATO countries part of the anti-ISIS coalition conducting air strikes in Syria and Iraq, "everybody's using a lot of munitions. ... I think a lot of the countries have run into shortages," but he reported they're "working with the manufacturers to replenish that."

Over time, "slowly but surely, ... everybody will come back into good health with respect to stockpiles," Gorenc asserted, though he admitted reaching that goal is not a short-term proposition. He said it would probably take a year to get stockpiles back up to where they should be.

Russia's saber-rattling is a good reminder to concentrate on the basics, and that includes having enough weapons available, Gorenc said. In times of

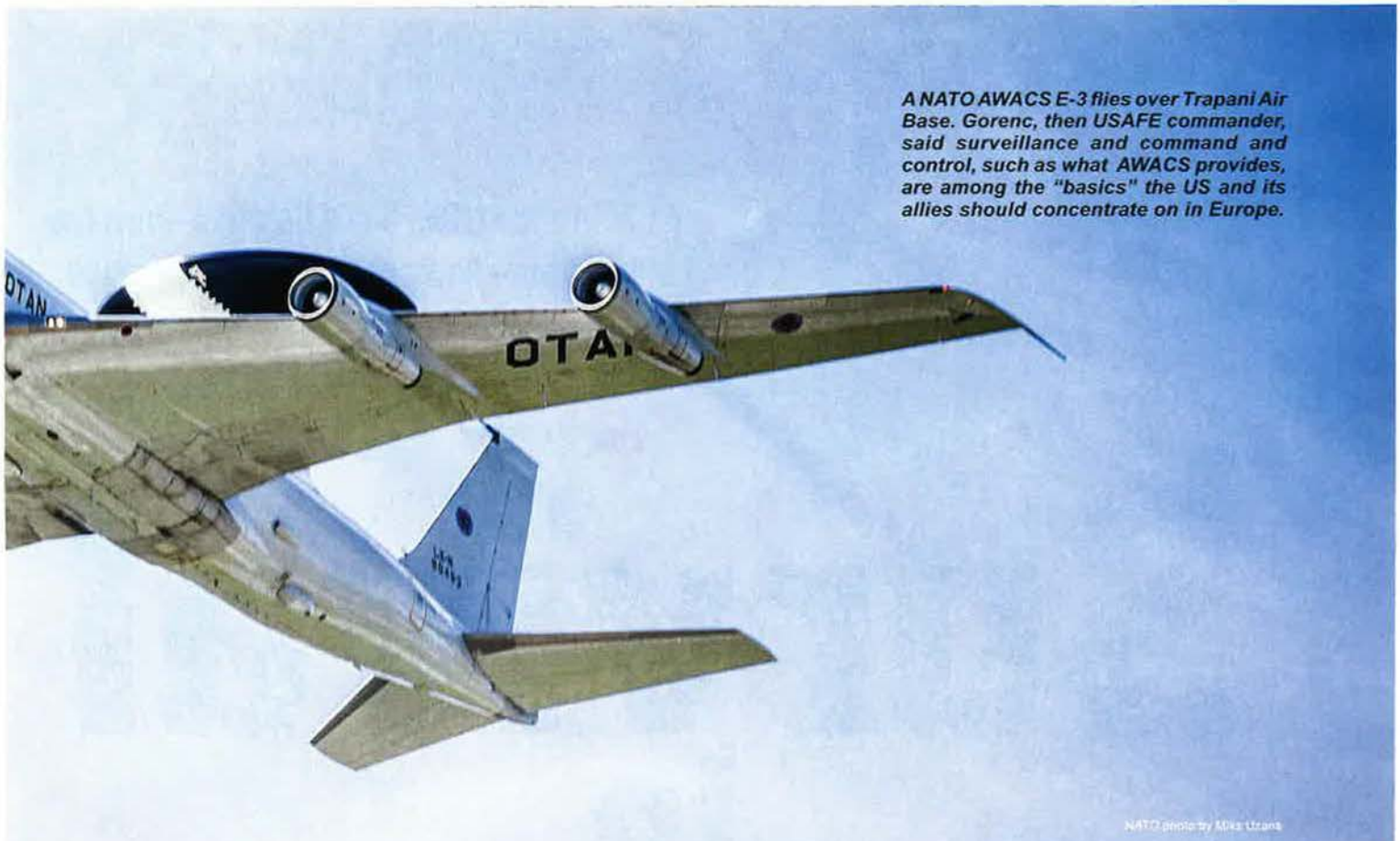
Fighters from four countries line the ramp at Trapani AB, Italy. At far left is a Tornado from Italy. Lined up are F-16s from Greece (blue and white tail flash), the US (SP tail markings), and Poland (red and white checks).

Photo by Mstyslav Chernov

Russian Federation Ministry of Defense photo

Top: Armored fighting vehicles near Donetsk, Ukraine, operated by Russian-backed rebels. Middle: MiG-29SMTs take off for a combat training exercise. Bottom: A Russian Tu-160 Blackjack is followed by two French Rafale fighters.

British Ministry of Defense photo



A NATO AWACS E-3 flies over Trapani Air Base. Gorenc, then USAFE commander, said surveillance and command and control, such as what AWACS provides, are among the "basics" the US and its allies should concentrate on in Europe.

NATO photo by Mike Uzzano

austerity, munitions stockpiles tend to be seen as a bill payer.

The airplanes have to be ready, ground crews and maintainers trained and exercised, "and of course, the availability of munitions to meet the aspirations of the country have to be ready," Gorenc said, and "everybody's making a move to replenish those that are used."

Isn't the common knowledge of such a fundamental shortage damaging to the credibility of the conventional deterrent?

"I don't think that's an issue," Gorenc answered. The Alliance—training and acting in a coherent manner—is itself a sound deterrent, and the US/NATO deterrent derives from a combination of capability along with capacity and a willingness to act.

"In the end, yes, we're using a lot of munitions in other parts of the world, but it's not to such an effect" that the responsiveness is hollow.

"We are an expeditionary Air Force; we move aircraft as required, ... and I'm confident that if anything happened in Europe that we'd be able to meet our requirements," Gorenc stated. Munitions are available to USAF worldwide, he said.

The UK's vote to separate from the European Union shouldn't have significant impact on its special military relationship with the US, Gorenc said.

"I see very, very little effect" on Britain's role in NATO as a result of the "Brexit" vote, he said. "We're going to pursue the great capability that we have in the air together." The biggest impact on USAF from the surprise move is that it's "the only thing that they're talking about, now, in Europe," when there are many more pressing security issues to discuss.

AFRICAN CHALLENGES

Africa, however, demands more attention from the Air Force, especially given that ISIS is targeting "ungoverned spaces," but he doesn't think USAFE and AFAFRICA should be broken up into two organizations, as they once were.

"The challenges in Africa are growing," Gorenc said, demanding specifically more ISR assets and airlift, given the lack of surface infrastructure in the interior of the vast continent.

"I see the requirement for air transport and ISR booming in Africa as ISIS starts moving about, particularly in Libya," he said.

But should AFAFRICA be spun off from USAFE? There's been no talk of doing that, Gorenc said.

The needs of US European Command and US Africa Command are being met by the current structure, he said, adding, "Right now I think we're ideally suited." What will be needed as ISIS ramps up its Africa activities is an increase to staffing, both at headquarters and in the Air Operations Center.

Gorenc said he's proud of USAFE's achievements during his years at the tiller.

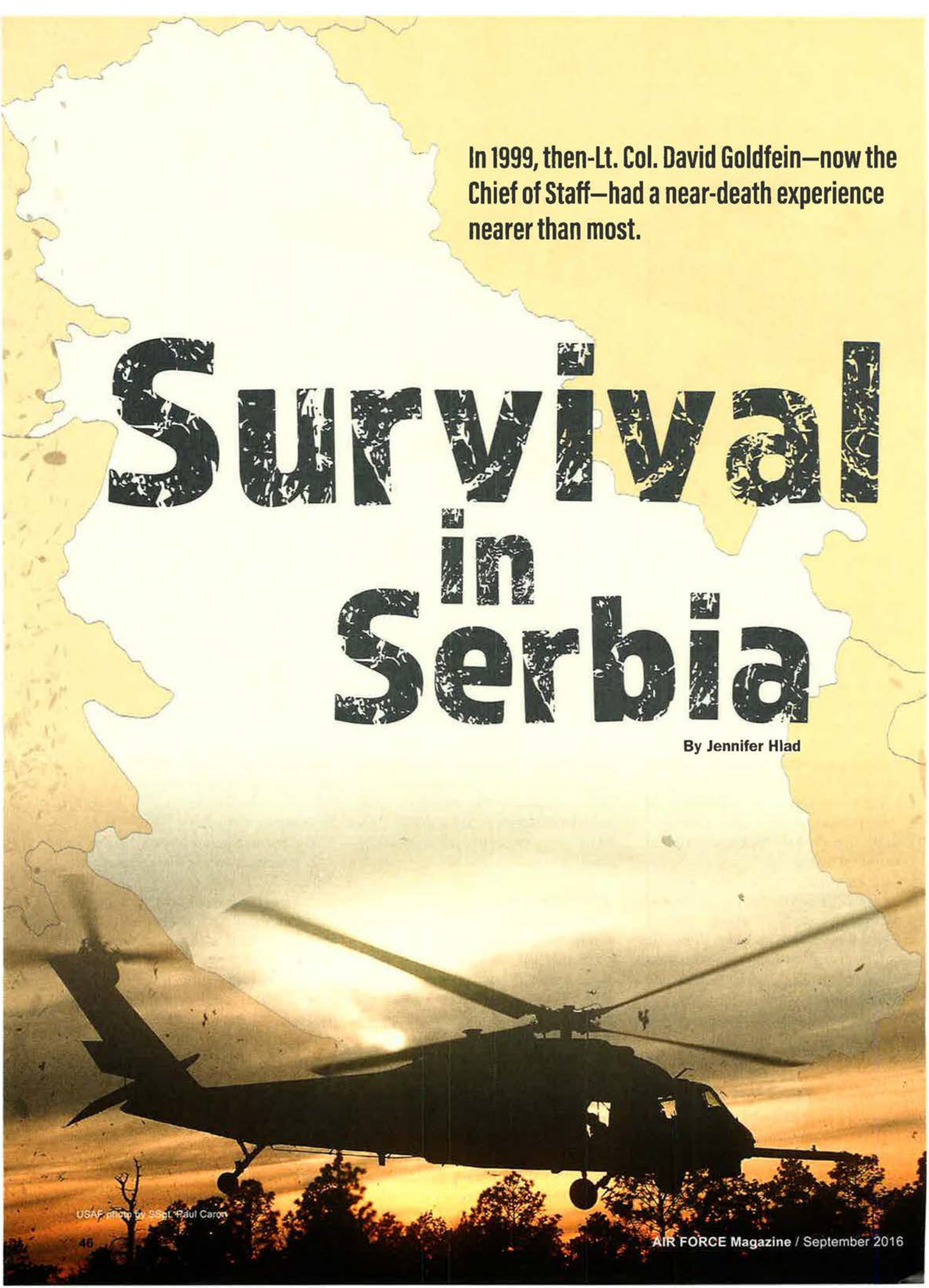
"When I took command, the biggest thing on the plate was how we would transition the mission in Afghanistan from combat ops to 'train, advise, and assist,'" he said. Within seven months, Russia seized the Crimea, "we were fully engulfed with ISIS," and the Ebola outbreak in Africa demanded people and aircrews.

"Each one of those required a response from air early," he said, with assets not just from his command but from USAF's rotational forces, as well. The success of those missions "has been a simply spectacular validation of how we're postured in the Air Force," he said. ✪

In 1999, then-Lt. Col. David Goldfein—now the Chief of Staff—had a near-death experience nearer than most.

Survival in Serbia

By Jennifer Hlad



USAF photo by SSgt Paul Caron

The night of May 2, 1999, Lt. Col. David L. Goldfein was flying an F-16 over Serbia, searching for surface-to-air-missile sites to attack when a SAM battery found him instead.

Goldfein saw two missiles streaking across the sky toward him at his 11 o'clock. However, he told ABC's "Nightline" in April 2000, "the one I didn't see is the one that got me."

The unseen SA-3 Goa missile hit Hammer 34, and after a long struggle to restart the engine and a quick call for rescue, Goldfein punched out. He survived the ejection in relatively good shape, got a good 'chute, and landed safely.

Goldfein then hid in a ravine, confident that his fellow airmen would quickly recover him.

Rescuing the downed Viper driver was no easy task, though. The Pave Low and the Pave Hawk helicopters sent to pick him up took nearly continuous fire even before they crossed the border into Serbia, and the attacks didn't let up until after the rescuers crossed back into Bosnia. Three officers involved in the mission were awarded Silver Stars for their actions, and the rescue community gained an ardent supporter.

"I truly respect those individuals in the rescue community, because I'm a proud recipient of their services," Goldfein, by then a major general, said in a USAF news release in 2010. "The rescue team didn't waste a second coming to my rescue. ... I am honored to represent them, and I'm glad to see that they are living up their motto: 'That Others May Live.'"

When Goldfein's aircraft was hit by the SA-3, he told ABC's "Nightline," he heard a loud explosion and saw smoke in the cockpit. He tried a full throttle check of the engine and soon realized that his fighter had turned into "a very expensive glider."

"My first reaction was, 'Shoot,'" he said. The second was "disgust, frustration."

He also had suffered a shrapnel injury in his hand, he told the *El Paso Times* in 2007.

Over the radio, he told the other jets in the flight that he was going to "continue to glide as long as I can," then said he would try shutting down the engine and restarting. Once it was obvious that the engine would not restart, he focused on getting out alive—and without giving away his position.

"I knew the race was on as soon as I pulled the handles, and I wanted to be in the lead of that race for as long as it took to get picked up," he said on the television program, where he was identified only by his call sign because he was still flying missions over the Balkans when the piece was broadcast.

I'M OUT

On the radio, he asked his rescuers to "start finding me, boys" and after assurances that they had a lock on his position, he made one last transmission: "I'm out."

Ejecting was a loud explosion, then a feeling like someone kicking him in the backside "as hard as you can possibly kick."

Once out of the airplane, there was "intense quiet," before a large explosion—his airplane hitting the ground. He landed on a "perfectly plowed field" and tripped and fell face first as he headed for a ravine, he told the *El Paso Times*. "My stuff was like a raft in front. ... I was riding it like Indiana Jones down to the bottom."

Ejecting was a loud explosion, then a feeling like someone kicking him in the backside "as hard as you can possibly kick."

Capt. Adam B. Kavlick was flying lead in the flight of F-16CJs that night, according to his Silver Star citation. He told "Nightline" the 555th Fighter Squadron pilots flying out of Aviano AB, Italy, into Serbia had gotten used to the danger, and because of the altitudes at which the fighter jets operated, they "felt fairly confident that [they] weren't at risk."

All that changed when Goldfein, his wingman—and commander of the 555th—went down. Kavlick and the other pilots stayed overhead, circling Goldfein and keeping in touch via radio while Kavlick arranged the rescue, as detailed in the June 2000 issue of *Air Force Magazine* (see "Silver Star," p. 80). The fighter took incoming fire from SAMs and anti-aircraft guns while they waited for the helicopters to arrive, according to Kavlick's award citation.

In Tuzla, Bosnia, Lt. Col. Steve Laushine, the rescue mission commander, was in the operations center with four other pilots, who were playing Spades when the call came in, he told "Nightline."

Capt. Kent A. Landreth, a Pave Low helicopter pilot with 16th Special Operations Wing, said they weren't too worried when they heard an aircraft had a problem and initially went back to playing cards. Capt. William F. Denehan, then a Pave Hawk pilot with 55th Special Operations Squadron, 16th Special Operations Wing, had just rolled over to go to sleep when he heard rapid footsteps coming down the hall.

Meanwhile, Goldfein was confident, knowing that "there was nothing that my nation would stop at to get me out," and that "come hell or high water," he would not be left in Serbia that night.

But Landreth and the other airmen coming to the rescue knew they had a significant challenge ahead: getting into and out of an area with live air defenses good enough to shoot down a high-performance fighter jet. And the enemy was awaiting the arrival of their large, slow-moving helicopters.

Denehan told the television program that his heart was beating "a mile a minute," while Landreth said the two-minute walk to the helicopter felt more like two hours.

SSgt. Andy Kubik, a combat controller, said the airmen were "willing to go on a moment's notice."

The rescue helicopters launched out of Bosnia "in a desperate push to reach [Goldfein] before sunrise, which was to arrive in less than two hours," Richard J. Newman reported in *Air Force Magazine's* June 2000 issue. "There was no time to wait for the [A-10s] that typically accompany such a rescue package, so the helicopters flew without them," he wrote.

Kubik said the helicopters banked to the left, then to the right, and when he looked up through the cockpit windows, he could see the other aircraft, "the size of school buses, just doing radical turns."

Pararescueman SrA. Ron Ellis said he "knew that something was definitely going wrong," while Laushine said the "pucker factor was probably a little bit higher at that time."

Not long after that, a missile came up between aircraft No. 2 and No. 3, "like a flaming telephone pole," Kubik said. Still, he said, "the funny thing is, we didn't stop. No one hesitated."

SSgt. Jeremy Hardy, another pararescueman, said as soon as the aircraft crossed the border, they felt like they were being "hunted, essentially."

According to Denehan's Silver Star citation, an SA-9 Gaskin missile missed his Pave Hawk by just 100 feet.

Flying low over enemy territory, with a full moon shining brightly, it seemed like "everyone knew we were there," Kubik said. When the helicopters got

Photo by Srdan Popovic

USAF photo by TSgt. Bruce Sherwood

Photo by Marko M.

Photo by Boris Dimitrov

Top right: A Serbian air defense system bristling with SA-3 surface-to-air missiles—the kind that took down Goldfein's F-16. Right: Airmen touch up the words "Triple Nickel" on an F-16 before a flight for an earlier mission over Bosnia. Bottom right: Goldfein's helmet and flight equipment are on display in a military museum in Belgrade, as is the canopy and part of the tail of his F-16 (below).

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USAF photo by TSgt. Ken Wright

to where they expected Goldfein to be, though, they couldn't find him. They circled the area, searching for the downed pilot.

"That was probably the point that I felt the most vulnerable," Hardy said. He felt "like a sitting duck" because "anybody with a farmer's rifle could have come out and done serious damage to us."

DEEPER INTO SERBIA

Denehan said it felt like the helicopters circled for 30 minutes, but Landreth said it was actually just six or seven.

"During a day, six to seven minutes isn't a lot, but you know, when you're orbiting in bad guy land for that period of time, ... it seems like an eternity," he said.

Finally, the helicopters learned they were in the wrong place. The coordinates they'd been given were about 17 miles from where Goldfein was hiding. They had to fly deeper into Serbia.

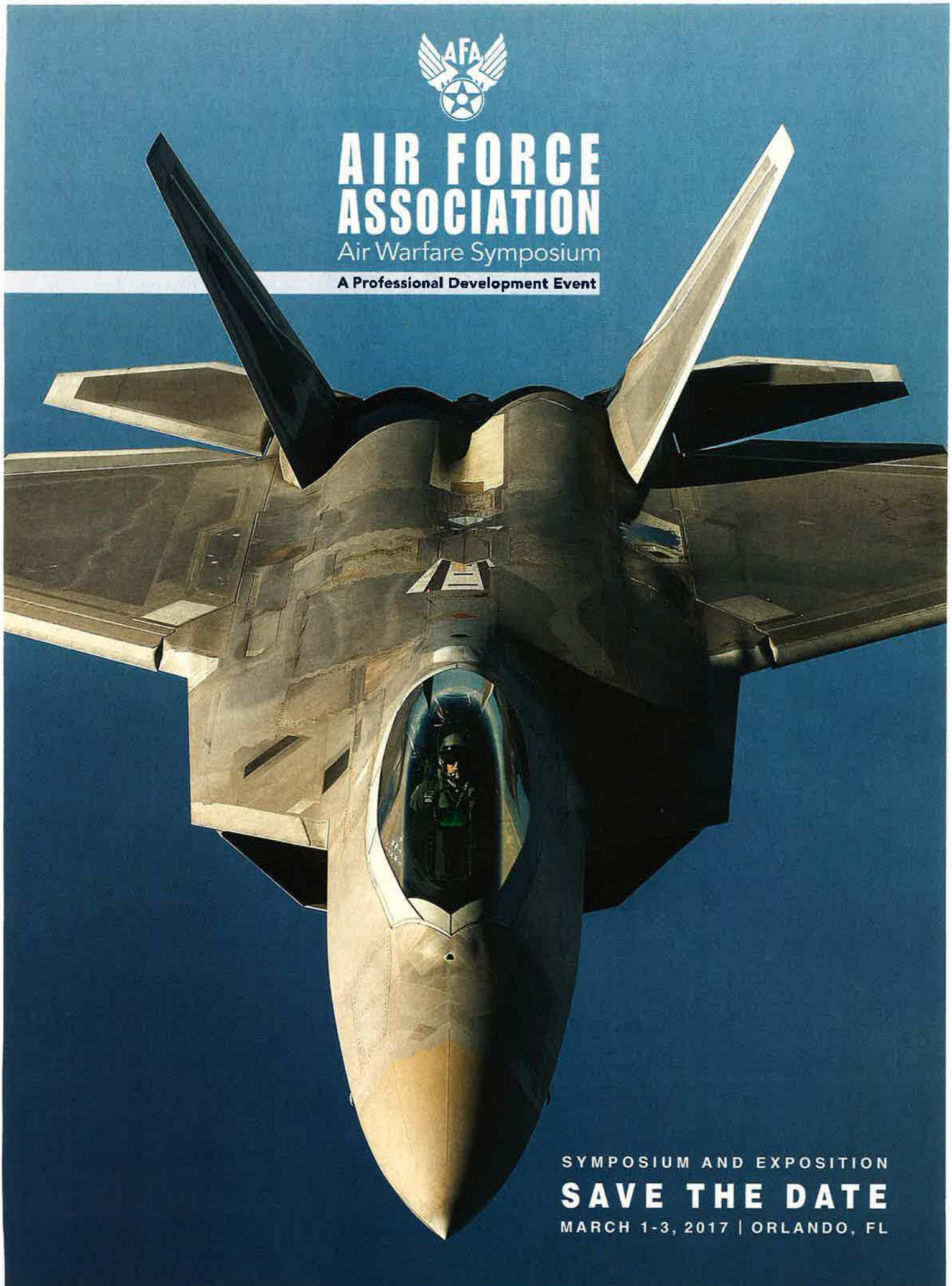
While he waited, Goldfein said he was comforted by the sound of jets overhead, despite the sounds of dogs and roosters nearby. But as he stood in the dark ravine, going through rocks to bring back to his children as souvenirs, he heard someone or something crunching leaves behind him. As it came close, Goldfein threw the rocks, and an animal "reared up on its hind legs and growled at me."

At the DOD's personnel recovery conference in 2000, Goldfein said he took off so fast that even Jesse Owens would not have been able to keep up.

"I'll swear to my dying day that it was a mountain lion or a jaguar in Serbia," he said, though his fellow pilots

USAF photo by A1C Benjamin Wiseman

Top: SrA. Ron Ellis (l), SSgt. Andy Kubik, and SSgt. Jeremy Hardy, members of the rescue team that retrieved Goldfein from behind enemy lines, in front of an F-16 in Florida. Above: Then-Maj. Gen. David Goldfein (l) and then-Lt. Col. Tom Kunkel, who piloted one of the Pave Hawks during the rescue.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USAF photo by Gary Ell

USAF photo by SrA. Hailey Haux

Left: Capt. Bill Denehen speaks to JROTC cadets in New York in 2000. A helicopter pilot, Denehen flew a Pave Hawk on the rescue mission. Below: Goldfein, now USAF Chief of Staff, holds a town hall event at Maxwell AFB, Ala., on July 20.

remained convinced it was a "Serbian field mouse."

GROUND FORCES OPEN FIRE

As the helicopters flew further into enemy territory, they continued to take fire. Landreth, whose Silver Star citation says he led three special operations helicopters "through sporadic barrages of surface-to-air missiles, anti-aircraft fire, and small-arms fire" for more than an hour, told "Nightline" he could see small-arms fire all along the horizon—"popcorn flashes all over the place."

As they neared, Goldfein heard the thump of the rotors and helped guide his rescuers in. Hardy noted how "amazingly calm" the pilot sounded for "a person in the situation he was in."

Then, he got more urgent: Ground forces had opened fire.

From then on, Goldfein said, it was "pretty much a shooting gallery."

Denehan's aircraft took several rounds in the fuselage and left engine cowling, according to his award citation, but Kubik said it didn't matter. "No one cared," he said. "We had to go get this guy."

Laushine agreed: "We press on."

Goldfein moved into the open. "With sunrise moments away, Denehan's helicopter touched down," this magazine reported in 2000.

As his team left the aircraft, Kubik said he wasn't sure he'd make it back, but it didn't stop them.

An armed combat controller ran past Goldfein to cover his back while a pararescueman laid down covering fire, and another got Goldfein ready to go. They took more small-arms fire as they jumped aboard the Pave Hawk, and the rescuers used their own bodies to shield Goldfein from fire.

"As the rescue aircraft streaked away, the sun winked over the horizon, giving Serb gunners one last chance to claim an American victim," the magazine reported. "They missed."

Anti-aircraft and small-arms fire followed them all the way to the border. It was not until the sun began to rise and the helicopters crossed back into the safety of Bosnia that the firing stopped, the rescuers said.

"There was a team of dedicated, enlisted officers who lived by that warrior ethos, came together in the worst-case scenario, went into really hostile territory, and pulled Goldfein out when he was shot down," Hardy told the Air Force Academy's *Academy Spirit* newspaper in 2013. "All three copilots on the team were lieutenants. They had a warrior ethos, were trained, and went in and saved Goldfein's life."

And Goldfein, now the Air Force's Chief of Staff, has never forgotten the risks they took to save him.

"We never know when some young airman is going to risk everything to come pull us out," he told the *El Paso Times*. "You become extremely humble."

Each year, he delivers a bottle of single-malt scotch to the squadron that rescued him, and they save the last of it so they can drink it with him when he brings the new bottle. He also stays in touch with many of the airmen who rescued him, and in 2010 reminisced with Col. Thomas Kunkel, now the commander of 23rd Wing at Moody AFB, Ga., who was flying one of the Pave Hawks that night in 1999.

"I watched them grow over the years. ... It's amazing to see how far they've come," Goldfein said at that time. ✪

Jennifer Hlad is a freelance journalist based in the Middle East. Her last article for Air Force Magazine *was "Making Space More Military" in the August issue.*

F-35: Lightning Unleashed

By John A. Tirpak, Editorial Director

The Air Force's newest fighter is ready for action.

Parked on the flight line at Mountain Home AFB, Idaho, an operational test F-35A awaits a mission. It was one of six making a test deployment in February. This was followed up by a formal, graded deployment in June that saw near-perfect aircraft availability and weapon accuracy.

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Fifteen years after the F-35 design was chosen to replace the F-16 and A-10, the first Lightning II squadron was declared operational on Aug. 2 and is now in the rotation of combat aircraft the Air Force can deploy around the world. The type will be USAF's most numerous fighter in a few years.

The announcement came from Air Combat Command chief Gen. Herbert J. "Hawk" Carlisle at a Pentagon press conference. The 388th Fighter Wing and its Reserve associate 419th Fighter Wing, both at Hill AFB, Utah, have met or surpassed the lengthy list of criteria to be considered "combat ready" with the F-35A, he said. The boxes checked off included having enough jets on hand (15 in the 3i configuration, versus the six to 12 airplanes required for initial operational capability), enough pilots trained and certified in the F-35's various missions, enough maintainers, adequate spare parts, and success at a practice deployment.

All those criteria were met with room to spare, and Carlisle said he was comfortable clearing the F-35A to take on real-world missions at any time. When that happens will be up to regional combatant commanders, he said: Their request for its capability will trigger the deployment. Carlisle was confident, though, that "sometime in the next 18 months" the F-35As will deploy to the European and Pacific theaters.

Program director Lt. Gen. Christopher C. Bogdan, in a press statement, said the announcement "sends a simple and powerful message to America's friends and foes alike: The F-35 can do its mission." He pointed out that the Air Force will operate the largest F-35 fleet in the world, with 1,763 planned, and it will form "the backbone of air combat superiority for decades and enable warfighters to see adversaries first and take decisive action."

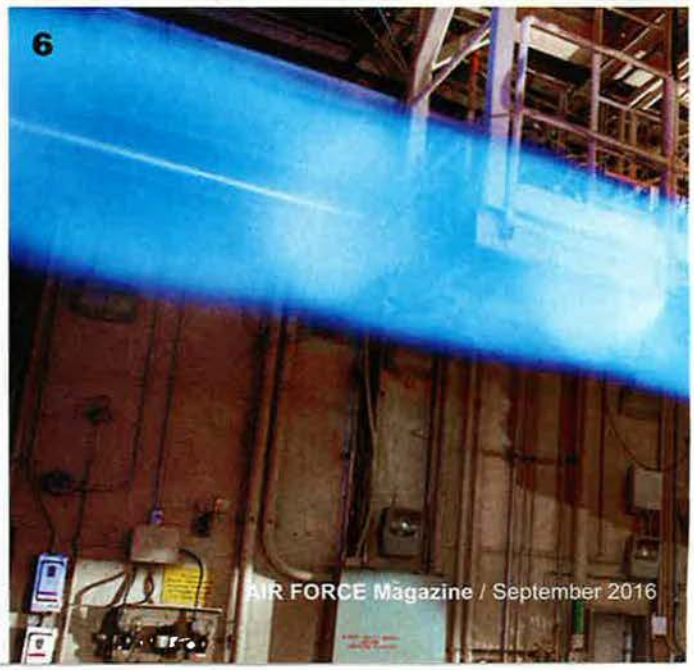
USAF photo by J. M. Eddins Jr.


1
Photo via Joint Strike Fighter Program


2


3
Lockheed Martin photo


4
USAF photo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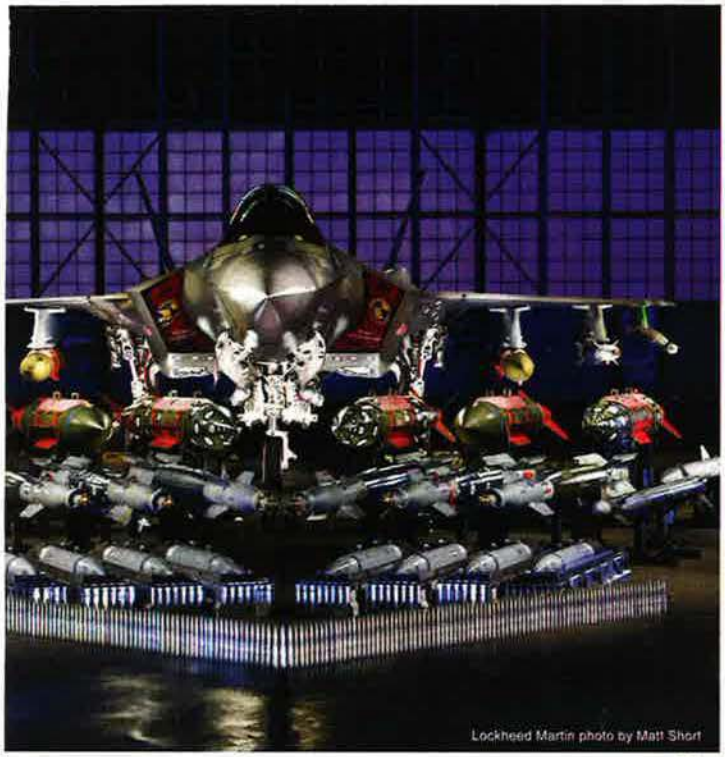


The Marine Corps declared IOC with 10 F-35Bs a year ago, but has yet to deploy the jets overseas. The Navy's IOC is slated for 2018.

Hill is receiving an average of two F-35As a month. In a teleconference with reporters a few days before the declaration, 388th Maintenance Group Deputy Commander Lt. Col. Steven Anderson reported, "We are getting good aircraft off the line from Lockheed Martin," and depot modifications to bring jets up to the 3i configuration are proceeding smoothly and on or ahead of schedule.

The event that clinched the IOC declaration was a deployment of the 388th FW F-35s to Mountain Home AFB, Idaho, in June. During a two-week exercise to tax the unit's ability to operate away from home base, the F-35s defeated F-15s and F-16s in simulated dogfights and overcame threat-representative surface radars and defenses. The jets scored an impressive mission ready rate of more than 92 percent and flew "88 of 88" scheduled sorties, 388th commander Col. David B. Lyons told reporters. They also scored direct hits on 15 of 16 targets with inert bombs; the one miss was due to a problem on the bomb, not the jet. No sorties were lost due to software, and the Autonomic Logistics Information System, on which the F-35's computerized maintenance runs, worked as expected.

The jets at Hill won't reach the full-up Block 3F configuration standard until 2018. By 2019, the base will have its full complement of 72 F-35s, and the Air Force will be standing up new units at Burlington, Vt., and Eielson AFB, Alaska. After that, RAF Lakenheath, UK, will be next in line. (See "Building Homes for F-35s," March 2015, p. 22.)

Since the outset of the program, the Air Force has stuck to its goal of buying just over 1,700 F-35As.

The plan originally called for buying 110 a year, to expedite the retirement of the A-10 and F-16 so they wouldn't need a service life extension. Delays and budget cuts have kept USAF from buying more than 48 a year, however. At that rate, the full complement won't be delivered until the 2040s, by which time some of the earliest models will retire.

Carlisle said that while 80 a year would be "optimum," forecasted budgets will make that rate "very, very hard to get to." The current goal is to ramp up to 60 a year for USAF, but when that might happen Carlisle couldn't predict.

"How many we are going to buy ... [is] a decision that can be made later," he said.

The F-35 has been one of the longest development programs ever. Its genesis came in an early 1990s effort to develop a stealthy successor to the F-16; it was envisioned

/1/ The Boeing X-32 (left) and Lockheed Martin X-35 (right) vied to become the Joint Strike Fighter. The X-35 prevailed after a tough competition that saw many aeronautical and manufacturing firsts—hence the "X" designations. /2/ An F-35A at Edwards AFB, Calif., shown with all the ordnance the 3F version will be able to carry. /3/ The X-35A/B (Air Force/Marine) and C (Navy) prototypes under construction. /4/ The X-35A's first flight, on Oct. 24, 2000. /5/ Gen. T. Michael Moseley, then USAF Chief of Staff, unveils the first production-version F-35A on July 7, 2006, officially naming the fighter the Lightning II. /6/ A test of Pratt & Whitney's F135 engine, which powers the F-35 family of fighters.

as a cheap, lightweight aircraft called the Multirole Fighter. At the same time, the Navy and Marine Corps were pursuing stealthy replacements for the A-6 medium bomber (the A/F-X) and AV-8B jump jet (called the Advanced Short Takeoff/Vertical Landing—ASTOVL—project).

Defense leaders, grappling with deep post-Cold War budget cuts, ordered the services to merge their programs into a common effort. Called the Joint Advanced Strike Technology, or JAST, program, it was initially headed by Air Force Maj. Gen. George K. Muellner. His job was to somehow harmonize the needs of the three services, which wanted very different aircraft. He believed each service could get better than 80 percent of what it wanted, at an affordable price, and with the cost benefits of high commonality, so that they could use the same or greatly similar engines, simulators, parts, and logistics support.

An overriding goal was to keep the cost down. It was clear the services wouldn't be able to modernize their fighter fleets unless the 50-year upward trend in costs was reversed.

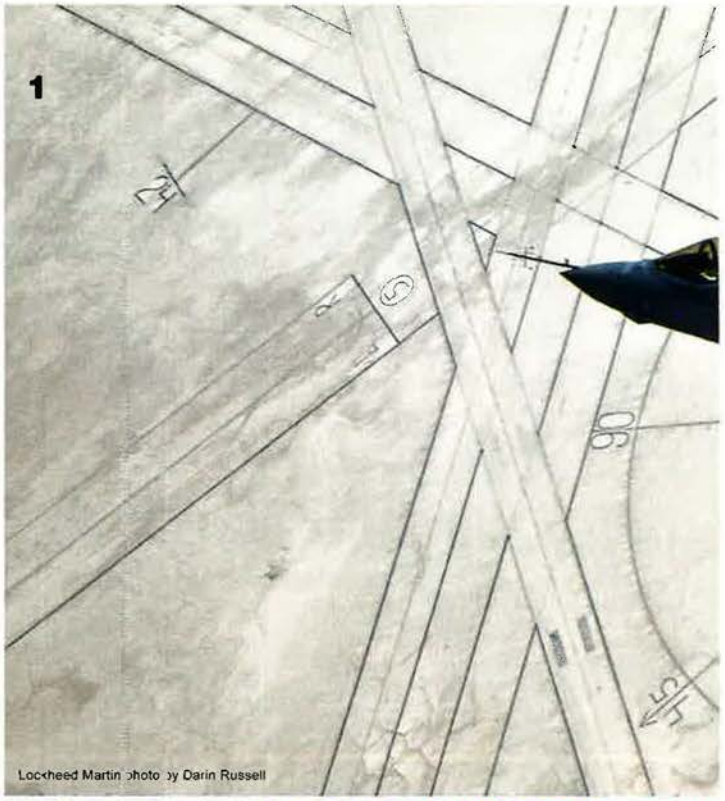
The JAST transitioned into the Joint Strike Fighter program, and it soon became clear this monster-size project would be the last fighter competition for the foreseeable future—a "must win" for any company that wanted to be a player in combat jets 30 years hence.

The magnitude of the program became evident in the first shakeout of competitors. Boeing, Lockheed Martin, and McDonnell Douglas were finalists. After McDonnell's JSF failed to make the cut, the company soon found itself merging with Boeing, and a major name in combat aircraft disappeared in 1997. Northrop Grumman and BAE Systems partnered with Lockheed in 2001.

Britain signed on as a JSF partner, contributing more than $2 billion in cash for development in exchange for a say in requirements and an early place in line for production aircraft. It would later be joined by seven other partner countries, with varying levels of investment and technical inputs.

To meet congressional "fly before buy" mandates, the Pentagon ordered two prototypes each from Boeing and Lockheed Martin. They would have to demonstrate a low-cost approach using new design and manufacturing methods, stealth, vertical takeoff and landing, carrier suitability, and advanced sensors and avionics.

The goal of the program was to produce a conventional takeoff F-35A for the Air Force; a short takeoff and vertical landing F-35B model for the Marine Corps and British air services; and an F-35C with landing gear and larger



/1/ An Air Force jet making a flight test over Edwards in 2011. /2/ TSgt. Brandon Sullivan of the 33rd Aircraft Maintenance Squadron uses the Autonomic Logistics Information System—a maintenance planner/tracker and parts inventory system so ambitious Pentagon leaders considered making it a separate program. /3/ The F-35A line starts to ramp up at Lockheed Martin's Fort Worth, Texas, plant in 2012. The F-35 took over the mile-long space where F-16s were built. /4/ SSgt. Guin Duprey of the 31st Test and Evaluation Squadron works with an F-35 computerized maintenance trainer. /5/ Three F-35As of the 33rd Fighter Wing fly near Eglin AFB, Fla. /6/ Know your ABCs: F-35s of all three variants fly in formation at Edwards in late 2013.


2
USAF photo by Maj. Karen Rogahn


5
USAF photo by MSgt. John R. Nimmo Sr.


6
Lockheed Martin photo by Darin Russell


1
UTAH
U.S. AIR FORCE
Lockheed Martin photo by Darin Russell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USAF photo by Samuel King Jr.


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USAF photo by Samuel King Jr.


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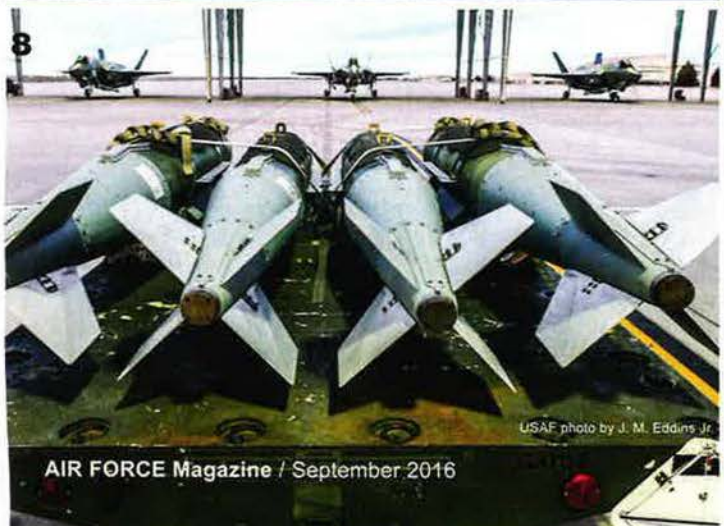
Lockheed Martin photo by Darin Russell



wings suitable for operation from an aircraft carrier. The commonality of parts among the variants was estimated to be upward of 75 percent.

Boeing's airplane was designated the X-32, while Lockheed Martin's was the X-35. The "X" designations indicated these airplanes were more experimental than prototypes.

While the X-32 depended on a single intake, relying on "blockers" to shield the high-radar-return engine fan blades, Lockheed's X-35 featured two serpentine intakes that completely hid the fan blades. And although the rules specified a single-engine aircraft, Lockheed's STOVL version included a "lift fan," a vertically mounted propulsion unit connected to the engine via a shaft and gearbox. Lockheed's STOVL concept also featured a main engine exhaust that could rotate downward—an idea adapted from Russia's Yak-38 jet. Boeing's version used a two-dimensional nozzle similar to that on the F-22.

Both evaluation flight programs had their ups and downs. Boeing's airplane flew first, but Lockheed's jets, once flying, apparently scored more frequently. A telling achievement was when the STOVL-configured X-35B took off, flew supersonically, hovered, and landed vertically on the same sortie.

On Oct. 26, 2001, Undersecretary of Defense for Acquisition, Technology, and Logistics Edward C. "Pete" Aldridge Jr. presided over a Pentagon press conference to announce the JSF winner. "Both contractor teams met or exceeded" required performance and technology requirements, he said, turning the podium over to Air Force Secretary James G. Roche to announce that, in concert with the UK, the Defense Department had selected Lockheed Martin's X-35 as the winner. The choice was made based on "a best-value basis," Roche said, after evaluating the "strengths, weaknesses, and degrees of risk" of both offerors.

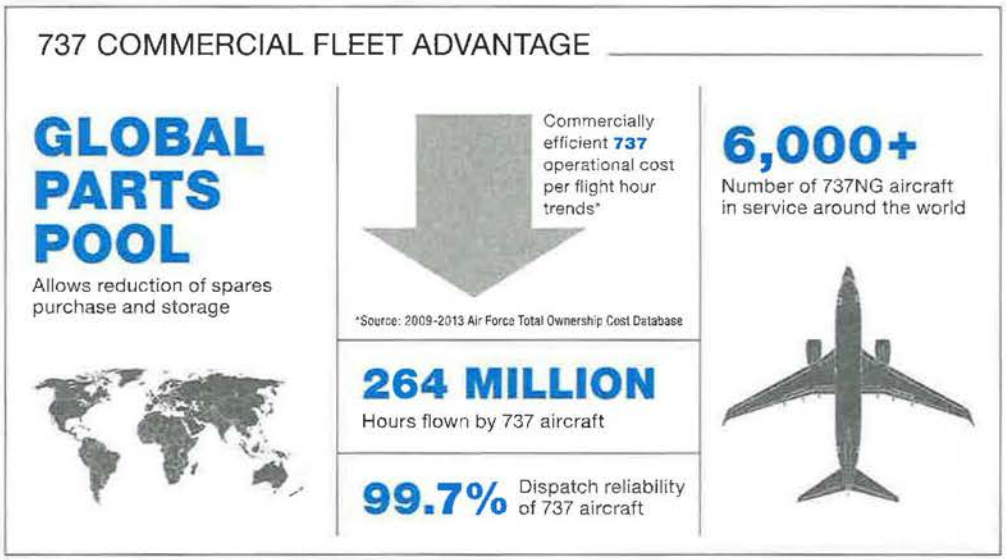
The new jet was awarded the wrong nomenclature. The next "number" in the fighter sequence was to have been F-24, following the F-22 and F-23. When asked what the new jet's nomenclature was, Aldridge flipped the question to then-program manager Marine Corps Lt. Gen. Michael A. Hough, who answered "F-35," presuming that the X-35 designation would convey. Traditionally, though, X designations have no bearing on operational designations; Hough was winging it, but the designation stuck.

Continued on p. 64.

/1/ Test F-35As tank up from a KC-135R in 2014 while an Edwards F-16 flies chase. /2/ SSgt. Mark Freeman of the 33rd Aircraft Maintenance Squadron refuels an F-35A at Eglin in 2014. USAF recruited its best maintainers for the F-35, to train those that followed. /3/ An Eglin F-35A is prepped for a training sortie. There are no two-seat F-35s: A pilot's first flight is also his or her first solo. /4/ A 2015 test firing of an AIM-120C AMRAAM. Though optimized for ground attack, the F-35 must be a lethal air-to-air fighter, too. /5/ A trio of F-35As returns to the US after the type's first overseas deployment, to Britain in July 2016. /6/ An F-35B heads out on a night mission, its under-nose Electro-Optical Targeting System clearly visible. /7/ In May 2015, Lt. Col. Christine Mau, 33rd Operations Group deputy commander, gears up for her first F-35A flight. She was the first woman to fly the Lightning II. /8/ Four inert GBU-31 GPS guided bombs await loading during the February 2016 Mountain Home deployment.

WILL THE AIR FORCE "SAVE $100 BILLION OVER THE NEXT THREE DECADES?"

Why defense leaders need commercial aircraft for the nation's best military value.



Nearly 25 years ago the United States Army and Air Force together purchased a fleet of used Boeing 707 commercial jetliners to enhance their airborne battle management capabilities. This use of commercial aircraft for military missions became known as the Joint Surveillance Target Attack Radar System (JSTARS), and the planes were modified with surveillance capabilities to detect, locate, identify, track and target enemy ground assets and send that information to U.S. and coalition ground forces. The original JSTARS aircraft have participated in nearly continuous deployments in multiple countries; the missions on already old and tired aircraft have taken their toll and now the United States Air Force desperately needs to replace the fleet.

With more than 50 years of experience integrating commercial aircraft and military missions, Boeing is the best choice to replace the Air Force's JSTARS planes. The Boeing 737 JSTARS offering is the best and most affordable solution for the USAF with the capability, capacity and reliability to meet current and future missions for decades.

"The Air Force could save $100 billion over the next three decades by replacing its current Intelligence, Surveillance and Reconnaissance (ISR) fleet with military versions of the 737," said Loren Thompson, Chief Operating Officer for the Lexington Institute in a study entitled *Modernizing the Air Force's Electronic Aircraft Fleet*. Thompson explains that by using commercial derivative aircraft, "development costs would be relatively low because so much of the engineering has been done. Sustainment costs will plummet as aging four-engine planes are replaced with modern twin-engine transports and the Air Force is able to utilize the 737's global maintenance network."

Reducing design and development dollars by repurposing technology

By utilizing a 737 for JSTARS, much of the platform engineering and development has already been done, assuring Boeing's solution sets new standards of military customer value. According to Thompson, "Money can be saved during initial development because airframes already exist and do not need to be designed from scratch." Integrating existing, proven surveillance technologies including Airborne Warning and Control System (AWACS) and systems like those used on Airborne Early Warning and Control (AEW&C), and C-40 significantly reduces costs while increasing acquisition speed. Additionally, open battle management systems paired with a flexible platform provide even more value to accommodate the USAF's specific requirements for command and control. Finally, Boeing's processes and lessons learned from assembling other aircraft on a 737-based fleet can be applied to save additional USAF dollars.

A proven platform with room to grow

The Air Force's existing JSTARS fleet has been in operation for nearly 30 years. Boeing's 737 solution provides the right size, weight, power and cooling for military missions now and in the future. With an innovative interior configuration, the almost 800 square feet of floor space in the 737 has the capacity to host up to 49,000 pounds of payload, a cabin area capable of hosting a dozen consoles, crew rest space and ease of movement for crew. Boeing's JSTARS solution is versatile enough to meet the current USAF requirements and adjust to support future warfighter requirements and the inevitable increase in technology. This means Boeing's offering stays functional for the 30+-year platform life providing long-term functionality and affordability.

Global support gives USAF's fleet the power of 6,000+

Aircraft size doesn't equate to low cost operations; it's about economy of scale. With over 6,000 737s operating around the world today with 193 operators, Boeing's 737 JSTARS provide the power of global sustainment and support. Choosing a 737-based platform gives the Air Force more than just a fleet of 17 JSTARS aircraft. The 737 provides strength in numbers backed by Boeing's enterprise of unparalleled comprehensive support 24 hours a day, 7 days a week, 365 days a year—in every time zone, anywhere in the world.

Recognizing the numerical power and long-term value of the 737 is the future of military aircraft. Sustainment savings gained from thousands of jets in service now and in the future, plus a rich history of military derivatives, makes this platform essential for an affordable and reliable fleet replacement. JSTARS is just the beginning—with other recaps on the horizon including Compass Call, AWACS and Rivet Joint, the Air Force has the opportunity to take advantage of the full scope of financial and operational benefits as part of an assured 737 fleet.


NEXT GENERATION
JSTARS
BOEING

The program is enormous. It aims to develop and build nearly 3,000 frontline combat aircraft for the US alone—and as many as half again that number for partners and export. There are three US services and eight nations as partners, with hundreds of suppliers and work performed globally. Regional depots are being built worldwide for both the aircraft and engine. It will use unprecedented technologies in manufacturing and a breathtaking amount of software—more than eight million lines of code in the aircraft itself and a like number for support systems and simulation—so delays and setbacks were to be expected.

Lockheed Martin had bet that advances in simulation and modeling would make it possible to drastically reduce the amount of flight testing required. If the aircraft's performance matched the computer predictions on two test points, for example, Lockheed reasoned that it didn't have to test all the points in between. The company believed a high level of "concurrency"—developing and testing aircraft at the same time the production line was running—could work on the F-35.

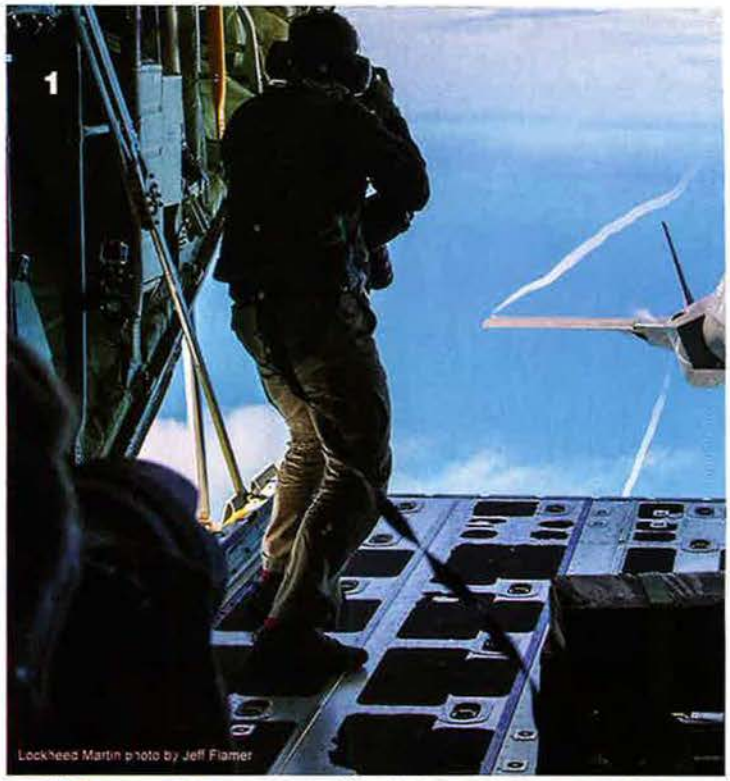
Those bets didn't pay off, and costs climbed as testing had to be added. Weight problems with the B model and arrestor hook issues on the C model forced redesigns.

Large-area use of composite materials also produced uneven results, leading to redesign of some major structures into smaller, more manageable pieces, adding weight in additional fasteners and structure. Dozens of similar deficiencies had to be corrected.

Original plans called for the Air Force F-35 to reach IOC in 2010, but the date was rolled back several times to work out the developmental kinks.

The program reached a crisis point in 2010. The program was billions over budget, and years of delay had accumulated. New management was brought in on both the government side and at Lockheed Martin. The F-35 was given a "re-baselining"—adding time and money to fix the problems, but only to a point. After that, new program manager Vice Adm. David J. Venlet said he would not ask for "more money or more time" on the F-35. Shortfalls would have to be managed within the program from then on.

Since 2012, the program office has kept its word. There have been additional hitches, but one by one they have been resolved. Problems that once seemed capable of derailing the project—an engine fire, issues with the F-35's unique and expensive helmet, and complaints that some of the aircraft's technology had been locked in prematurely—were addressed and are "no longer anything I lose sleep over," Bogdan said.



/1/ Photographers aboard a KC-130J tanker shoot a Marine Corps F-35B during the July 2016 visit to RIAT. /2/ An Eglin F-35 gets a "hot pit refuel," with the engine running, practicing a rapid wartime turnaround in May. /3/ MSgt. Jeffrey Taggart (center) supervises Amn. Juan Rivas and SSgt. Jeffrey Kalsbeek, both from the 388th Aircraft Maintenance Squadron, in an April weapons loading competition at Hill AFB, Utah. /4/ Two of the first all-up F-35As to be assigned to Hill. /5/ A Hill Lightning pulls into a climb. Under certain lighting, the stealthy metallic undercoating of the F-35's paint shines through. /6/ A Hill F-35 leads the two aircraft the type is to replace: an F-16 and an A-10.

USAF photo by SrA. Andrea Posey

Photo by Jim Haseltine

Photo by Jim Haseltine

Photo by Jim Haseltine

The F-35, because its multiservice, multinational nature makes it the most expensive weapons program ever, has been subject to unrelenting criticism. But Bogdan has said the critics are out of date, especially on cost. Though a 53-year life cycle cost for all three variants—including buying the jets, maintaining and upgrading them, military construction, fuel, and five decades of inflation—at one point pushed the program over the $1 trillion mark, the cost has been steadily receding. That same program estimate is now under $850 billion, and the program office promises that the per-jet F-35A price will be less than $85 million by 2019. That's the same or a lower price than fourth generation jets like the European Typhoon or F/A-18.

/1/ Hundreds attended the F-35's IOC ceremony at Hill on Aug. 5. /2/ The new Air Force Chief of Staff, Gen. David Goldfein, speaks at the ceremony at Hill. /3/ Maj. Gen. Jay Silveria, then commander of US Air Warfare Center, wears the F-35 helmet, tailor-made for each pilot. It has been described as a "workspace," displaying situational and targeting information in 360 degrees. Silveria was the first general officer to qualify in the F-35.

The F-35 is now operating at many locations. Eglin AFB, Fla., is the basic training base for all F-35 pilots. Advanced F-35A training—for both USAF and foreign F-35A users—takes place at Luke AFB, Ariz. Nellis AFB, Nev., flies its F-35s for developing tactics, and flight test continues at Edwards AFB, Calif. Basic flight testing of the airframe is complete, and flight test of the final 3F software is nearly complete. Most testing now focuses on the carry and release of weapons and adjustments to software, and this effort will continue indefinitely.

The JSF partners do, indeed, see the F-35 as a platform that will be flying for most of this century and are already starting to develop the upgrades that will be a recurring feature of the program. For now, these are known as the "Block 4" changes and are expected to add new sensors, electronic warfare, and new weapons roughly every two years.

The new aircraft will give the Air Force an "unmatched advantage" in wars to come, officials said. "I have a message to our adversaries," Goldfein said. "It sucks to be you." ✪

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Outstanding AIRMEN OF THE YEAR

SMSGT. MARK E. FARMER
Operations Superintendent
114th Space Control Squadron (ANG)
Patrick AFB, Fla.
Home of Record: Cleveland, Tenn.

As the noncommissioned officer in charge of a command and control space cell deployed to Al Udeid AB, Qatar, Farmer led his team in three intelligence collection missions, identifying two high-value individuals and guaranteeing battlespace awareness. He led three crews through more than 30 rehearsal of concept drills that exercised space effects and elevated the crews' ability to carry out combatant command missions. He modified four mission-critical documents and created a C2 real-time tracker to organize events during multiple missions. This increased situational awareness during periods of high operational tempo. He guided the transition from classroom-based training to high-fidelity performance-based scenarios that developed ready warriors.

SMSGT. JEREMIAH F. GRISHAM
Superintendent, Explosive Ordnance Disposal Flight
11th Civil Engineer Squadron (AFDW)
JB Andrews, Md.
Home of Record: Lakewood, Colo.

Grisham led a flight of 22 airmen supporting more than 230 US Secret Service missions, representing about 50 percent of the Air Force's quota of missions in 2015. His flight provided Air Force counterimprovised explosive device capabilities at the 18-acre White House complex. Grisham revolutionized his flight's support to the VIP Protection Support Activity by adapting a model used by large-range bases to simultaneously cover home station and range missions. This system allowed his flight to execute 50 percent more missions than the previous year and was positively highlighted during the 11th Wing's 2015 Unit Evaluation Inspection. He developed a streamlined tasking process for VIP missions, adapted by the Air Force Civil Engineer Center for use throughout the enterprise.

SMSGT. REBECCA F. MCNELLEY
Superintendent, Standardization and Evaluation
90th Security Forces Group (AFGSC)
F. E. Warren AFB, Wyo.
Home of Record: Clearwater, Kan.

McNelley pioneered the 90th Missile Wing's first active-shooter exercise by partnering with the Wyoming Air National Guard and Army National Guard, preparing more than 8,000 personnel to avert such threats. She directed more than 1,000 evaluations and assessments for four squadrons, reducing the number of defenders posted in missile fields by 10 percent. McNelley engineered weekly missile field and weapons storage team visits, covering three squadrons and 17 flights, ensuring 1,200 security forces airmen were nuclear-security ready. She was proactive in the community, managing the Air Force's largest Airman's Attic program and overseeing her wing's loan locker, assisting more than 3,000 families.

The Air Force Outstanding Airman program annually recognizes 12 enlisted members for superior leadership, job performance, community involvement, and personal achievements.

The program was initiated at the Air Force Association's 10th annual National Convention, held in New Orleans in 1956. The selection board comprises the Chief Master Sergeant of the Air Force and the command chief master sergeants from each USAF major command. The selections are reviewed by the Air Force Chief of Staff.

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

MSGT. MARCUS A. MADER
Superintendent, Recruiting, Assessments, and Selection
Special Tactics Training Squadron (AFSOC)
Hurlburt Field, Fla.
Home of Record: Clarksville, Tenn.

Mader led the Special Tactics Training Squadron's largest assault team, training 37 airmen in four Air Force specialty codes while managing an operating budget of more than $470,000. When a Louisiana National Guard UH-60 Black Hawk helicopter crashed in the Gulf of Mexico, he alerted the dive team, stood up the unit control center, and oversaw 92 dives in five days, ensuring the remains of the seven marines and four soldiers onboard were returned honorably. Additionally, he led 60 airmen through seven months of deployment preparation, pushing 22 special operations forces to three areas of responsibility, crushing ISIS with 582 strikes and an estimated 1,200 enemies killed in action. Finally, he led a local memorial and dignified transfer, raising $5,000 in a fallen teammate's honor.

TSGT. MICHAEL A. ASUNCION JR.
Pavement and Equipment Craftsman
45th Civil Engineer Squadron (AFSPC)
Patrick AFB, Fla.
Home of Record: Mangilao, Guam

Asuncion was vital in the construction of the Royal Air Force's 44,000-square-foot aircraft maintenance area, enabling coalition forces to obliterate more than 500 ISIS targets. He filled the noncommissioned officer in charge position across two work centers, leading 51 airmen for 130 days, enabling 16 space launches with more than $6.3 billion in payload. He presided over two junior enlisted organizations, influencing more than 1,500 members across two areas of responsibilities. His leadership led to six quarterly awards, culminating in his team earning the Heavy Equipment Shop Team of the Year win. This contributed to his squadron and operations flights being named the best in Air Force Space Command in 2015.

TSGT. SHARRY L. BARNSHAW
NCOIC, Cyberspace Plans and Implementation
436th Communications Squadron (AMC)
Dover AFB, Del.
Home of Record: Dundalk, Md.

Barnshaw led 16 projects, 45 contractors, and $30 million in command and control programs. She finalized a six-year, $12 million military construction project by migrating 20,000 telephones and 30 systems, leading to her unit earning recognition as Dover Air Force Base's Team of the Quarter. She lobbied for 10 projects within Air Mobility Command, garnering approval for a $6 million engineering and installation work plan, cementing information technology support to 19 squadrons. As president of Team Dover's Junior Noncommissioned Officer Association, she partnered with three other organizations to raise more than $9,000 and donated more than 1,200 volunteer hours in support of programs across the state of Delaware.

Outstanding AIRMEN OF THE YEAR

TSGT. CASSANDRA L. CRUZ
Professional Military Education Instructor
81st Force Support Squadron (AETC)
Keesler AFB, Miss.
Home of Record: Hau'ula, Hawaii

Cruz aided the Total Force Integration initiative by educating 113 Active Duty, Air National Guard, and Air Force Reserve Command leaders, facilitating 1,000 hours of instruction. She identified credential shortfalls for her primary Air Force specialty code and aligned civilian requirements with the Career Field Education and Training Plan, enabling the expansion of seven additional certifications available to over 2,000 airmen. As a base victim advocate, she dedicated 1,300 hours to the Sexual Assault Prevention and Response program, serving as a first responder and trainer for base personnel. She was recognized as a distinguished graduate from the Archibald Mathies NCO Academy's Intermediate Leadership Experience.

SSGT. RAQUEL R. CARAMANNO
Medical Readiness Technician
412th Medical Support Squadron (AFMC)
Edwards AFB, Calif.
Home of Record: Staten Island, N.Y.

As a senior airman, Caramanno was instrumental in leveraging a 50 percent staff loss while flawlessly managing 17 medical contingency response teams and $1 million in war reserve materiel. Her attention to detail drove "Outstanding" test wing ratings in the Air Force Input Tool; Defense Readiness Reporting System; Air Expeditionary Force Reporting Tool; and Emergency Management programs. As the chemical, biological, radiological, and nuclear program manager, Caramanno directed a 42 percent capability surge, leading to $40,000 in modernization upgrades to critical assets. She identified a pandemic-influenza shortfall, resulting in the procurement of $26,000 in protective equipment, ensuring the operational integrity of $895,000 in allowance standards. Finally, her dedication to excellence culminated in her selection as the 2015 Air Force Medical Service Health Services Management Airman of the Year.

SSGT. DEREK F. MILES
Ground Radar Systems Technician
39th Operations Support Squadron (USAFE)
Incirlik AB, Turkey
Home of Record: Buffalo, N.Y.

As a senior airman, Miles guided a four-member emergency response team, rewiring the Turkish air force precision approach radar in under one hour to secure host nation F-16 alert capabilities. He repaired a vital radar control unit, saving $19,000 in procurement costs, and restoring air traffic control of 6,700 NATO missions for Operation Inherent Resolve. Additionally, he stepped outside his career field to install nine ground-to-air radios in less than 48 hours, establishing operations centers for five deployed squadrons flying more than 1,000 OIR missions. Miles displayed his adaptive leadership ability during a three-week stretch, leading his work center through 103 maintenance actions and an unprecedented 99.9 percent radar uptime rate. He earned the John L. Levitow Award for academic and leadership excellence at Airman Leadership School.

SSGT. AARON M. TOBLER
Geospatial Intelligence Analyst
50th Intelligence Squadron (AFRC)
Beale AFB, Calif.
Home of Record: Rocklin, Calif.

Tobler repeatedly filled Active Duty intelligence, surveillance, and reconnaissance operations gaps, logging hundreds of combat mission hours. He exploited 45 high-value targets, providing key indicators and warnings to seven combatant commands. He provided intelligence support to special operations forces, resulting in the neutralization of terrorist camps and associated members. He identified terrorist weapon manufacturing compounds, resulting in crippling a network. He facilitated joint task force convoy overwatch, clearing more than 2,000 miles, securing forces, and marginalizing hostile combatants. He earned a Project Management Professional Certification and a Master Analyst Program Certificate. He led a Friendship Place charity event attended by the President and first family, raising more than $4 million.

SSGT. JAMIE K. ZIMMER
Intelligence Analyst
347th Operations Support Squadron (ACC)
Moody AFB, Ga.
Home of Record: Newburgh, N.Y.

As a senior airman, Zimmer was instrumental in establishing the Joint Rotary Wing Intelligence Working Group, increasing interservice operability across 14 rotary wing intelligence squadrons spanning all branches of the Department of Defense. As the acting noncommissioned officer in charge of intelligence training, she created five scenarios and crafted deployment briefings, increasing the expertise of 187 personnel in the 23rd Wing and directly impacting multiple high-level exercises, including Trident Juncture, NATO's largest joint and coalition force exercise. She also excelled scholastically, obtaining an associate's degree through the Community College of the Air Force, earning a Pitsenbarger scholarship, and winning the John L. Levitow Award for academic and leadership excellence on completion of Airman Leadership School.

SRA. JASMIN N. FIGUEROA
Emergency Services Technician
51st Medical Operations Squadron (PACAF)
Osan AB, South Korea
Home of Record: Lakewood, Colo.

Figueroa facilitated five specialty clinics and trained 14 personnel on the Air Force Medical Service Provider and Patient Continuity Program. Her efforts helped support the medical care of more than 11,000 Active Duty and civilian personnel. In addition, she spearheaded a basewide influenza-prevention campaign, surpassing the Air Force's goal of immunizing 90 percent of the base's populace within a two-week period, sustaining an overall 99.5 percent medical readiness rating for her base. She is pursuing a bachelor of science degree in nursing, applying her training and leadership principles to mission objectives. She has arranged three speed-mentoring events, connecting five senior leaders at Osan Air Base in Korea with 60 airmen, providing networking opportunities.

Photochart of USAF Leadership

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As of Aug. 15, 2016

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CMSAF James A. Cody

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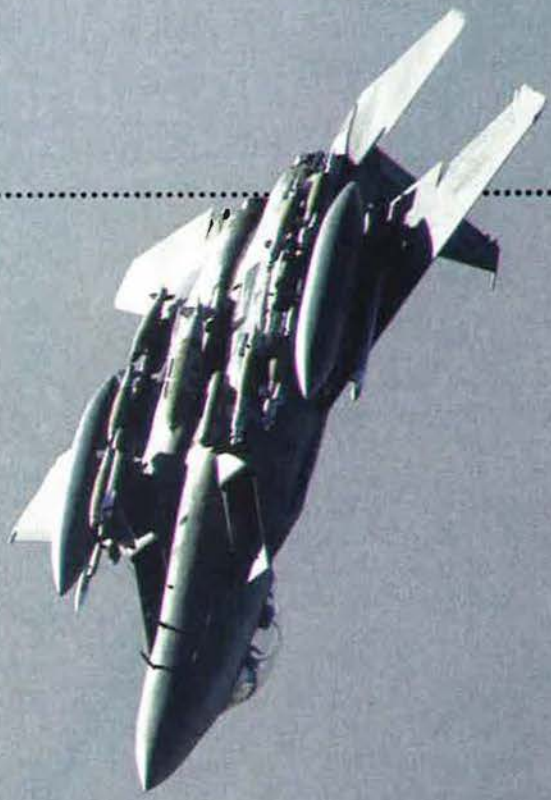
A ROLLING
AT

Four airmen played vital roles preventing a burning F-15E from causing untold death and destruction.

USAF photo by SSgt. Kentavist F. Franklin

BOMB BAGRAM

By Rebecca Grant



USAF photo by SSgt. Larry E. Reid Jr.

IT'S not every day a combat-loaded F-15E erupts in flames at the end of a crowded runway, but that's what happened when a Strike Eagle caught fire on the flight line at Bagram Airfield, Afghanistan, on Dec. 2, 2015.

The incident began when a pair of F-15Es landed at Bagram late in the morning. The crews "had just returned from a night mission. Everything was going normal," said a 391st Expeditionary Fighter Squadron weapon systems officer who was in the mishap aircraft.

"As we leave the de-arm area, we get a sharp salute from the crew chief, and we normally start taxiing to our parking spot at that point," the major explained in an Air Force news release. Edging forward, the aircraft pilot tapped the brakes.

That's when the crisis began. Orange flames billowed up under the F-15E. Fire reached toward the weapons and fuel tanks.

Suddenly the Bagram flight line was one flaming jet away from a major disaster. The airmen closest to the F-15E had only seconds to prevent it.

At left, the airmen who prevented a catastrophe on the flight line at Bagram Airfield, Afghanistan: SrA. Nash Camden, SrA. Matthew Mayo, SrA. Blake Destasio, and TSgt. Kyle Martin (l-r). They responded quickly when an F-15E—like this one descending after refueling—caught fire on the flight line.

SLOPING RUNWAY

Located some 30 miles north of Kabul, Bagram has long been the Chicago O'Hare of coalition air operations in Afghanistan. Nearly 40,000 military, civilian, and contractor personnel work on Bagram's six square miles. First built up by the Soviets in the 1980s, the runway had its oddities. "The whole airfield was on a slight grade," said SrA. Matthew Mayo in an interview.

The winter of 2015 found aviators at Bagram holding a steady pace. Sorties supported two overlapping missions: US forces continued counterterrorism operations, while NATO led Operation Resolute Support.

On any day at Bagram the flight line might be dotted with AC-130 gunships, Army AH-64 Apache helicopters, other USAF fighters like F-16s and A-10s, and of course unmanned airplanes like the MQ-9 Reaper. C-130s, C-17s, and C-5Ms routinely landed. Bagram's busy hospital transferred medevac patients via C-17s and KC-135s. Allies rotated F-16s, F/A-18s, and other fighters and military aircraft through Bagram on deployments supporting the NATO mission.

The 391st Fighter Squadron—the "Bold Tigers"—and its F-15Es from Mountain Home AFB, Idaho, had been deploying to Bagram for years. The aircraft's range and ability to carry

a diverse and substantial payload of weapons made it a premier choice for coalition ground operations with Afghan allies.

Strike Eagles fly with a crew of two, but on the ground the team expands.

NASCAR has pit crews. Thoroughbred racehorses are bustled off the track by grooms. F-15Es have crew chiefs and weapons loaders. The small team meets the aircraft at the de-arming point before the jet taxis back to park along the flight line.

On this morning, a group of four airmen was in position at the de-arming point. SrA. Blake Destasio and TSgt. Kyle Martin were crew chiefs assigned to the 380th Expeditionary Aircraft Maintenance Squadron. When an F-15E taxis in and pauses, crew chiefs chock their jet and plug in a headset to communicate with the pilot and weapon systems officer. Engines continue to run.

Mayo and SrA. Nash Camden, likewise assigned to the 380th EAMXS, were also on duty at the de-arming point.

Weapons loaders like these two load and check weapons for a combat sortie before take off and immediately after the aircraft lands. Typically, the F-15Es carried a mix of GBU-38s and other weapons for a standard load of about 3,000 pounds of ordnance. "We make sure aircraft can drop what it needs to and the bombs are loaded correctly," explained Mayo.

At de-arm, weapons loaders have a series of quick, essential tasks to perform. Pins safe unexpended bombs and missiles slung under the hard points on the jet's belly and wings.

What weapons loaders and crew chiefs have in common, of course, is their dedication. They are the small party on the ground when the aircraft returns. It's a scene repeated countless times per day at bases around the globe.

The F-15E at Bagram spent just a few minutes at the de-arming point as crew chiefs and weapons loaders set about their work. Mayo and Camden approached the jet to safe the weapons, inspect rails, and look over the aircraft quickly. "You are always aware," observed Mayo.

TRAINING KICKS IN

And the jet looked good. With their initial check complete, the weapons loaders stepped back. The crew chiefs pulled out their headset and lifted up the chocks. They signaled with their hands for the airplane to taxi forward. Mayo and Camden were 10 feet from the wingtips of the F-15E.

Briefly the F-15E moved forward. Then a metallic screech split the air. Under the jet, on the right wheel of the landing gear, the brake's bleed port had broken. Hydraulic fluid sprayed the hot brakes.

Suddenly Mayo and Camden saw their jet on fire. "As weapons troops we learn a lot about how long it takes a piece of ordnance to explode once it's enveloped in flames," Camden later said in the Air Force news release.

"The whole underbelly of the aircraft was a fireball," said Mayo. "Fire and bombs don't go well together," he recalled thinking.

"My training kicked in," he said.

Years ago, personnel working on active flight lines didn't always receive that training. Airmen as first responders to fire dates back to a single destructive incident.

On July 29, 1967, a Zuni rocket accidentally fired off from an F-4 Phantom on the deck of the aircraft carrier *Forrestal* while the ship was launching combat missions over North Vietnam. The rocket ruptured the underwing fuel tank of an A-4 nearby.

Leaking fuel and exploding bombs started a conflagration that swept across the deck of the carrier, and what was initially a small fire billowed into a tower of flame.

Overheated bombs blew craters and holes in the armored steel flight deck.

An F-15 taxis on a runway in Southwest Asia with an F/A-18 fighter visible to the left.

USAF photo by TSgt. Jeff Andrejcik

Nine major explosions of fuel and ordnance took place within the first five minutes. Specialized firefighting crews on deck were killed within moments. Sailors rushing topside to fight for survival on the blazing deck had insufficient training in firefighting techniques, the Navy later concluded. Some sprayed the deck with seawater from hoses, sweeping away the firefighting foam.

A total of 134 sailors lost their lives that day, and another 161 were injured. After the *Forrestal* disaster, flight line firefighting changed across the US military. Images of the charred and twisted deck with melted airplanes became a regular feature in military firefighting training.

For USAF, training airmen with flight line jobs in the techniques of firefighting became standard practice. As a result Camden and Mayo, as weapons loaders, and Destasio and Martin, as crew chiefs, were ready to battle the flames.

Gerald Ford Museum, courtesy of RVAHNAVY Assn.

During the Vietnam War, a malfunction caused a Zuni rocket to fire from an F-4 on the deck of USS Forrestal. Leaking fuel and exploding bombs killed 134 sailors. Afterward, training for the possibility of a flight line fire became standard.

For these four airmen and the others near them there was never a moment for doubt. "We train for instances like this. Things like this have happened in the past," said Mayo. At the core of the training is the impulse to run toward and combat the fire. "See fire, fight fire" is the mantra, according to Mayo.

Now it was a matter of seconds until the flames heated up the weapons slung on hardpoints under the F-15E's wings.

"Your average time is 1.5 minutes, when the plane is engulfed in flames until the munitions become volatile and could explode," Mayo said.

USAF fire emergency services vehicles need at least a short period of time to reach the incident site. In civil aviation, the FAA stipulates airport fire engines have to reach the scene in three minutes or less. At Bagram, three minutes would have been far too long.

STOP THE DANCING

With fire near the weapons, every second counted. Camden took the front end of a fire extinguisher hose, while Mayo was on the back. "Camden pulled the front end and I started pushing the bottle," said Mayo.

The "bottle" was a 150-pound Halon 1211 flight line fire extinguisher.

Halon as a gas or liquid puts out fires without leaving residue on high-value equipment like that found in hospitals or data centers—or on an active flight line. In theory, an F-15E could be smothered in halon and return quickly to the flying schedule.

Fires require fuel, air, and ignition heat. "Traditionally, to stop a fire you need to remove one side of the triangle—the ignition, the fuel, or the oxygen," stated a research paper by the Halon Alternative Research Corp. "Halon adds a fourth dimension to firefighting—breaking the chain reaction. It stops the fuel, the ignition, and the oxygen from dancing together by chemically reacting with them," explained the researchers.

An F-15E taxis in after an Operation Inherent Resolve mission. Airmen in the foreground have a fluorescent-colored halon fire extinguisher on wheels at the ready.

USAF photo by SSgt. Sandra Welch

Camden and Mayo doused the flames with halon. The fire abated under the suppressant.

Destasio, the crew chief, now realized there was a fresh danger. Hydraulic fluid had slopped onto the hot tires when the aircrew braked. An exploding tire could "literally cut you in half," Destasio recounted in the Air Force news release.

He saw that Mayo and Camden were perilously close as they handled the hose.

"You're thinking about getting the fire bottle in position, not where your position is," Mayo later explained.

Destasio shouted at Mayo and Camden to move back.

It was just in time. Inside the Strike Eagle, the crew had hit the emergency brakes to stop the aircraft from rolling forward, unwittingly spraying more hydraulic fluid.

Flames flared again. The crew chiefs signaled the aircrew to cut the engines.

"After we shut the engines off we started to roll backwards because of the slight [runway] incline and there's no more thrust coming from the engines," said the WSO, who was not identified for security reasons.

"It rolled 20 feet forward and then 20 feet back again," Mayo recalled. "About the time it started to roll backward we were getting in position and starting to bring the fire down."

"As we start to roll backwards, we feel the crew chiefs throwing the chocks under the tires and we feel a little bump because we have momentum going backwards, and we're rolling over the chocks," the WSO said.

"We couldn't get the chocks under because it was too big of a fire," recalled Mayo.

The F-15E was sliding past the ground crew with the aircrew still in the cockpit.

Now the four airmen and others who joined them were fighting against that tilt in Bagram's tarmac.

With the right brake inoperative, the F-15E veered left. The slight downslope of Bagram's de-arm area caused the burning fighter to pick up speed, rolling toward other aircraft on the flight line.

"At that point I'm thinking, 'Well, I've been on fire before; that wasn't a big deal, but now we have no brakes and we're rolling backwards, possibly into this jet behind us.' That's going to be a pretty big deal," said the WSO. "That's when I unstrapped and I'm sitting in my seat getting ready to jump outside of the jet."


USAF photo by SSgt. Kentavist P. Brackin

The airmen first responders to the F-15E fire each received an Air Force Commendation Medal in a ceremony in February.

Parked about 50 feet away were F/A-18 fighters belonging to a NATO ally, Spain's Ejército del Aire. On this December morning, the Hornets were fueled and combat-loaded, awaiting a mission later in the day.

ANYTHING TO STOP IT

The flaming F-15E was swerving closer to the Spanish F/A-18s. Within seconds the F-15E could touch off multiple fires if it hit the parked aircraft loaded with fuel and bombs—just as had happened decades before aboard *Forrestal*.

"We were trying to get chocks underneath. Anything to stop it," Mayo said. Still the F-15E rolled backward. Inside, the pilot and weapons systems officer were flipping open the buckles connecting them to the ejection seats, tugging at harnesses, unplugging oxygen lines, and preparing to get out.

Finally a chock lodged under the nose wheel. The F-15E stopped less than 15 feet away from the F/A-18s, but it was still on fire. "The residue still wanted to flare up," according to Mayo. He maneuvered a second 150-pound bottle of halon in place to combat the flames. A good portion of the second bottle was gone by the time the fire emergency services arrived.

At last the fire was out. Cautiously the crew chiefs put a ladder up to the cockpit and out came the aircrew.

With the fire department on scene, the first responders got checked over themselves. "We were coughing," Mayo said. He'd breathed in "a few big puffs of halon." They went to the base hospital where medical staff cleared them.

The runway at Bagram was soon active again.

Airpower takes many forms as it upholds national security. The standout actions of Camden, Destasio, Mayo, and Martin proved it again, and the four were each awarded the Air Force Commendation Medal for their efforts fighting the fire and saving the aircraft.

Lt. Gen. Charles Q. Brown Jr., now deputy commander of US Central Command, described it well during a February 2016 visit to bases in the AOR. "Airpower is everything we do; it's not just the folks in the cockpit dropping bombs. It's all the things that happen to get us to that point, from the folks that keep us safe to those that keep us fed and bed us down," said Brown.

For all the excitement of the burning jet on that December day, routine is better.

"I would not like to have that happen again," concluded Mayo. ✪

Rebecca Grant is president of IRIS Independent Research. Her most recent article for Air Force Magazine, *"The Second Offset," appeared in July.*

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BUZZ

By Peter Grier

Buzz Aldrin is famous for being an astronaut. He set a record for spacewalk length as a crew member of Gemini 12 in 1966, was one of the first men to land on the moon, and was the second to walk on its surface as part of the historic Apollo 11 mission of 1969. Overall he logged 289 hours and 53 minutes in space.

Today he continues to advocate for interplanetary exploration. In particular he is pushing for a US manned mission to Mars.

But outer space is not the only place Aldrin flew. Before capsules he sat in cockpits for the Air Force.

A West Point graduate, Aldrin was an airman before and after his NASA experience. He flew 66 combat missions in Korea. Today he remembers the service as a place where he experienced friendship and camaraderie. It is also where he learned to control his response in moments of personal danger, a skill as valuable in space as it was over the Yalu River.

"At age 17 at West Point, I took an oath to serve my country, and that has been the overriding purpose in all of my activities since then," Aldrin says.

Buzz Aldrin was born into a flying family. His father, Edwin E. Aldrin Sr., was a career military officer and flight pioneer who, among other assignments, was assistant commandant of the Army's first test pilot school at McCook Field, Ohio, from 1919 to 1922. The senior Aldrin also founded the engineering school,

Astronaut Buzz Aldrin walks on the moon during the Apollo 11 mission in 1969.

NASA photo by Neil Armstrong

As the third-ranking cadet in his class, Aldrin could choose the direction of his military career. Upon graduation in 1951, he followed his dream and opted to enter the Air Force...

which later became the Air Force Institute of Technology at Wright-Patterson AFB, Ohio.

As a student, he had studied under rocketry pioneer Robert H. Goddard at Clark University before earning a doctorate from MIT. He was a passenger on the first transatlantic round trip of the dirigible Hindenburg, which later burned and crashed at Lakehurst Naval Air Station, New Jersey. He knew Orville Wright and Billy Mitchell. Jimmy Doolittle occasionally stopped by the Aldrin house. (The future Tokyo Raider eventually befriended youngster Buzz and would later serve as a valued mentor.)

In 1928 Aldrin Sr. left the service and took a job as an oil company executive. He was one of the world's first flying executives, traveling around the globe preaching the gospel of commercial air travel. In 1932, he took then-two-year-old Buzz on his first airplane ride, in a Standard Oil Lockheed Vega.

"I remember that it was painted red and white and looked like an eagle," Aldrin says today.

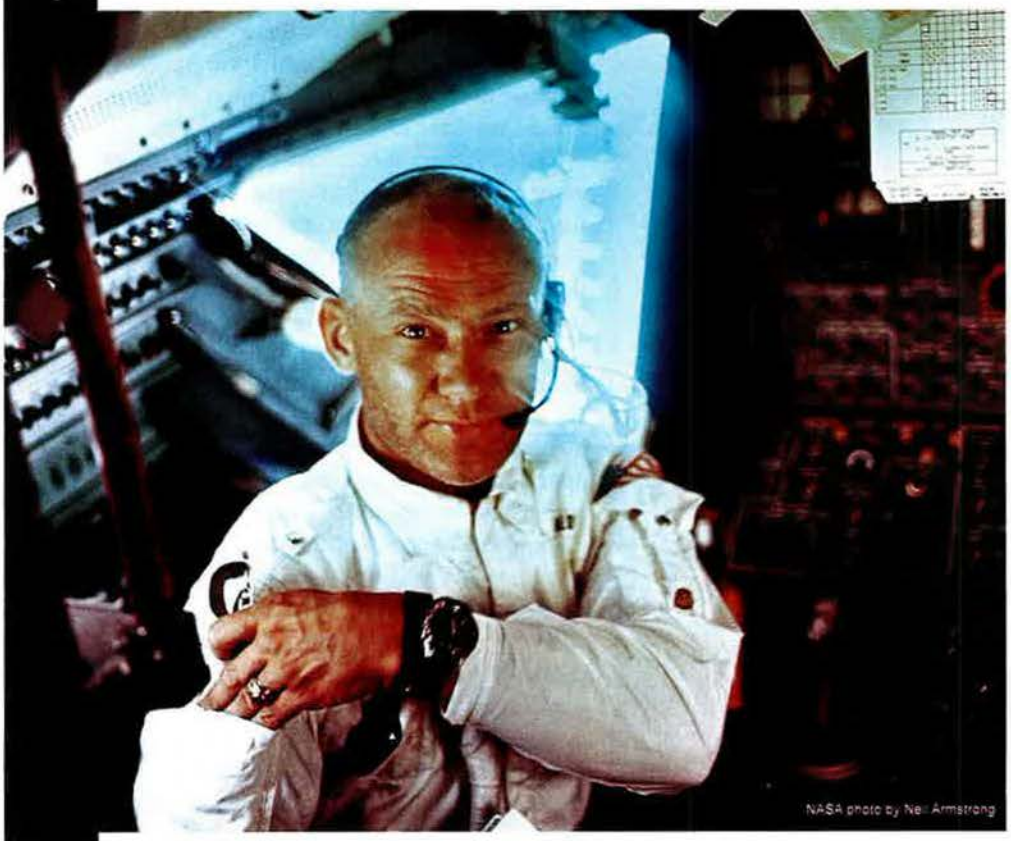
STANDING HIS GROUND

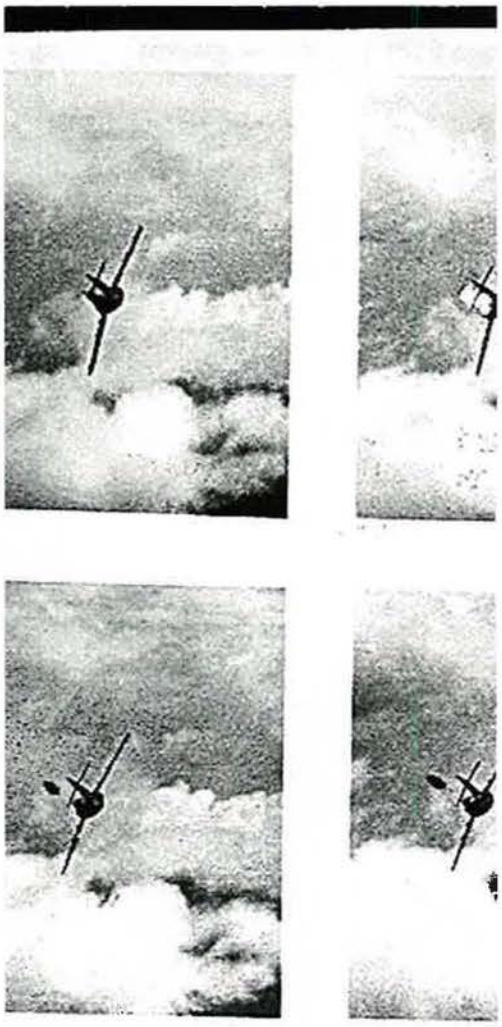
Aldrin's given name was Edwin Eugene Aldrin Jr. He got his nickname from his sister Fay Ann; she could not say "brother" and called him "buzzer" instead. As an adult Aldrin made it official, legally changing his first name to "Buzz."

Given this background, and the fact that Aldrin was an impressionable teen during the earth-shaking events of World War II, it was almost inevitable that he would enter the military himself. As a little boy he had loved building model airplanes and reading space-theme Buck Rogers comics. As he got older he became more and more interested in the mechanics of airplanes.

When his father landed a P-38 at an airport near their home after the war, Buzz noticed little things, he writes in his latest book, *No Dream Is Too High: Life Lessons From a Man Who Walked on the Moon.* For instance, the P-38's rivets were not flush with the aircraft's skin.

" 'We need to improve that,' I thought. Eventually we did," Aldrin writes.



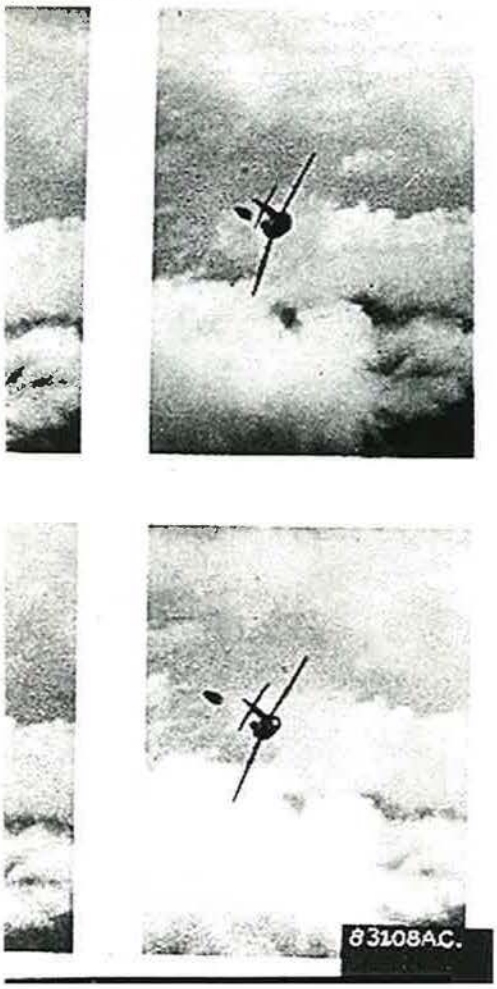


Below left: NASA turned down Aldrin on his first attempt to become an astronaut. Seven years later, he was in the Lunar Module, preparing to set foot on the moon, as Apollo 11 commander Neil Armstrong took this photo. Below: During the Korean War, fighter pilot Aldrin's gun camera footage captured for the first time a MiG-15 pilot punching out. **Life Magazine** ***printed the photos.***

USAF photo

Sandbags and pierced steel planking: F-86 Sabres from the 51st Fighter-Interceptor Wing—Aldrin's unit during the Korean War—are prepared at Suwon AB, South Korea, about 1952.

USAF photo via National Archives



Airman and tireless space exploration advocate Buzz Aldrin was also the second man to walk on the moon.

Surprisingly, Edwin Aldrin Sr. pushed hard for Buzz to try for entry into the Naval Academy. He thought that would ensure a brighter long-term future.

"He said he knew more successful businessmen who had gone to the Naval Academy than West Point," says Aldrin.

But he didn't want to go to Annapolis. He wanted West Point, in part because he'd been so impressed by his sister Madeline's boyfriend, a cadet who had been featured with the color guard in a photo for the cover of *Life Magazine.* Eventually Buzz prevailed, though this involved standing his ground against his formidable father.

He entered the academy in 1947. He thrived under the orderly and intense educational regimen, though not everything went smoothly.

During his third year, Aldrin reported a classmate he saw cheating on a test. According to West Point's honor code, Aldrin was bound to tell instructors what he saw. But the culprit was not punished, as the commandant felt evidence was lacking. It shook young Buzz's faith in the system.

Aldrin later wrote that he learned a lesson from this: There are always people who bend the rules, in any organization. Still, he and the academy were a good fit.

"I was unformed, and West Point, for better or for worse, fit me into a form," he wrote in *Return to Earth,* his 1973 autobiography.

As he neared the end of his formal education it was already clear where the US military might need him. In the summer of 1950, prior to his last year, he and a small group of other top West Point cadets toured Japan and the Philippines to study Gen. Douglas MacArthur's occupation governments and its creation of new laws and constitutions.

Their first night in the Far East, *Stars and Stripes* was slipped under their door. The paper's headline read that North Korea had invaded South Korea.

"At that point you kind of knew that after another year of West Point, there were a lot of cadets who were going to be involved in the Korean War," says Aldrin.

As the third-ranking cadet in his class, Aldrin could choose the direction of his military career. Upon graduation

in 1951, he followed his dream and opted to enter the Air Force, which had become an independent service at about the time he entered West Point.

Basic flight training was in Bartow, Fla. For six months, Aldrin flew T-6 trainers during the week and watched the water skiing maidens at nearby Cypress Gardens on weekends. Among the lifelong friends he made at this first stop in his Air Force career was Sam Johnson, a fellow pilot and future member of Congress from Texas who was shot down over North Vietnam and imprisoned for seven years.

Johnson was a POW when Aldrin landed on the moon in 1969. When he heard the news, Johnson went up to a guard and pointed at the moon hanging in the sky over Hanoi.

"That's ours now," he said.

Aldrin's early flight career was not without incident. He was fond of aerobatics and that nearly proved fatal. Piloting a T-28 one day during training in Texas, he attempted a double Immelmann and suffered a grayout from excessive G forces.

F-86: PERSONAL FAVORITE

He awoke as though from a nap, rested and surprised to discover there was a spinning propeller in front of him. It took him some moments to realize he was in an airplane and in trouble. He pulled out about 2,000 feet above the ground.

When it came time to choose a type of aircraft following basic school Aldrin had further conflict with his strong-willed father. "He wanted me in bombers. He thought there was more leadership there," says Aldrin today.

The father was projecting his own career onto his son: He thought multiengine aircraft were the better path to higher rank and eventual business success, due to the experience of commanding a crew.

Buzz wanted fighters. They meant excitement, drama, and individual accomplishment. Again, he scored near the top of his class and got his wish. His next stop was three months at Nellis AFB, Nev., learning to fly F-80s and F-86s.

The latter was his favorite. "Rarely would I find anyone in that epoch who didn't greatly favor the Sabre," he says.

He arrived in Korea the day after Christmas 1951, in the midst of a typically severe Korean cold wave. The war was settling into a stalemate, though he didn't know that at the time. During one of his early acclimation flights Aldrin had what he remembers as one of his most harrowing airborne experiences. His main fuel-control

Buzz wanted fighters. They meant excitement, drama, and individual accomplishment. Again, he scored near the top of his class and got his wish.

USAF photo

Four F-100C Super Sabres in formation. Aldrin flew jets like these when based at Bitburg AB, West Germany, in the mid-1950s.

system froze in the 100 percent power setting. The F-86 had an emergency manual fuel switch that enabled him to override the system, but it was a button that needed to be handheld to operate, making it virtually impossible for him to also operate the radio. In enforced radio silence, he broke off and headed for base. He barely made it.

Aldrin would eventually fly 66 combat missions in the Korean War. He scored two kills.

The first was not dramatic. Flying about five miles south of the Yalu River on May 14, 1952, he saw two MiG fighters, well below. He dove down, targeting the wingman. The MiGs never saw him coming. Aldrin simply lined up and fired. The MiG engine started smoking, the canopy flew off, and the pilot—likely North Korean or Chinese—ejected. The Russians were more capable and probably would have detected the attack and put up a fight.

For Aldrin, the most notable aspect of this encounter came from his gun camera. It turned out that his pictures caught the enemy ejection sequence, the first such photos to do so. A week later they appeared in *Life Magazine.* They went on to be among the most reproduced images of the Korean air war.

Aldrin's second MiG fight was far more exciting—and not necessarily in a good way. On patrol June 7, he was forced to join a flight of newer F-86s from another squadron when his wingman developed engine trouble. The new fighters were much faster and Aldrin had trouble keeping up as they moved in to attack a North Korean air base. Lagging behind, he looked up and saw an airplane sliding in from the right. The high tail gave it away as a MiG.

They saw each other at about the same time. Aldrin and his foe quickly went through several scissors maneuvers as both tried to get behind the other. Aldrin finally turned tightly enough to gain an advantage. He tried to fire but the aiming dot on his gun jammed.

Flying with his left wing pointed straight down toward the earth, Aldrin manually sighted in on his target and pulled the trigger. He saw something spark on the MiG's wing. Then Aldrin rolled back upright, punched the throttle to full open, and fired again as his foe went into a hard right turn. At this point they were getting close to the ground—too close for the dogfight to last much longer. As the MiG rolled out of the turn and dived, Aldrin fired two more bursts.

A holographic Aldrin appears in "Destination: Mars," a NASA and Microsoft-produced "mixed-reality" experience, where visitors use headsets to see realistic, 3-D views of the Red Planet.

"It was like a slow-motion movie as I watched the enemy plane's nose come up and seem to hang in the air, the engine stalling. The canopy of the jet opened, and I saw the flash of the pilot's ejection flare. Whether he had time to open a parachute I don't know, but the MiG definitely beat him to the ground," wrote Aldrin in the 2016 book *No Dream Is Too High.*

STEERED TOWARD THE STARS

The danger wasn't over. Aldrin was 20 miles north of the Yalu, in enemy territory, and low on fuel. Other MiGs would surely arrive soon. He made a beeline south, pushed by the helpful hand of the Manchurian Express, a jet stream that helped him make it back to base.

The hardest part of the encounter was checking his fear, Aldrin told an audience at Nellis in a 2007 appearance. The solitude of trying to escape enemy airspace without knowing when danger might arrive was "haunting," he said. But that's part of being a fighter pilot. Fear must be put aside if you're to survive.

"You have to appreciate the threats, the danger of things, but you can't be obsessive over them, otherwise you are in the wrong business," Aldrin told the Nellis group.

After the fighting ended, Aldrin returned to the US and served as an aide to the dean of faculty at the new Air Force Academy. He went through Squadron Officer School. Then in 1956 he returned to flying, this time as a flight commander with the 36th Fighter Day Wing, based in Bitburg, West Germany.

In Germany Aldrin flew the F-100, a supersonic jet with greater performance than the F-86. At first, air-to-air combat was his unit's mission. Aldrin and other pilots sat alert in g-suits so they could be airborne within five minutes of a call. During the Hungarian crisis of 1956 they were deployed to a forward base in Munich and patrolled the tense border between communist and free worlds.

Eventually the F-100 was pressed into fighter-bomber service. Aldrin ceased to serve as a fighter jockey and instead took on the deadly serious responsibility of preparation for a possible World War III.

"We'd sit on alert with nuclear weapons on the wings of F-100s,

bombs we were supposed to deliver at a low level," he says today.

Despite the gravity of this mission Aldrin remembers his posting in Germany as an enjoyable time in his life. It was also a place where friendship steered him toward the stars.

Edward H. White had been one year behind Aldrin at West Point. The two men met and bonded as members of the academy's track team. When Aldrin arrived in Bitburg, White was already there, and they reconnected. It was a time of rapid development in the nascent discipline of spaceflight. Russia's Sputnik satellite shocked the world in October of 1957 and White became increasingly interested in the subject.

White left Bitburg to attend the University of Michigan and earn a higher degree in aeronautical engineering. He wrote back to Aldrin, expressing enthusiasm for what he saw as a brave new world.

But as the decade of the 1950s drew to a close, those events were still to come. Aldrin, too, began to consider the wonder and promise of the space field. Ed White was selling the virtues of higher education, hard. Aldrin's own father had earned a doctorate from MIT. Why shouldn't Buzz apply to MIT himself? He did and was accepted for study in 1959.

Aldrin found he enjoyed academic life. He knew that if he stayed long enough to earn a doctorate, he would likely lose out on test pilot school—and to that point all US astronauts had test pilot experience. But he also thought that learning might prove more valuable to the space program in the future than test flying skill, and in that he was prescient. He went for his PhD.

He chose for his thesis an examination of a man-controlled rendezvous between space vehicles. He knew NASA intended computers to control any such maneuver, but what if the computers failed and a human had to take control? They had to know what to calculate and how to do it. Eventually the work was titled "Line of Sight Guidance Techniques for Manned Orbital Rendezvous." Its first page was clear evidence of its author's desires. Aldrin dedicated the thesis to "The men in the astronaut program."

"Oh, that I were one of them," the dedication continued.

In fact, Aldrin was already working on that sort of rendezvous. He'd applied to the astronaut program in parallel with his academic studies. In 1962, just as he finished the doctorate, NASA turned him down: It still wanted its astronauts to have test pilot experience.

He moved into a job in Los Angeles for USAF's Space Systems Division. Eventually, he began planning Department of Defense experiments to be carried on Gemini flights. Meanwhile, he reapplied to NASA.

Finally, in late 1963, Aldrin was at his office reviewing some technical documents when a secretary entered and said he had a phone call. It was Deke Slayton, chief of NASA's astronaut office.

In a matter-of-fact manner Slayton asked Aldrin if he would like to join the space program.

"Shoot, Deke, I'd be delighted to accept," Aldrin said.

DR. RENDEZVOUS

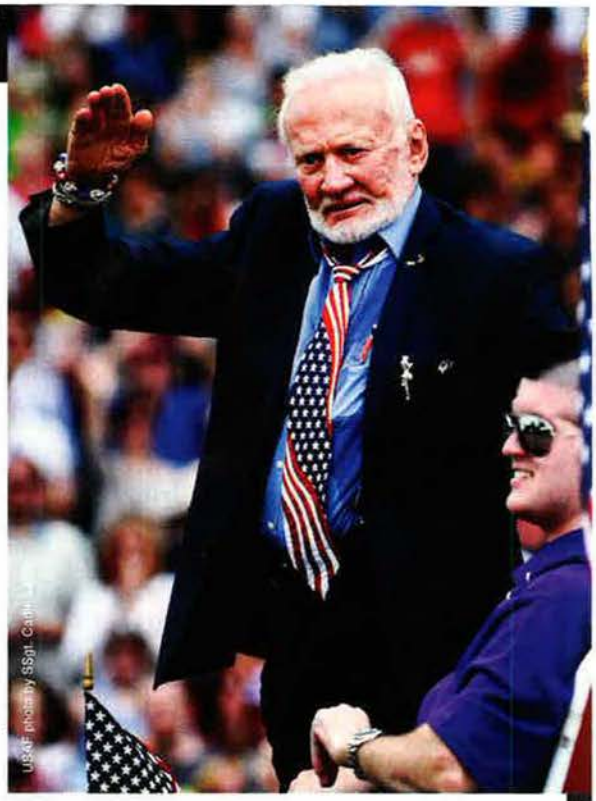
Aldrin had long known many of the men in the astronaut corps. Besides Ed White, he'd flown with John H. Glenn Jr. in Korea in the last days of the war. Now he and some of the other astronauts would be flying again, toward much higher ground.

NASA had selected White as one of the initial group of Project Gemini astronauts. He went into space on Gemini 4 and was the first astronaut to perform a successful space walk. White was scheduled to fly on the first Apollo mission, but he died in the tragic launchpad fire of Jan. 27, 1967, which also killed Virgil I. "Gus" Grissom and Roger B. Chaffee.

When Buzz Aldrin walked on the moon he carried a religious medallion in memory of his friend Ed White.

Aldrin spent eight years as an astronaut. Among the test pilots, he was known as something of an egghead.

"I'm sure that the fact I was called 'Dr. Rendezvous' was not always ... meant as praise," he says. Today he values the camaraderie of the remaining early astronauts. As a member of the first mission to the moon, his place in history is secure.



USAF photo by SSgt. Cara

Aldrin waves to the crowd during the Memorial Day Parade in Washington, D.C., in May.

He returned to the Air Force following his 1971 resignation from NASA and was eventually named chief of the Air Force Test Pilot School.

Beset by depression and alcohol dependence, Aldrin retired in 1972 with 21 years of Active Duty service. He sought help for his personal problems and has spent the past decades as a tireless advocate for space exploration. He has long insisted that what the US needs is a big, soul-stirring project: manned missions to Mars.

The best way to do that is via an approach he labels the "Aldrin cycler." It involves a series of cycling spacecraft that form a virtual staircase to the planet.

"The cycling starts in low-Earth orbit, then goes to lunar orbit with reusable orbiters," he says, calling this "Air Force inventiveness, typical out-of-the-box thinking."

In all, at 86, Aldrin seems to be taking the advice he lays out in his newest book, one chapter of which is titled: "Keep a Young Mind-Set at Every Age." ✪

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, *is a longtime contributor to* Air Force Magazine. *His most recent article, "The First Offset," appeared in June.*

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Stink Bomb

For US naval aviators, it is a red-letter event—the day in fall 1965 when Attack Squadron 25 toilet-bombed Vietnam. Sailors on board USS Midway *wanted to mark the dropping of its six-millionth pound of ordnance. They took a commode, built a rack, tail fins, and nose fuse for it, and hung it on an A-1H Skyraider. No one told the captain. When the pilot, Cmdr. Clarence Stoddard Jr., launched, the bridge PA system barked, "What the hell was that on 572's right wing?" Stoddard flew from Dixie Station to the Mekong Delta. He put the A-1 into a dive and launched "Sani-Flush," as the "special weapon" was named. It came off the pylon, turned in the wind, and nearly hit the wingman. It is said to have whistled all the way to the ground. The wingman filmed it all.*

Though weird, the "Toilet Bomb" had a Korean War predecessor. In August 1952, an officer of Attack Squadron 195 told a reporter, "We dropped everything on them [North Korea] but a kitchen sink." That was all it took. Sailors quickly built a "Sink Bomb," a 1,000-pounder blended with an actual kitchen sink. Lt. j.g. Carl Austin, flying an AD-4 from USS Princeton, *dropped it on Pyongyang.*

USN photos

Stoddard, aboard Midway, *awaits launch. Note white "special weapon" on outboard pylon.*

"Sani-Flush," viewed from the deck plates.

In Korea, it was the Kitchen Sink Bomb.

THE PUSH FOR ROME

By John T. Correll

Italy had dropped out of the war, but the Germans were still there.

AFTER the Allied invasion of Sicily in July 1943, the Italians arrested dictator Benito Mussolini and removed him from office. Field Marshal Pietro Badoglio, former head of the armed forces, was appointed by King Victor Emmanuel III to head the government and began secret negotiations for an armistice.

Italy surrendered unconditionally on Sept. 8. Two days later, Germany—up to then Italy's partner in the Axis pact—occupied Rome. Badoglio and the king fled south to the Allied lines.

The Germans rescued Mussolini, who had been confined in a remote mountain lodge, Sept. 10 and installed

German Federal Archives photo

USAF photo

him as the figurehead of a puppet regime in German-held northern Italy. Meanwhile, the invasion proceeded. The British Eighth Army crossed the Strait of Messina from Sicily to land at Reggio Calibria and Taranto in the southern end of the Italian boot. The main effort, however, was by the US Fifth Army, which went ashore on Sept. 9 at Salerno, some 145 miles south of Rome.

On Oct. 13, Italy declared war on Germany, after which the Germans treated Italy as an occupied country. The great symbolic prize was Rome, which figured to be the first Axis capital to fall. "No objective can compete with the capture of Rome," said British Prime Minister Winston Churchill.

Left: German paratroopers fire a mortar at Allied troops. Above: B-25s on the way to bomb German troops near Monte Cassino in March 1944 pass Mount Vesuvius belching huge clouds of ash and smoke. Many USAAF aircraft were damaged by the hot ash and turbulent air near the eruption.

On the eve of the Salerno landing, the Allies considered dropping paratroopers from the US 82nd Airborne near Rome to link up with Italian forces and seize the city. The idea was scrubbed when closer examination revealed that the Germans had two panzer divisions in the vicinity and that Italian participation was uncertain.

The Italian campaign itself was a matter of considerable dispute. In 1942, the US had reluctantly accepted Churchill's "Southern Strategy," committing forces to North Africa and the Mediterranean and postponing the invasion of Europe across the English Channel. In the summer of 1943, the British wanted to proceed northward through Italy into the Balkans and, as Churchill put it, the "soft underbelly" of Europe.

The Americans, who now provided an increasingly larger share of the forces for the war, refused to put off the cross-Channel strategy any longer. A target date of May 1944 was set for the invasion of France, which had been designated Operation Overlord. The Italian campaign continued at Churchill's insistence, but with a reduction in priority and resources.

Italy was a tougher nut to crack than anticipated. The Allies had expected the Germans to fall back steadily to the north but the Germans dug in and made their stand in the rugged terrain between Naples and Rome.

ALLIES IN TRANSITION

The campaign for the Italian mainland began with the same US and

British leaders who had conducted the war in North Africa and Sicily, but within a few months most of them were gone, reassigned to England for the buildup to Overlord.

US Gen. Dwight D. Eisenhower, commander in chief in the Mediterranean theater, went to command the Overlord invasion forces gathering in Britain. Along with him went his senior air commander, Air Chief Marshal Arthur Tedder, and the two top American airmen, Lt. Gen. Carl A. "Tooey" Spaatz and Maj. Gen. Jimmy Doolittle. Gen. Bernard L. Montgomery, who had led the British Eighth Army, was not far behind.

Lt. Gen. Ira C. Eaker was called in to command the Mediterranean air forces but the Italian front took on more of a British complexion, with the Americans accounting for fewer than a third of the combat forces in the theater.

British Gen. Henry Maitland "Jumbo" Wilson replaced Eisenhower as theater commander with British Gen. Harold Alexander as the senior ground commander. Lt. Gen. Mark W. Clark commanded the US Fifth Army, which was created for operations in Italy. Fifth Army consisted of two American corps and one British corps.

The Allied lineup in Italy included Canadians, Indians, New Zealanders, Poles, South Africans, Italians, and Free French, but overall, it was a smaller force than before. Seven divisions—four US, three British—and several bomber groups were transferred to Britain to prepare for Overlord.

The air campaign in Italy would rely primarily on Mediterranean Allied Tactical Air Force, which had medium bombers as well as fighters. The Allied Strategic Air Force component devoted its primary attention to western Europe although the heavy bombers were usually available for longer-range strikes in Italy.

Among the American GIs who landed was Bill Mauldin, a rifleman with the 180th Infantry Division. Mauldin drew cartoons for the 45th Division News, using whatever scrap paper he could find. His characters, Willie and Joe, were enormously popular and before long, Mauldin had his own jeep and was producing six panel cartoons a week for the military newspaper *Stars and Stripes*.

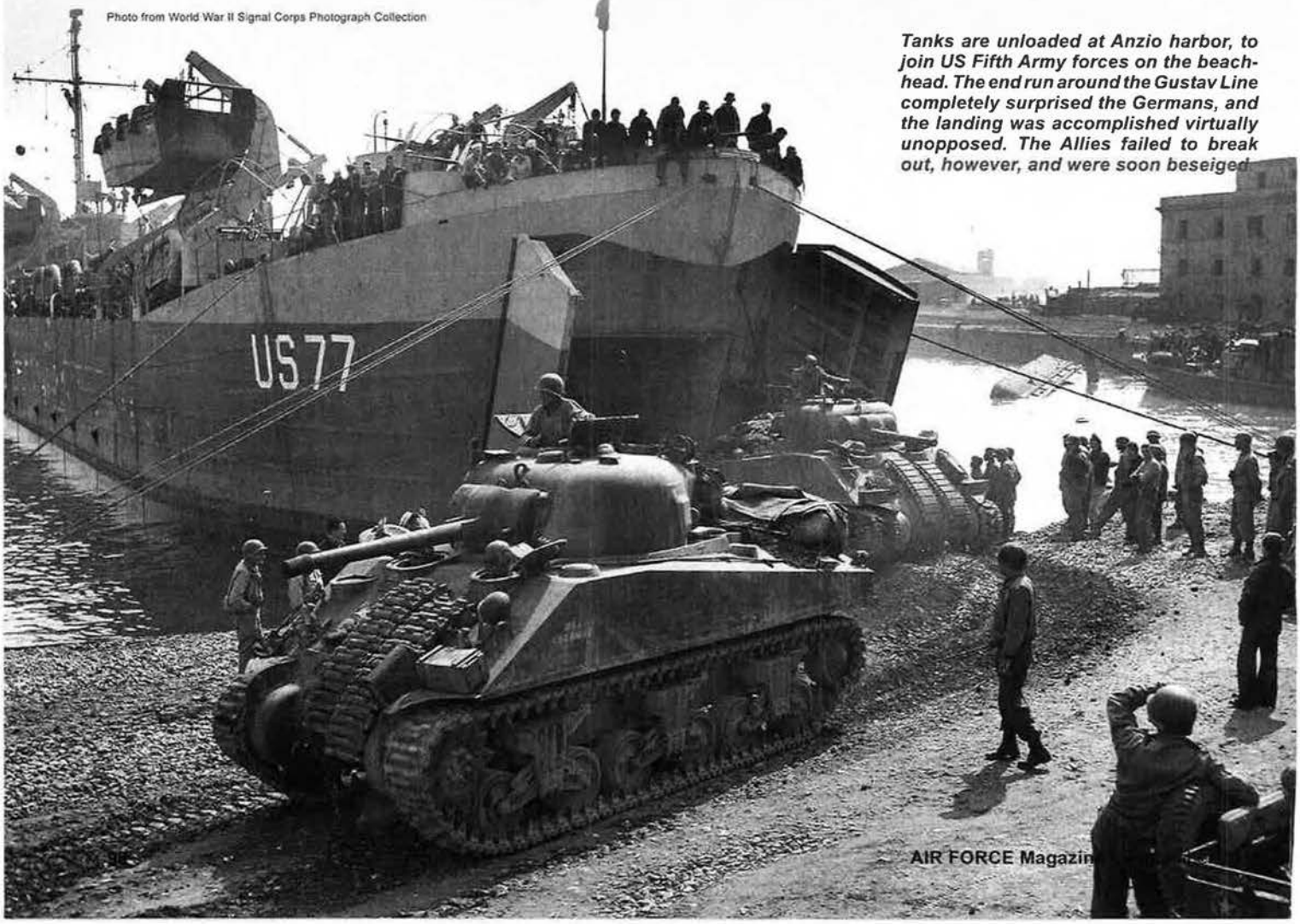
THE GUSTAV LINE

Field Marshal Erwin Rommel, commanding the German forces in northern Italy, did not believe the peninsula could be held after the Italian surrender. To better defend the approaches to the German homeland, he proposed a fighting withdrawal to the Gothic Line above Florence.

However, the commander in the south, Field Marshal Albert Kesselring, argued for staging the defense as far away from Germany as possible. Fuhrer Adolf Hitler agreed, and Rommel was transferred to France. Kesselring was given command of a new organization, Army Group C, to which all of the German forces in Italy were assigned.

Kesselring's military weakness was airpower. In September 1943, the Luftwaffe had only 625 combat airplanes left in the entire Mediterranean theater, vastly outnumbered by the Allied air forces, even after the drawdown for Overlord.

Photo from World War II Signal Corps Photograph Collection



Tanks are unloaded at Anzio harbor, to join US Fifth Army forces on the beachhead. The end run around the Gustav Line completely surprised the Germans, and the landing was accomplished virtually unopposed. The Allies failed to break out, however, and were soon beseiged.

The Germans made effective use of geography, especially the Apennine Mountains, a chain that ran down the spine of Italy. Easy movement was possible only along the narrow coastal plains. Above Salerno, Kesselring pulled together several fortified echelons, known collectively as the Winter Line, stretching from coast to coast across Italy at the most narrow point. The most formidable of these interlocking defenses was the Gustav Line, which ran through the craggy stronghold of Monte Cassino.

High atop Monte Cassino was an ancient monastery where the Benedictine order was founded in the sixth century. The Germans maintained—truthfully, as it turned out—that they had not occupied the monastery itself, but the slopes of the mountain were strewn with mines and the heights all around bristled with artillery pre-sighted on the approaches below.

"You'll get over it, Joe. Oncet I wuz gonna write a book exposin' the army after th' war myself."

Cartoonist Bill Mauldin's GI characters Willie and Joe on the ground in Italy. Mauldin provided six panel cartoons a week for* Stars and Stripes. *They were enormously popular with the troops.

The Allied plan was for the British Eighth Army to push north and link up with the US Fifth Army forces from Salerno. Together they would drive toward Rome. The Salerno beachhead was secured in nine days of hard fighting and the Allies took Naples Oct. 1. Progress beyond that was slow and difficult. Repeated attempts failed to break the Gustav Line.

By the end of September, the Allies were in firm control of southern Italy but were unable to advance further. The main battle lines remained static for the rest of 1943.

ANZIO

If the Allies could not break though the Gustav Line, perhaps they could go around it with an "amphibious end run" to land at Anzio, behind the German right flank and about 35 miles south of Rome. This would put pressure on Kesselring to pull back and defend his supply lines and the approaches to Rome.

The greatest advocate of the Anzio offensive—dubbed Operation Shingle—was Churchill, whose enthusiasm prevailed over military concerns about the risk. The landing was made Jan. 22 by the Fifth Army's VI Corps, commanded by Maj. Gen. John P. Lucas, with a British division assigned to satisfy Churchill's requirement for British participation.

The Germans were completely surprised and the Allies went ashore at

Photo by Radomil Binek

German Federal Archives photo

ere: The ancient abbey at Monte Cassino as destroyed Feb. 15, 1944, but the ermans weren't there. They had instead ıg in on the grounds outside the walls. bove: View of the rebuilt abbey in 2004.

Anzio essentially unopposed. However, Lucas wasted the advantage, dug into a defensive position, and advanced only a few miles inland. He made no serious effort to go further for nine days, and by then it was too late. Kesselring had Anzio surrounded with eight divisions.

Two large railway guns—dubbed "Anzio Annie" and "Anzio Express"—firing from caves in the hills, pounded the beachhead day and night. Lucas was relieved from command and replaced but the failure was not his alone. As Kesselring himself noted, the landing force had not been large enough or strong enough to succeed.

Anzio turned into a 125-day siege with the Allied force isolated on the beach. On German radio, Axis Sally called it "the largest self-supporting prisoner of war camp in the world."

The Fifth Army's II Corps moved up the coast from Salerno to join the British Eighth Army in a renewed effort to breach the Gustav Line. The attack centered on Cassino, beyond which lay the valley of the Liri River and Route 6 toward Rome and points north.

MONTE CASINO

Kesselring had plugged that gap with his strongest defenses. Allied ground forces and aerial observers were convinced that the Germans were using the 1,400-year-old Benedictine abbey on Monte Cassino for military purposes. They were mistaken about that, but in any case, German machine guns and mortars were thick on the ground outside the walls of the monastery.

The commander of the New Zealand Corps assigned to storm Monte Cassino did not want to attack until the monastery was destroyed. Wilson, the theater commander, deciding that military necessity and danger to Allied forces outweighed other considerations, ordered the bombing of the abbey.

The monastery was reduced to rubble on Feb. 15 by waves of B-17s, B-26s, and B-25s with additional bombardment by heavy artillery. It was not enough. When the bombing subsided, the Germans came out of their bunkers and tunnels, brought up reinforcements, and held the Gustav Line through five more days of fighting. The stalemate continued into March.

Lt. Gen. George Patton, Gen. Henry "Hap" Arnold, and Lt. Gen. Mark Clark (l-r) in Sicily.

The next shot at weakening the Gustav Line was Operation Strangle, launched by the Mediterranean Allied Air Forces March 9 to disrupt Kesselring's supply lines. It was the biggest aerial interdiction effort of the war to date.

Military target planners were required to follow the theories and priorities of professor Solly Zuckerman, an academician who had influence with Churchill's science advisor, Lord Cherwell. According to Zuckerman's studies, the interdiction strikes should concentrate on large rail centers and marshaling yards: Roads, railways, and bridges were deemed "uneconomical and difficult targets," seldom worth attacking.

Combat experience soon proved otherwise. "Trains were made up north of the Alps and run straight through to railheads near the front," said historian Eduard Mark. "Marshaling yards were little more than switching stations" and "the Germans were reopening bombed yards in one to three days."

The best targets were those scorned by Zuckerman. In the mountains and valleys of central Italy, the railroads had an enormous number of bridges and viaducts, most of them vulnerable to air attack. Within the month, the medium bombers had cut the rail lines supplying the German front and kept them cut. Rail traffic was blocked 50 miles north of Rome. When the Germans shifted to motor transport, the Allied fighters and fighter-bombers strafed and bombed the roads so effectively that trucks seldom moved in the daytime.

What saved the Gustav Line was the static nature of the battlefront. The Germans remained in their entrenched positions, expending ammunition and fuel in limited amounts. Some deliveries got through at night, and they conserved the supplies in their stockpiles. They had enough to get by until they were forced to fight and maneuver more actively.

When Operation Strangle ended May 11, Mediterranean air forces had flown some 65,000 sorties, mostly against German road and rail lines, with US airmen accounting for more than half of the attacks. The medium bombers did the brunt of the work, but P-47 fighter-bombers proved especially adept at destroying bridges as well as in the armed reconnaissance role.

Thus far, Strangle looked like a failure. What it had accomplished would not become apparent until the Germans were flushed out of their defensive positions.

ON TO ROME

In May, the Allies finally hit on a strategy that would oust the Germans from the Gustav Line as Operation Strangle merged directly into a complex offensive by ground and air forces called Operation Diadem.

Taking care to conceal his movements from the Germans, Alexander concen-

German National Archives photo

A German Tiger I tank in front of the Altare della Patria, a monument built in honor of King Victor Emmanuel, the first king of a unified Italy. The Allies finally captured Rome just two days before the D-Day invasion of Normandy.

trated his forces on a much shorter front that stretched only about 25 miles from Cassino to the sea. Except for a small screening force, he abandoned his positions along the Adriatic and transferred the rest of the British Eighth Army to the area around Cassino. The US Fifth Army's II Corps held the coastal flank of the new Allied line.

Kesselring never saw it coming. He thought he was facing six Allied divisions on the main Gustav front. In fact, there were more than 15 of them.

Furthermore, the German defending force was not nearly as strong as it had been when it threw back the Eighth Army assault in February. The Germans were short of fuel, ammunition, food, and motor transport. They could bring in reinforcements only with great difficulty and were constrained in their ability to shift their forces to strengthen weak or threatened positions. This was largely the result of the Strangle interdiction strikes.

On May 16, Allied air and ground forces hit the Gustav Line with devastating intensity and within days had punched through to the Liri Valley. By May 23, the Germans were in retreat all along the battlefront. The seven divisions at the Anzio beachhead finally broke out to join the offensive.

Alexander's plan was to destroy or capture the retreating German army. That did not happen because of a serious failure in Allied coordination.

The entire Italian campaign had been marred by Anglo-American dissention and disunity. There was high-level disagreement about how resources should be allocated between Overlord and the Mediterranean. In Sicily, the rivalry between Montgomery and US Lt. Gen. George S. Patton had taken on a hard edge.

Clark, noted for both his ambition and his fondness of publicity, had never gotten along well with Alexander. When Alexander ordered the Fifth Army to block Route 6 and intercept the escaping Germans, Clark's resentment boiled over. He suspected—not entirely without cause—that this was part of a plan to leave the honor of liberating Rome to the British while the Fifth Army carried out a blocking maneuver.

Clark decided to defy Alexander's instructions. On the thinly disguised pretext of emerging operational conditions, he changed the order and sent most of his force racing for Rome with less than a third of the Fifth Army allocated to the Route 6 operation. He waited almost 24 hours to inform Alexander of what he had done.

On June 3, Kesselring declared Rome an open city and retreated northward. Route 6 remained open and most of the German forces from the Gustav Line escaped as well.

Rome fell to Clark and the Fifth Army June 4. The glory of it did not last long, though. Two days later, the Overlord invasion landed in Normandy and drew the newspaper headlines and the attention of the world away from Clark's triumph.

WITHIN SIGHT OF THE ALPS

Churchill's determination to pursue the war in Italy was undiminished. "At least let us have a chance to launch a decisive strategic stroke with what is entirely British and under British command," he said in a note to his chief of staff in July. "I am not going to give way about this for anybody. Alexander is going to have his campaign."

He was unable to persuade the Americans on his southern strategy, but Clark agreed. In his memoirs, published in 1951, Clark said that weakening of the campaign in Italy "was one of the outstanding political mistakes of the war" and that the Allies could have and should have pushed on to capture the Balkans.

The Allies reached the Gothic Line, 15 miles north of Florence, Sept. 15 and by October, the Fifth Army had pushed far enough beyond that to see the Alps but could not go further. Alexander was promoted to field marshal in December. Clark replaced him as commander of ground forces in Italy and got his fourth star in March 1945.

Kesselring was injured when his staff car collided with a mobile gun. After hospitalization, he was appointed commander in chief of the Western front in Germany in March 1945. Mussolini was killed by partisans in April 1945 as he was fleeing from the Allied advance.

Between September 1943 and April 1945, Allied casualties in Italy were 320,000, of which about 70,000 were killed in action. Total German casualties were more than 600,000, including 150,000 killed.

The Italian campaign ended May 2, a week before the general German surrender, when Army Group C surrendered unconditionally to the Allies. After the war, the abbey at Monte Cassino was rebuilt as an operating monastery. ✪

John T. Correll was editor in chief of Air Force Magazine *for 18 years and is now a contributor. His most recent article, "Inventing NATO," appeared in the August issue.*

TARGET: Ramenskoye

By Jeffrey T. Richelson

National Archives photo via GlobalSecurity.org

Photo from CNES/Astrium via Google Earth

Image © 2016 CNES / Astrium

A ceremony held on May 30, 2016, about 25 miles southeast of Moscow, marked the opening of Zhukovsky Airport, Moscow's fourth international airport. For decades the facility had been known by a different name—Ramenskoye—and had been a major target of America's spies.

What made it important was that it was the Soviet equivalent of Edwards AFB, Calif.: A procession of Soviet military aircraft appeared there during the early stages of their development, before they were produced in large numbers and deployed to Soviet air bases across the country. (See "Ramenskoye: Past and Present," April 2008, p. 48.) US intelligence collection directed against Ramenskoye provided a first step in determining the existence and capabilities of new Soviet military aircraft.

The US kept a close watch on the Soviet Union's premier air and space testing facility, just outside Moscow.

National Archives photo via GlobalSecurity.org

In 1952, the United States had limited means of gathering intelligence on Soviet military developments. The CIA did not even open a station in Moscow until the following year, but even that didn't go well.

ULTIMATE FLYAWAY FIELD

Dedicated intelligence overflights of Moscow were not possible, and captured German photography dated back to 1941. The CIA was able to debrief individuals with knowledge of the airfield, although sometimes that knowledge was also from an earlier decade.

A late January 1952 agency information report focused on the airfield's runways, the presence of a radar set, and the unsuccessful attempts, in 1947, of a pilot to get his four-jet airplane off the ground.

The US did have one set of intelligence officers operating in Moscow years before the CIA arrived—military attachés, who in addition to collecting data during the public Soviet military parades also conducted their own, less authorized, intelligence gathering activities.

During a July 30, 1953, visit to Ramenskoye, the US air attaché observed and photographed an aircraft similar to the B-47. The images showed the aircraft to be one-and-a-half times larger than the Tu-4 Bull, the main Soviet bomber. The attaché also reported observing 30 to 35 Tu-4s; 25 to 30 Il-28 bombers; and 15 to 20 MiG-15s.

Three years later the US would have an important new asset for monitoring Soviet military activities. On July 5, 1956, CIA pilot Carmine Vito took off from Wiesbaden Air Base in West Germany on the second U-2 mission over Soviet territory. His route took him over East Germany, Warsaw, Minsk, and Moscow before heading back. While the Soviet capital was almost completely covered by clouds, two key facilities in the vicinity were available to the spyplane's cameras. One was the Fili airframe plant, where the Myasishchev-4 (Mya-4) bombers, spotted at Ramenskoye in 1953 and later designated Bison by US intelligence, were built.

The second was Ramenskoye itself—"the ultimate flyaway field for Bisons assembled at Fili," according to an official history of the CIA's photographic interpretation center.

Former CIA photo interpreter Dino A. Brugioni recalled in his book, *Eyes in the Sky,* that Vito's mission solved one puzzle involving Ramenskoye. "We had wondered," he wrote, "how the Soviets could get a Bison bomber out of the Fili plant because the runway was far too short for such a large plane to take off." He then explained, "We got our answer when the images showed a large barge on the Moscow River next to the plant. The Bisons were placed on the barge and ferried to the Ramenskoye test field."

Vito's mission would be the first and last U-2 flight over Moscow and its vicinity.

The next month ground photography, taken from some distance, showed the construction of several new buildings at Ramenskoye. But in 1960, with the first successful Corona mission, the US would finally have the means for repeated overhead coverage of any target on Soviet territory.

Corona (KH-1 through KH-4B, 1960-72) would be augmented by the Gambit high-resolution spacecraft (KH-7, 1963-67 and KH-8, 1966-84), and then supplanted by the Hexagon (KH-9, 1971-86) search

Above left: A photo of the north end of the runway at Ramenskoye and a photo of a Tu-95 Bear bomber (right), both taken by a US KH-7 Gambit satellite on May 30, 1967. Left: Ramenskoye, now Zhukovsky Airport, today.

system. Finally, electro-optical imagery arrived in December 1976 with the first launch of a Kennen (KH-11) spacecraft. Deployment of those spacecraft was the key factor in permitting US intelligence analysts to produce detailed reports on the flight test center at Ramenskoye, associated research institutes, and the Soviet aircraft and spacecraft at the facility.

Ramenskoye had been of sufficient importance to be listed as one of the highest priority targets for the August 1960 Corona mission. Seven years later a CIA report described it as "the most important flight test center in the USSR," explaining that "all Soviet aircraft under development are usually tested at this center." The report also stated that subsequent to its initial identification, the test center had been photographed on 34 KH-4 and two KH-7 missions.

Declassified National Photographic Interpretation Center (NPIC) reports on the Ramenskoye Flight Test Center, based on the product of satellite reconnaissance missions, include those from 1968, 1974, and 1981-83. The first of those reports identified over 15 different types of assorted structures at the test center—including the airfield and its runway, maintenance areas, an air warning and airfield surveillance radar, visual landing aids, and a probable aircraft landing area. Along with identifying what could be found at the test center, the report specified locations and dimensions and noted that a particular concrete hangar apron was "used mainly by MiG aircraft" while another was "used mainly by Sukhoi aircraft." In addition to examining satellite photography, assorted tables, and drawings of specific buildings (from different perspectives), the reader could consult a complete layout of the test center—with each element identified.

NEW CONSTRUCTION

Six years later NPIC produced a report whose main focus was on construction activity at the test center. It said that over 80,000 square feet of floor space had been added since September 1971 and ongoing building efforts would add at least another 211,520 square feet. Also noted was the presence of an "eye chart" for spy satellites—targets used to test the capabilities of high-resolution overhead photographic reconnaissance systems—some first discovered in May 1973. The Siemens stars at Ramenskoye and other Soviet facilities were generally a series of alternative light and dark spokes radiating from a center point, spokes broadening as they became more distant from the center.

In November 1982, an NPIC publication on the flight test center reported on new construction—providing descriptions of the additions, their estimated dimensions and floor space, date of completion, and short remarks. The document reported removal of a structure that had served as environmental protection for an object similar in appearance to the US space shuttle's external fuel tank. The center's imagery analysts devoted several paragraphs to Ramenskoye's Telemetry Collection and Processing Center, consisting mainly of two buildings and telemetry collection equipment. They commented on the presence of a "square building of unusual design" with "three large, circular patterns" on three sides of the building, but were uncertain whether the building was part of the processing center.

Adjacent to Ramenskoye is an institution established in the early days of Soviet rule. The Central Aerohydrodynamic Institute (TsAGI) was founded on Dec. 1, 1918. The 1952 CIA information report had linked Ramenskoye and TsAGI, listing the institute's location, dimensions, and security arrangements—including a guard force of 20 men from the Soviet air force. It said 17 German specialists worked there, and "it was believed that jet aircraft with swept-back wings and high rudder assembly were manufactured at the plant."

A 1967 NPIC report described it as "one of the most important of all the installations associated with aerospace

USAF photo

Technicians load a camera into a U-2's equipment bay. The camera was used on the first U-2 overflight of the Soviet Union on July 4, 1956.

USAF photo

Cameras on a Hexagon KH-9 reconnaissance satellite on display in the Cold War Gallery at the National Museum of the US Air Force.

programs in the Soviet Union"—so that its work was closely related to much that was taking place at Ramenskoye. In the 1980s, some of its efforts were directed toward improving the maneuverability of jet fighters, including the MiG-29. The report provided highlights of the chronological development of TsAGI from 1941, based on captured German photography, ground photography from 1947, 1953, and 1956, and Corona photography starting in 1962.

The 1962 images revealed continued expansion of TsAGI, with "significant construction observed for the first time," including four laboratory buildings and an aircraft engine test facility. Later imagery made it "evident that during 1965 ... TsAGI was in the initial [phase] of another large-scale expansion program." The report went on to identify 95 different elements of the institute, state their probable functions, and give their estimated dimensions along with occasional comments. There was the standard line drawing of the full layout of the institute, showing the locations and shapes of each building and a key that described their purpose.

Intelligence about what was going on inside TsAGI may have also come to the United States from 1979 through 1985 from CIA asset Adolf G. Tolkachev, the chief designer of Phazotron, the Scientific Research Institute for Radio Engineering and a victim of CIA turncoat Aldrich H. Ames. His institute's work involved the radar systems of the MiG-29, MiG-31, and Su-27—just the type of aircraft that would be among the more important airplanes photographed at Ramenskoye and all likely to have been the subject of study at TsAGI.

But the most important intelligence on Ramenskoye concerned the aircraft and spacecraft photographed by the National Reconnaissance Office's imagery spacecraft and sometimes the subject of reports by US attachés. One consequence of the reconnaissance effort directed at Ramenskoye was the occasional inventory of aircraft, including aircraft well-known to US intelligence, at the test center.

BEARS, BADGERS, FOXBATS

A Corona/KH-4A mission in August 1964 allowed imagery interpreters to report on the presence of a variety of aircraft at the site, although the resolution of the images apparently made it difficult to distinguish some aircraft from others.

A 1971 report, based on higher resolution KH-4B imagery, noted the presence and precise numbers of an assortment of fighters, bombers, transports, intelligence, and other aircraft at different areas of Ramenskoye. In one of those areas, imagery interpreters concluded that the aircraft included one Bear (Tu-95) and eight Badger (Tu-16) bombers, seven MiG-25 Foxbat fighters, two Tu-124 passenger airplanes, and one Tu-144 supersonic transport.

Far more important than an inventory of known aircraft at Ramenskoye was providing imagery interpreters and intelligence analysts at the CIA, Defense Intelligence Agency, and Air Force Foreign Technology Division with their first looks at new Soviet aircraft—aircraft new enough to have no US designation or only a provisional one. Thus, the 1971 report, relying on both satellite and ground photography, pointed out a jet transport with a high wing and "underslung jet engines similar to those on the Lockheed C-141" as well as a tail with a T configuration. The aircraft's first flight had occurred only a month before, and its description and history matched what the US Intelligence Community would eventually refer to as the Ilyushin-76 Candid. But at the time it was simply identified as "a new Soviet four-engine jet transport."

It probably received, as was standard practice for newly identified aircraft and spacecraft at Ramenskoye, a designation consisting of RAM, followed by a letter. In January 1980, NPIC reported on observations of the fuselage of a "probable" RAM-K aircraft, an airplane; it would become better known as the Su-27 Flanker.

A Department of Defense illustration of a Soviet Buran space shuttle transported atop a Myasishchev M-4 Bison bomber. In December 1984, the US obtained imagery showing two Soviet space shuttles, although only one was capable of an outer space journey.

DOD illustration

An aircraft design undergoes testing at the Central Aerohydrodynamic Institute's T-101 wind tunnel. Adjacent to Ramenskoye, the testing facility was one of the most important aerospace installations in the Soviet Union.

Along with satellite imagery the authors had access to ground photography obtained when attachés snapped pictures of a canvas-covered aircraft fuselage being towed on Moscow's Garden Ring Road, part of a convoy that included Militsiya cars and motorcycles, trucks, and other vehicles that took up four lanes of the road. Further analysis indicated the images were probably of a RAM-K fuselage.

Among the aircraft with provisional designations noticed at the test center—although only briefly—in a May 1981 NPIC study of Ramenskoye were the RAM-J and RAM-L. Those fighter aircraft became better known as the Su-25 and MiG-29. Initial identification of the MiG-29 was due to observation while it was being towed through the test center's east parking area and the ability of interpreters to correlate those images with an aircraft that was always under canvas cover when US satellites took its picture. The canvas covering had finally come off the RAM-K/Su-27, which had been seen without its shroud in time to be included in the study. Also noted was a Badger with Aeroflot markings that the analysts said "may have been modified to support high-ranking officials/officers"—the type of airplane closely monitored by US intelligence agencies since its movements were often signs of impending military tests or other events.

In August 1981, KH-11 imagery resulted in a one-page report titled "New Prototype Aircraft." Designated RAM-M, it was covered by a "loose non-formfitting canvas," but the analysts were still able to conclude that the airplane appeared to have a dropped nose and high-visibility bubble canopy. Other characteristics estimated were its overall length (66 feet) and wingspan (49 feet). It was first photographed in fully assembled form at Ramenskoye in January 1982 while subsequent imagery indicated the Soviets had begun flight testing the aircraft. CIA weapons analysts said its small fuselage suggested RAM-M "may have been designed to carry high-density, relatively low-volume payloads such as photographic reconnaissance equipment and electronics" and that "RAM-M could be used for the same type missions as the U-2." The airplane entered service in 1982 and would be known to US intelligence as the Myasishchev-55 or Mystic. As estimated, it was as a high-altitude reconnaissance platform.

AIR-BREATHING SHUTTLE

In addition to fighters and reconnaissance aircraft, bombers and spacecraft were spotted at Ramenskoye during the early 1980s.

The May 1981 report stated the presence of Backfire B and modified Backfire B aircraft at Ramenskoye—and noted the differences between the two, including nose attitude.

Sometime in 1981, the Blackjack bomber, initially designated RAM-P, was photographed at the test center, prior to its initial flight in December. The discovery was, according to a November 1982 NPIC report, "the most significant observation at the FTC during the period [covered by the report]." Those bombers, capable of carrying between 12 and 24 cruise missiles as well as different types of bombs, would begin reaching Long-Range Aviation units in May 1987.

In December 1984, analysts received imagery showing two Soviet Buran (Snowstorm) space shuttles—although no more than one would be capable of an outer space journey. Exploitation group analysts listed assorted details about the shuttles, including the apparent presence of tankers—one of them possibly transferring fuel. They observed that "the presence of the shuttle in a hangar with facilities to test jet engines lends strong credence to the theory that the Soviet shuttle will have air-breathing engines for endo-atmospheric maneuvering."

The analysts reported that one of the shuttles had two blisters on either side of the fuselage. They had not been previously seen on the shuttle when it was photographed at Ramenskoye and "might be attachment points or air scoops for air-breathing engines." Eventually, it would become clear that while training versions used in atmospheric flight had such engines, the operational Buran spacecraft did not.

In any case, it was almost four years later, November 1988, before the unmanned spaceplane made its only flight.

The importance attached to Ramenskoye, resulting in repeated coverage by US reconnaissance satellites and attention from attachés, was a reflection of its status as the most important Soviet flight test center. In some cases satellite imagery showed objects concealed under canvas coverings—part of the extensive Soviet denial and deception efforts. In other cases, imagery interpreters could say much more about the aircraft or spacecraft based on high-resolution images of aircraft that were in plain view.

Not all of the initial conclusions would prove correct, but the process of developing accurate descriptions of the existence and capabilities of Soviet military aircraft often began by watching what was happening at the premier Soviet air and space test center—relying on both US technical and human intelligence assets. As a result, what happened at Ramenskoye often did not stay at Ramenskoye. ✪

Jeffrey T. Richelson is a senior fellow and consultant with the National Security Archive in Washington, D.C., and author of nine books on intelligence and military topics. His most recent article for Air Force Magazine, *"The Grounded Spies," appeared in December 2014.*

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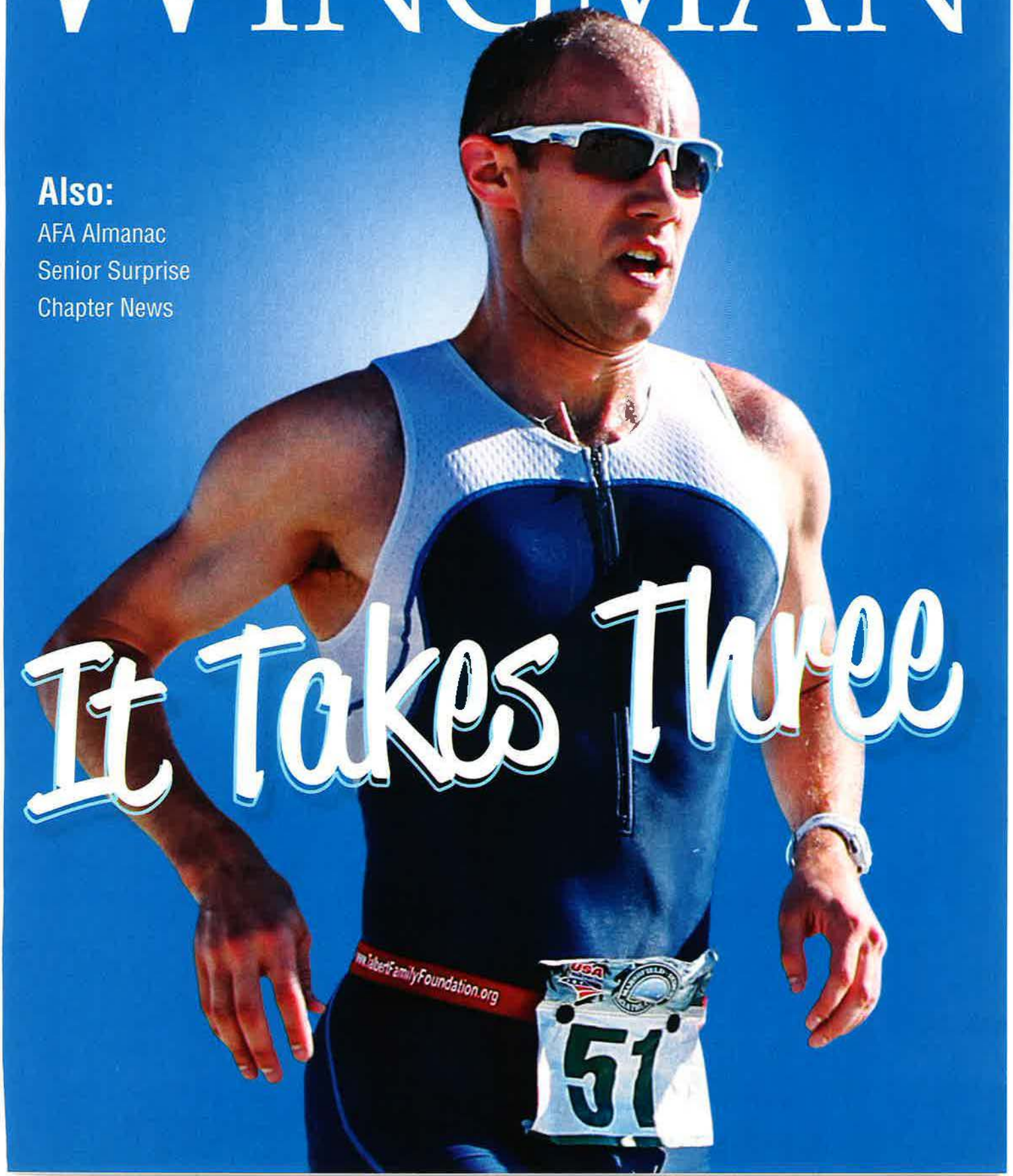
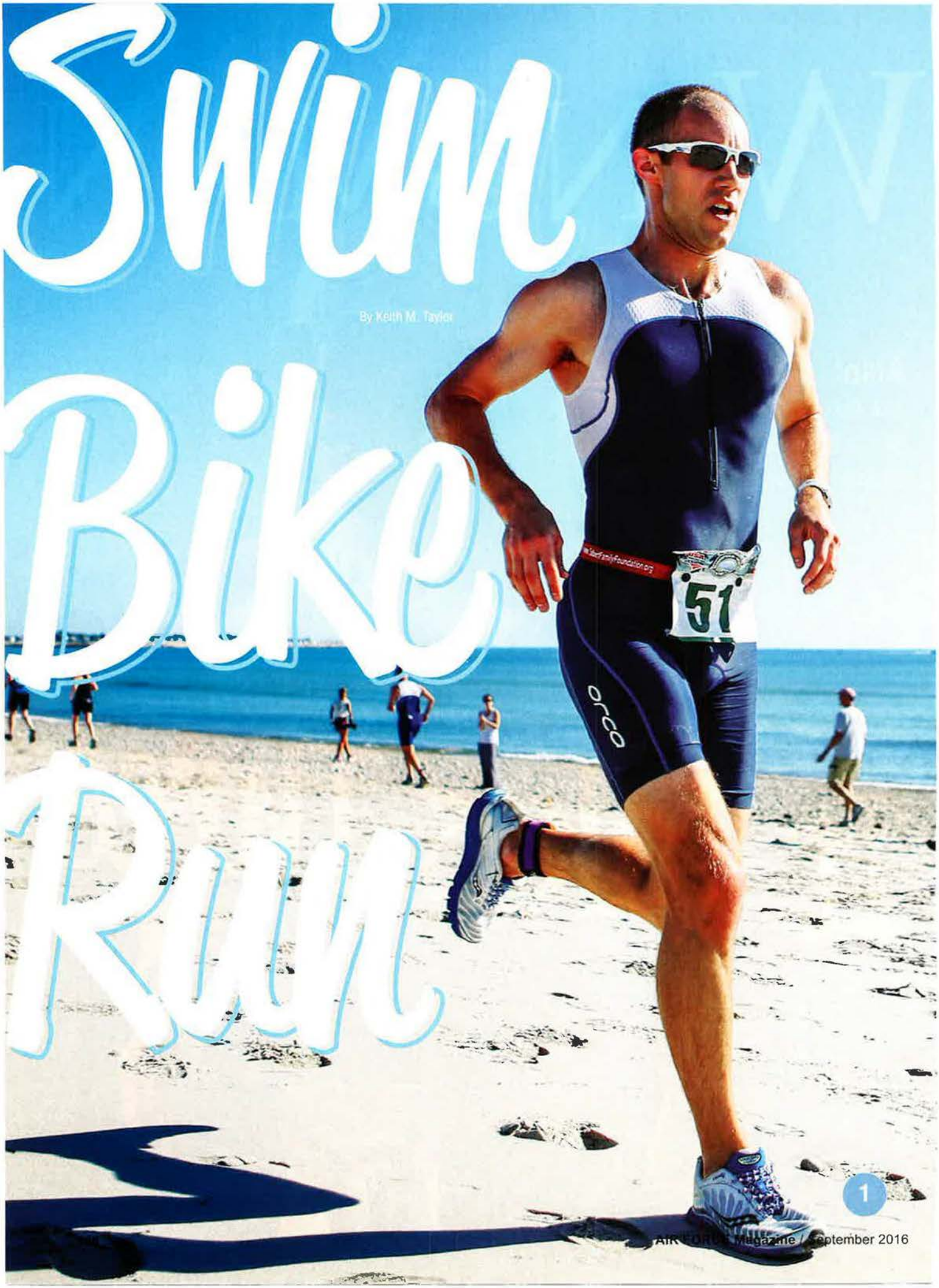


It Takes Three

Swim Bike Run

By Keith M. Taylor



A triathlete takes on all three sports.

On a 5K Fun Run in Massachusetts, I met an Ironman.

One sunny day in November 2013, I had just finished the Paul Revere Chapter's second annual Jim Thorpe Classic 5K Road Race. I was wearing bib No. 1 and not thinking much of it. It was a small race and without needing to position runners based on projected finish times, the race director registered me with the top bib number.

Milling around awaiting postrace announcements, I met the winner, Maj. Brian Hans. He shook my hand and looked at my bib number. He was slightly puzzled because he hadn't seen me during the run. I was slightly embarrassed since Hans had won the race with a decisive margin.

I learned that day that Hans belonged to AFA, but I didn't realize until recently the significance of his running with us: After all, he is a triathlete—capable of swimming, biking, and running in the course of one race. Hans, now 35 years old, has done some 50 triathlons since 2002 and is an Ironman. An Ironman triathlon calls for swimming 2.4 miles in open water, followed by 112 miles of nonstop biking, topped off with a 26.2-mile marathon. Hans has done it six times.

Yet he had turned out for our 3.1-mile fun run to support AFA.

AIR FORCE TRIATHLETE

From 2008 to 2014, Hans was on the Air Force triathlon team through the Air Force Sports Program. He represented the Air Force at the annual Armed Forces Triathlon Championship during those years.

The program gives USAF members a chance to participate in sports programs and to represent the Air Force at the interservice and potentially even Olympic level.

The Armed Forces Triathlon Championship involves a 1,500-meter ocean swim, 40-kilometer bike ride, and a 10K run (That's .9 miles, 24.8 miles, and 6.2 miles.).

IT'S NOT ABOUT ONE PERSON

Hans says he sometimes had nightmares before a competition. In those dreams, he would forget one of the many necessary pieces of gear, or he would be late for the start.

At the 2010 Armed Forces Triathlon Championship, it actually happened. Just before the race began, his Air Force teammate noticed that Hans was not wearing a timing chip. As Hans crossed timing mats on the ground, the computer chip was to record when he began the race, when he passed various points on the course, and when he crossed the finish line.

The prerace clock was counting down, as Hans ran back to race officials to get a timing chip. The starter pistol fired. Everybody took off. Hans was starting the race from behind.

Adrenaline and motivation drove him to catch up with the other racers, though, and he recorded a better time than normal. In the end, the Air Force team placed second, behind Navy. Hans's time was respectable, strong, and didn't hurt the team.

Looking back, he says, "I could have internalized that defeat, but one learns that narrow wins and losses are more than any one person."

ALWAYS AN ATHLETE

A native of Seattle, Hans competed in cross country, track, and swimming in high school.

At the Air Force Academy, he joined the triathlon club and found the drive to compete in three sports. Hans graduated from the academy in 2003 with a degree in astronautical engineering.

That year, he met Jane Calhoun at the Air & Space Basic Course at Maxwell

A Few Stats

HERE'S A SAMPLE OF BRIAN HANS' RACE TIMES.

Boston Marathon 2012	3:23:10
Marine Corps Marathon 2010	3:02:25
Army Ten-Miler 2008	1:02:30
Savageman Triathlon 2008	2:18:18
Vineman Half-Ironman 2006	5:21:43
Escape From Alcatraz 2004	2:26:38

Older Yet Faster

Brian Hans improved with every Ironman triathlon. His secret? "Age and experience helps for endurance," he says. He also credits AFRC Lt. Col. Erika Foster, a former Air Force triathlon team member, who coached him from 2009 to 2013.

Ironman Wisconsin 2002	11:32:24
Ironman Arizona 2005	11:21:01
Ironman Arizona 2006	10:46:48
Ironman Wisconsin 2008	10:45:56
Ironman New Zealand 2011	10:15:02
Ironman Florida 2012	10:00:00

AFB, Ala. At the time, she was assigned to Edwards AFB, Calif., as a services officer and he was an engineer at Los Angeles Air Force Base. Today they have a daughter, Pepper, and are expecting their second child this month.

Hans is a career acquisition officer, and until June managed electronic warfare programs in the Special Programs Division at Hanscom AFB, Mass. He is now a student at the Air Command and Staff College at Maxwell.

USMC MARATHON QATAR

When deployed to Al Udeid AB, Qatar, from summer 2014 through January 2015, Hans took his bike, a Giant TCR.

Working on the staff of US Air Forces Central Command as deputy coalition coordinator to integrate allied partners into the air campaign, he had limited time and space for riding his bicycle, but he mapped out a short course of 13 miles and would ride it three times on Saturdays.

A luxury was having two swimming pools on base. He used them regularly and ran early in the morning to avoid the heat.

His favorite memory from that deployment was starting a Marine Corps Marathon at 2 a.m.—again to beat the heat—and finishing before sunrise.

The experience of "hearing the muezzin call to prayer from the Qatari side of base at about 0430" during the marathon was "unforgettable," he says.

SEVEN MILES UPHILL

Hans has done as many as five triathlons a year. Having a young family and an Air Force career has meant making time for it all by doing early morning runs and becoming what he calls "a weekend warrior"—doing long bike rides of up to six hours on Saturday or Sunday and, during those Ironman years, following it with a run.

During an average work week, Hans logs 10 to 15 hours in training, swimming three days a week, running 45 to 90 minutes a day, and biking an hour or two.

On his race calendar for the summer was New Hampshire's annual Mount Washington Road Race, running more than seven miles uphill to the summit at 6,289 feet. Hans did it in a little over 90 minutes. "It was humbling," he said.

BUCK SIGNED HIM UP

Hans first joined AFA just to be able to attend a conference.

In 2008, though, David T. "Buck" Buckwalter, signed him up as a Life Member. Buckwalter, who was AFA's executive vice president from 2008 to 2012, had taught with Hans' father-in-law at the Naval War College in Rhode Island.

Hans said: "What I know and continue to appreciate is the support AFA provides, not just for Air Force members or the institution itself, but supporting the values that the Air Force contributes to our nation and world. I want to support that even beyond my career in the Air Force." ✪

Keith M. Taylor is a retired Air Force master sergeant, an AFA Life Member, and former president of the Paul Revere Chapter in Massachusetts.

/1/ "Normally, I don't do sprint distance," says Brian Hans, explaining this 2015 photo from a short triathlon—half-mile swim, 12.4-mile bike, and 3.1-mile run—at Duxbury, Mass. But "after running on that sand, I was glad it was only 5K." [Photo by Colin J. Bell] **/2/** At the Armed Forces Triathlon Championship in 2013 at NAS Point Mugu, Calif. [Photo by Jane Hans] **/3/** At the Hero Triathlon at JB Cape Cod, Mass., a full wetsuit helps. **/4/** At the same triathlon, Hans bikes past an F-15 on static display. [Photos courtesy Hero Triathlon Cape Cod]

CHAPTER NEWS

By Frances McKenney, Deputy Managing Editor

Updates on AFA's activities, outreach, awards, and advocacy.

GEN. E. W. RAWLINGS CHAPTER

AFA backed a race car.

True, its max speed was 35 mph, and it needed recharging after 50 miles. But consider its efficiency rating: a 1,750 mpg equivalent.

Needless to say, the Gen. E. W. Rawlings Chapter took pride in helping to promote this racer, made by 14 students and led by AFA 2015 National Teacher of the Year Mark Westlake and Minnesota State Teacher of the Year Caroline Little. Both teach at St. Thomas Academy in Mendota Heights, Minn. (See "The Shoulders of Giants," April, p. 72.)

The students took the 290-pound car to Detroit in April and won first place in the Shell Eco-marathon's Urban Concept Battery-Electric Car category and first place for urban concept vehicle design. They also qualified for the international Shell Eco-marathon Drivers' World Championship at London's Olympic Park in July.

For a while, the lithium-battery-powered one-seater led the London championship until it rolled at a hairpin turn and was damaged, preventing more racing. Fortunately, all safety systems worked and the driver was fine, wrote Minnesota State President Lawrence J. Sagstetter.

Above: With an AFA logo on a rear panel, this electric car motors along a 1.4-mile track in London, competing against eco-friendly vehicles from 29 countries. Below: Murray Price dons his vintage World War II flight jacket for a newspaper photo shoot last year.

COLUMBIA PALMETTO CHAPTER

In June, a World War II veteran spoke to South Carolina's Columbia Palmetto Chapter about his wartime experiences as a B-24 pilot.

First Lt. D. Murray Price, a Lexington, S.C., native flew 40 combat missions in the South Pacific—30 from Saipan and 10 from Guam.

Sharing the podium with Price was ANG F-16 pilot Capt. Joshua Rosecrans of the 157th Fighter Squadron, McEntire JNGB, S.C. He updated the chapter on plans for the 2017 South Carolina Air National Guard Air & Ground Expo. Chapter President Jonathan Thompson said his AFA members, as a culminating activity next year, want to set up a STEM zone to promote science, technology, engineering, and math projects among schoolkids at the air show.

ALBUQUERQUE CHAPTER

New Mexico State AFA and the Albuquerque Chapter hosted the Southwest Region AFA conference recently in Albuquerque, featuring as keynote speaker the adjutant general for the state's National Guard.

Brig. Gen. Andrew E. Salas, a Life Member of the Fran Parker Chapter, described Army and Air National Guard achievements and contributions to New Mexico and the nation. He also presented National Guard challenge coins to two Albuquerque Chapter members, retired Lt. Col. Byfield D. Gordon and retired Col. Clay O. Keen, both World War II veterans.

USAF Chief of Safety Maj. Gen. Andrew M. Mueller was the evening dinner speaker, at the culmination of the conference. Mueller heads the Air Force Safety Center, Kirtland AFB, N.M., overseeing mishap prevention on the ground, in the air, and in space, as well as nuclear surety programs.

Among the VIP guests at the event were Southwest Region President John A. Toohey.

SARASOTA-MANATEE CHAPTER

The Sarasota-Manatee Chapter in Florida announced that its Teacher of the Year is Denise Touchberry. She runs an Engineering Lab for kindergarteners through fifth-graders at Gilbert W. McNeal Elementary School in Bradenton.

Chapter President Michael E. Richardson presented the award at a county school board meeting. He said 750 students rotate through Touchberry's classroom, learning about everything from simple machines, animation, and circuits to programming robots and 3-D printing.

Touchberry received $250 from AFA and chapter sponsorship for the Civil Air Patrol Aerospace Education program. This will make CAP's STEM teaching resources available to her. These include teacher's guides, lesson modules, and activity books.

RAMSTEIN CHAPTER

Mention Grafenwoehr, Germany, to Cold War veterans, and it conjures up memories of US military training, mud, the heavy snowfall of Bavarian winters—hard-nosed preparation for a Warsaw Pact invasion.

The Ramstein Chapter gave JROTC cadets in Europe a taste of the Grafenwoehr experience through the 2016 Cadet Leadership Course in late June. Organized with the DOD Education Activity Europe, the weeklong course involved nearly 100 cadets: 90 Air Force, three Army, and one Navy. They came from Bitburg, Kaiserslautern, Ramstein, and Stuttgart, Germany; from Lakenheath, UK; from SHAPE in Belgium; from the Netherlands; and Sigonella, Italy.

The chapter's role began with Chapter Treasurer Robert Berrier leading interviews for the course instructor positions. Chapter President MSgt. Dustin E. Lawrence, who is first sergeant for the 691st Cyberspace Operations Squadron, attended the course as a supervisor. Lawrence wrote in an email that he "put in 18-hour days every day." Chapter member SSgt. Mark Karas served as a flight training officer.

Lawrence said the cadets lived in the barracks, ate MREs—meals ready to eat—and tackled cliff climbing, obstacle courses, physical training, and close-quarters weapons training, among a long roster of activities.

GEN. CARL A. SPAATZ CHAPTER

In Scarsdale, N.Y., Emily Murray received an AFA Civil Air Patrol Outstanding Squadron Cadet of the Year award in June.

Although she is a new NCO, "she's a mentor to other cadets," commented her CAP squadron Emergency Services Officer Harry Torres.

AFA's Gen. Carl A. Spaatz Chapter Senior VP and Secretary Joseph V. Traina presented the award.

Photo via Browns River Middle School Facebook

Willie Lee, overseeing students building a trebuchet, has received both the Green Mountain Chapter and the Vermont State Teacher of the Year awards. Chapter President Ray Tanguay and Government Affairs VP Dick Strifert presented the honors to Lee at Browns River Middle School in Jericho, Vt.

Photo by MSgt. Dustin E. Lawrence

An instructor demonstrates equipment adjustments during marksmanship training at the JROTC Cadet Leadership Course at Grafenwoehr, Germany. A Ramstein High School cadet stands at right, observing. JROTC cadets from all over Europe gathered at Kaiserslautern High School to ride a bus to the course.

GENESEE VALLEY CHAPTER

Alfred E. Smith, president of New York's Genesee Valley Chapter, presented five Teacher of the Year awards at one time in June.

How did so many instructors—not to mention several VIP presenters—manage to be in one place at the same time? The recognition ceremony took place at a Rochester Teachers Association representatives assembly.

Peter Mastrogiovanni, Vici L. Patanella, and Tina Rodger, all from Nathaniel Rochester Community School, and Samuel Consagra and John Haag, both from the Rochester International Academy, received AFA certificates from Smith.

In addition, Republican State Sen. Joseph E. Robach and Gloria Hunter—an aide representing Republican State Sen. Richard Funke—presented New York State Senate Certificates to the teachers to commemorate their achievement.

Photo by Vici L. Patanella

A Genesee Valley Chapter Teacher of the Year, Tina Rodger, shows students how to create a web strong enough to hold weight. It's part of a STEM challenge held every month.

Reunions

reunions@afa.org

34th Tactical Fighter Sq. Sept. 21-23 at Ben Lomond Suites in Ogden, UT. **Contact:** Ken Mays, 2879 Pilgrim Ln., Lorena, TX 76655 (254-749-5818) (105pltkm@gmail.com).

49th Bomb Wg and 47th BW groups, including 15th AF pilots. Oct. 13-16 at the Wyndham Garden Dallas North in Dallas. **Contacts:** Ryan O'Brien (ryan95628@hotmail.com) or Dick Olson (303-460-8316) (oly484olson@gmail.com).

Combat Camera. Oct. 13-16 at Embassy Suites-Airport, Charleston, SC. **Contact:** (USAFCombatCamera.org).

Arnold Air Society/Silver Wings, including alumni. April 14-17, 2017, at the Walt Disney World Resort in Orlando, FL. **Contact:** Dan Whalen (304-268-9776) (danielpwhalen@gmail.com).

Early Vietnam veterans. Oct. 20-23 in Washington, DC. **Contact:** Bill Pratt, 661 N. Big Oak Rd., NW, Malta, OH 43758 (740-962-2666) (maag16-411@embarqmail.com).

Having a Reunion?

Email notices to reunions@afa.org or mail notices four months ahead of time to "Reunions," *Air Force Magazine*, 1501 Lee Hwy., Arlington, VA 22209.

SYMPOSIUM: SENIOR SURPRISE

By William D. Croom Jr.

A 25th anniversary brought nearly 300 people to this symposium.

The operation's official name was Senior Surprise, but at the time the crew called themselves "Secret Squirrels," after a cartoon character in the 1960s.

Retired Lt. Gen. Robert J. Elder Jr., former commander of 8th Air Force at Barksdale AFB, La., wrote in a *Shreveport Times* newspaper article: "The Air Force has a proud legacy, but few people appreciate the breadth and depth of US Air Force's contributions to US national security."

In Shreveport, the Ark-La-Tex Chapter backed a local university in addressing this challenge by organizing a symposium in January. It recognized an anniversary important to Barksdale airmen: their history-making mission at the start of Operation Desert Storm.

Surprise Squirrels

Called Senior Surprise, the January 1991 mission to Iraq involved B-52s from Barksdale's 2nd Bomb Wing flying more than 14,000 miles for over 35 hours. It was the combat debut of the AGM-86C conventional air-launched cruise missile. At the time, the weapon, mission, and crew members all shared a nickname "Secret Squirrels." (See "The Secret Squirrels," April 1994, p. 56.)

Twenty-five years later, the AFA chapter teamed with Louisiana State University Shreveport and Barksdale organizations to conduct the symposium at LSUS with a reunion, luncheon, and banquet featuring several Senior Surprise crew members.

University history professor Gary D. Joiner provided background information for the audience. He outlined the events surrounding the initial strikes into Iraq in January 1991 and set the scene for symposium panel members who comprised the actual Senior Surprise planners, operators, logisticians, and maintainers.

The nearly 300 guests in the audience learned that the 38-day Desert Storm air campaign dismantled Iraqi defenses and set the stage for ground forces to take back Kuwait in just 100 hours, with far fewer casualties than had been predicted before the air campaign alternative was proposed. They learned that although airmen make their operations look easy, the missions are actually only possible due to extensive planning, training, and experience. It became clear that airmen think about air, space, and cyberspace differently from other services.

The symposium explored the value and irreplaceable capabilities of airpower to ground commanders, for example, in air surveillance, close air support, mobility, and space.

Community Support

The Barksdale Chapter and local universities plan to do more of these events, drawing on examples of alternative strategies the Air Force has made possible—particularly those cases where the Air Force has done more than provide overwatch and protection for ground forces. Some examples of where these strategies were employed might be Vietnam, Operation Northern Watch and Operation Southern Watch, and Iraq.

Every base has stories to tell, and most have colleges or universities with historians, political scientists, or other international affairs staff interested in

supporting the military facilities. This presents a valuable community-support opportunity for AFA chapters and has the potential to attract new members.

Another benefit is to provide Air Force supporters with information they need to advocate for Air Force requirements with DOD and Congress. With proper support, local AFA members can ensure that their congressional delegations understand the value of the Air Force to national security and the need to resource it properly.

An AFA Obligation

Elder, who is now a research professor at George Mason University in Fairfax, Va., is part of a team that believes AFA can help. The team has formulated an initiative to educate airmen, the American public, and senior US decision-makers about the unique, multifaceted value of the Air Force.

The goal, which the team believes is an AFA obligation, is for Air Force supporters to learn some of the lesser known ways the service, since its earliest days, has defended the US homeland and its citizens from attack, has given the government and international partners the means to advance United States global interests, and has protected joint forces in combat.

We Must Tell Their Stories

AFA's Aerospace Education Council, of which Elder is a member, can advise AFA field units in identifying, conceptualizing, and planning similar symposiums.

A chapter does not need to have a major installation nearby.

After all, the Air Force has been in continuous combat operations for a quarter of a century. Total Force units or individuals from a chapter's area were undoubtedly involved. Their stories need to be told. Airmen need to know their efforts and sacrifices were important—and appreciated. Their friends and community need to understand their "hometown heroes" truly are heroes. ✪

William D. Croom Jr. is an AFA national director emeritus and was National Secretary from 1997 to 2000. He is a member of the Alamo Chapter in Texas.

Bob Elder at the Senior Surprise anniversary symposium he organized with a university consortium. He hopes AFA chapters will follow this example in creating events that involve several community groups.

AFA Almanac

By Frances McKenney, Deputy Managing Editor

Donald W. Steele Sr. Memorial Award

Air Force Association unit of the year

Year	Recipient(s)
1953	San Francisco Chapter
1954	Santa Monica Area Chapter (Calif.)
1955	San Fernando Valley Chapter (Calif.)
1956	Utah State AFA
1957	H. H. Arnold Chapter (N.Y.)
1958	San Diego Chapter
1959	Cleveland Chapter
1960	San Diego Chapter
1961	Chico Chapter (Calif.)
1962	Fort Worth Chapter (Texas)
1963	Colin P. Kelly Chapter (N.Y.)
1964	Utah State AFA
1965	Idaho State AFA
1966	New York State AFA
1967	Utah State AFA
1968	Utah State AFA
1969	(no presentation)
1970	Georgia State AFA
1971	Middle Georgia Chapter
1972	Utah State AFA
1973	Langley Chapter (Va.)
1974	Texas State AFA
1975	Alamo Chapter (Texas) and San Bernardino Area Chapter (Calif.)
1976	Scott Memorial Chapter (Ill.)
1977	Thomas B. McGuire Jr. Chapter (N.J.)
1978	Thomas B. McGuire Jr. Chapter (N.J.)
1979	Brig. Gen. Robert F. Travis Chapter (Calif.)
1980	Central Oklahoma (Gerrity) Chapter
1981	Alamo Chapter (Texas)
1982	Chicagoland-O'Hare Chapter (Ill.)
1983	Charles A. Lindbergh Chapter (Conn.)
1984	Scott Memorial Chapter (Ill.) and Colorado Springs/Lance Sijan Chapter (Colo.)
1985	Cape Canaveral Chapter (Fla.)
1986	Charles A. Lindbergh Chapter (Conn.)
1987	Carl Vinson Memorial Chapter (Ga.)
1988	Gen. David C. Jones Chapter (N.D.)
1989	Thomas B. McGuire Jr. Chapter (N.J.)
1990	Gen. E. W. Rawlings Chapter (Minn.)
1991	Paul Revere Chapter (Mass.)
1992	Central Florida Chapter and Langley Chapter (Va.)
1993	Green Valley Chapter (Ariz.)
1994	Langley Chapter (Va.)
1995	Baton Rouge Chapter (La.)
1996	Montgomery Chapter (Ala.)
1997	Central Florida Chapter
1998	Ark-La-Tex Chapter (La.)
1999	Hurlburt Chapter (Fla.)
2000	Wright Memorial Chapter (Ohio)
2001	Lance P. Sijan Chapter (Colo.)
2002	Eglin Chapter (Fla.)
2003	Hurlburt Chapter (Fla.)
2004	Carl Vinson Memorial Chapter (Ga.)
2005	Central Florida Chapter
2006	Enid Chapter (Okla.)
2007	Central Oklahoma (Gerrity) Chapter
2008	Lance P. Sijan Chapter (Colo.)
2009	Paul Revere Chapter (Mass.)
2010	C. Farinha Gold Rush Chapter (Calif.)
2011	Lance P. Sijan Chapter (Colo.)
2012	Hurlburt Chapter (Fla.)
2013	Paul Revere Chapter (Mass.)
2014	D. W. Steele Sr. Memorial Chapter (Va.)
2015	Lance P. Sijan Chapter (Colo.)
2016	Paul Revere Chapter (Mass.)

AFA Membership

Year	Total	Life Members	Year	Total	Life Members
1946	51,243	32	1981	170,240	3,515
1947	104,750	55	1982	179,149	7,381
1948	56,464	68	1983	198,563	13,763
1949	43,801	70	1984	218,512	18,012
1950	38,948	79	1985	228,621	23,234
1951	34,393	81	1986	232,722	27,985
1952	30,716	356	1987	237,279	30,099
1953	30,392	431	1988	219,195	32,234
1954	34,486	435	1989	204,309	34,182
1955	40,812	442	1990	199,851	35,952
1956	46,250	446	1991	194,312	37,561
1957	51,328	453	1992	191,588	37,869
1958	48,026	456	1993	181,624	38,604
1959	50,538	458	1994	175,122	39,593
1960	54,923	464	1995	170,881	39,286
1961	60,506	466	1996	161,384	39,896
1962	64,336	485	1997	157,862	41,179
1963	78,034	488	1998	152,330	41,673
1964	80,295	504	1999	148,534	42,237
1965	82,464	514	2000	147,336	42,434
1966	85,013	523	2001	143,407	42,865
1967	88,995	548	2002	141,117	43,389
1968	97,959	583	2003	137,035	42,730
1969	104,886	604	2004	133,812	42,767
1970	104,878	636	2005	131,481	43,094
1971	97,639	674	2006	127,749	43,266
1972	109,776	765	2007	125,076	43,256
1973	114,894	804	2008	123,304	43,557
1974	128,995	837	2009	120,507	43,782
1975	139,168	898	2010	117,480	43,954
1976	148,202	975	2011	111,479	44,182
1977	155,850	1,218	2012	106,780	43,686
1978	148,711	1,541	2013	102,540	43,851
1979	147,136	1,869	2014	96,017	43,720
1980	156,394	2,477	2015	92,829	43,936
			2016	93,379	44,074

Profiles of AFA Membership

As of June 2016 (Total 93,379)

40%	One-year members
14%	Three-year members
46%	Life members
14%	Active Duty military
49%	Retired military
12%	Former service
5%	Guard and Reserve
15%	No military service
3%	Cadet
1%	Spouse/widow(er)

Of AFA's service members who list their rank:

68% are officers

32% are enlisted

Of AFA's retired military members who list their rank:

69% are officers

31% are enlisted

H. H. Arnold Award Recipients

Named for the World War II leader of the Army Air Forces, the H. H. Arnold Award has been presented annually in recognition of the most outstanding contributions in the field of aerospace activity. Since 1986, it has been AFA's highest honor to a member of the armed forces in the field of national defense.

1948 W. Stuart Symington, Secretary of the Air Force
1949 Maj. Gen. William H. Tunner and the men of the Berlin Airlift
1950 Airmen of the United Nations in the Far East
1951 Gen. Curtis E. LeMay and the personnel of Strategic Air Command
1952 Sens. Lyndon B. Johnson and Joseph C. O'Mahoney
1953 Gen. Hoyt S. Vandenberg, USAF (Ret.), former Chief of Staff
1954 John Foster Dulles, Secretary of State
1955 Gen. Nathan F. Twining, Chief of Staff, USAF
1956 Sen. W. Stuart Symington
1957 Edward P. Curtis, special assistant to the President
1958 Maj. Gen. Bernard A. Schriever, Cmdr., Ballistic Missile Div., ARDC
1959 Gen. Thomas S. Power, CINC, SAC
1960 Gen. Thomas D. White, Chief of Staff, USAF
1961 Lyle S. Garlock, Assistant Secretary of the Air Force
1962 A. C. Dickieson and John R. Pierce, Bell Telephone Laboratories
1963 The 363rd Tactical Recon. Wing and the 4080th Strategic Wing
1964 Gen. Curtis E. LeMay, Chief of Staff, USAF
1965 The 2nd Air Division, PACAF
1966 The 8th, 12th, 355th, 366th, and 388th Tactical Fighter Wings and the 432nd and 460th TRWs
1967 Gen. William W. Momyer, Cmdr., 7th Air Force, PACAF
1968 Col. Frank Borman, USAF; Capt. James Lovell, USN; and Lt. Col. William Anders, USAF, Apollo 8 crew
1969 *(No presentation)*
1970 Apollo 11 team (J. L. Atwood; Lt. Gen. S. C. Phillips, USAF; and astronauts Neil Armstrong and USAF Cols. Buzz Aldrin and Michael Collins)
1971 John S. Foster Jr., Dir. of Defense Research and Engineering
1972 Air units of the Allied Forces in Southeast Asia (Air Force, Navy, Army, Marine Corps, and the Vietnamese Air Force)
1973 Gen. John D. Ryan, USAF (Ret.), former Chief of Staff
1974 Gen. George S. Brown, USAF, Chm., Joint Chiefs of Staff
1975 James R. Schlesinger, Secretary of Defense
1976 Sen. Barry M. Goldwater
1977 Sen. Howard W. Cannon
1978 Gen. Alexander M. Haig Jr., USA, Supreme Allied Commander, Europe
1979 Sen. John C. Stennis
1980 Gen. Richard H. Ellis, USAF, CINC, SAC
1981 Gen. David C. Jones, USAF, Chm., Joint Chiefs of Staff
1982 Gen. Lew Allen Jr., USAF (Ret.), former Chief of Staff
1983 Ronald W. Reagan, President of the United States
1984 The President's Commission on Strategic Forces (the Scowcroft Commission)
1985 Gen. Bernard W. Rogers, USA, SACEUR
1986 Gen. Charles A. Gabriel, USAF (Ret.), former Chief of Staff
1987 Adm. William J. Crowe Jr., USN, Chm., Joint Chiefs of Staff
1988 Men and women of the Ground-Launched Cruise Missile team
1989 Gen. Larry D. Welch, Chief of Staff, USAF
1990 Gen. John T. Chain, CINC, SAC
1991 Lt. Gen. Charles A. Horner, Cmdr., CENTCOM Air Forces and 9th Air Force
1992 Gen. Colin L. Powell, USA, Chm., Joint Chiefs of Staff
1993 Gen. Merrill A. McPeak, Chief of Staff, USAF
1994 Gen. John Michael Loh, Cmdr., Air Combat Command
1995 World War II Army Air Forces veterans
1996 Gen. Ronald R. Fogleman, Chief of Staff, USAF
1997 Men and women of the United States Air Force
1998 Gen. Richard E. Hawley, Cmdr., ACC
1999 Lt. Gen. Michael C. Short, Cmdr., Allied Air Forces Southern Europe
2000 Gen. Michael E. Ryan, Chief of Staff, USAF
2001 Gen. Joseph W. Ralston, CINC, EUCOM
2002 Gen. Richard B. Myers, USAF, Chm., Joint Chiefs of Staff
2003 Lt. Gen. T. Michael Moseley, Cmdr., air component, CENTCOM, and 9th Air Force
2004 Gen. John P. Jumper, Chief of Staff, USAF
2005 Gen. Gregory S. Martin, USAF (Ret.), former Cmdr., AFMC
2006 Gen. Lance W. Lord, USAF (Ret.), former Cmdr., AFSPC
2007 Gen. Ronald E. Keys, Cmdr., ACC
2008 Gen. Bruce Carlson, Cmdr., AFMC
2009 Gen. John D. W. Corley, Cmdr., ACC
2010 Lt. Gen. David A. Deptula, USAF Deputy Chief of Staff, ISR
2011 Gen. Duncan J. McNabb, Cmdr., TRANSCOM
2012 Gen. Norton A. Schwartz, USAF (Ret.), former Chief of Staff
2013 Gen. Douglas M. Fraser, USAF (Ret.), former Cmdr., SOUTHCOM
2014 Gen. C. Robert Kehler, USAF (Ret.), former Cmdr., STRATCOM
2015 Gen. Janet C. Wolfenbarger, USAF (Ret.), former Cmdr., AFMC
2016 Gen. Mark A. Welsh III, USAF (Ret.), former Chief of Staff

John R. Alison Award Recipients

AFA's highest honor for industrial leadership.

1992 Norman R. Augustine, Chairman, Martin Marietta
1993 Daniel M. Tellep, Chm. and CEO, Lockheed
1994 Kent Kresa, CEO, Northrop Grumman
1995 C. Michael Armstrong, Chm. and CEO, Hughes Aircraft
1996 Harry Stonecipher, Pres. and CEO, McDonnell Douglas
1997 Dennis J. Picard, Chm. and CEO, Raytheon
1998 Philip M. Condit, Chm. and CEO, Boeing
1999 Sam B. Williams, Chm. and CEO, Williams International
2000 Simon Ramo and Dean E. Wooldridge, missile pioneers
2001 George David, Chm. and CEO, United Technologies
2002 Sydney Gillibrand, Chm., AMEC; and Jerry Morgensen, Pres. and CEO, Hensel Phelps Construction
2003 Joint Direct Attack Munition Industry Team, Boeing
2004 Thomas J. Cassidy Jr., Pres. and CEO, General Atomics Aeronautical Systems
2005 Richard Branson, Chm., Virgin Atlantic Airways and Virgin Galactic
2006 Ronald D. Sugar, Chm. and CEO, Northrop Grumman
2007 Boeing and Lockheed Martin
2008 Bell Boeing CV-22 Team, Bell Helicopter Textron, and Boeing
2009 General Atomics Aeronautical Systems Inc.
2010 Raytheon
2011 United Launch Alliance
2012 Boeing
2013 X-51A WaveRider Program, Boeing, Aerojet Rocketdyne, and Air Force Research Laboratory
2014 C-17 Globemaster III, Boeing
2015 F-22 Raptor, Lockheed Martin
2016 SpaceX

W. Stuart Symington Award Recipients

AFA's highest honor to a civilian in the field of national security, the award is named for the first Secretary of the Air Force.

1986 Caspar W. Weinberger, Secretary of Defense
1987 Edward C. Aldridge Jr., Secretary of the Air Force
1988 George P. Schultz, Secretary of State
1989 Ronald W. Reagan, former President of the United States
1990 John J. Welch, Asst. SECAF (Acquisition)
1991 George Bush, President of the United States
1992 Donald B. Rice, Secretary of the Air Force
1993 Sen. John McCain (R-Ariz.)
1994 Rep. Ike Skelton (D-Mo.)
1995 Sheila E. Widnall, Secretary of the Air Force
1996 Sen. Ted Stevens (R-Alaska)
1997 William Perry, former Secretary of Defense
1998 Rep. Saxby Chambliss (R-Ga.) and Rep. Norman D. Dicks (D-Wash.)
1999 F. Whitten Peters, Secretary of the Air Force
2000 Rep. Floyd Spence (R-S.C.)
2001 Sen. Michael Enzi (R-Wyo.) and Rep. Cliff Stearns (R-Fla.)
2002 Rep. James V. Hansen (R-Utah)
2003 James G. Roche, Secretary of the Air Force
2004 Peter B. Teets, Undersecretary of the Air Force
2005 Rep. Duncan Hunter (R-Calif.)
2007 Michael W. Wynne, Secretary of the Air Force
2008 Gen. Barry R. McCaffrey, USA (Ret.)
2009 Sen. Orrin G. Hatch (R-Utah)
2010 John J. Hamre, Center for Strategic & International Studies
2011 Rep. C. W. "Bill" Young (R-Fla.)
2012 Gen. James L. Jones, USMC (Ret.)
2013 Michael B. Donley, Secretary of the Air Force
2014 Ashton B. Carter, former Deputy Secretary of Defense
2015 William A. LaPlante, Asst. SECAF (Acquisition)
2016 Jamie M. Morin, Director, Cost Assessment & Prgm Evaluation

AFA Lifetime Achievement Award Recipients

The award recognizes a lifetime of work in the advancement of aerospace.

2003 Maj. Gen. John R. Alison, USAF (Ret.); Sen. John H. Glenn Jr.; Maj. Gen. Jeanne M. Holm, USAF (Ret.); Col. Charles E. McGee, USAF (Ret.); Gen. Bernard A. Schriever, USAF (Ret.)
2004 Gen. Russell E. Dougherty, USAF (Ret.), Florene Miller Watson
2005 Sen. Daniel K. Inouye; William J. Perry; Patty Wagstaff
2007 CMSAF Paul W. Airey, USAF (Ret.)
2008 Col. George E. Day, USAF (Ret.); Gen. David C. Jones, USAF (Ret.); Harold Brown
2009 Doolittle Raiders; Tuskegee Airmen; James R. Schlesinger
2010 Col. Walter J. Boyne, USAF (Ret.); Andrew W. Marshall; Gen. Lawrence A. Skantze, USAF (Ret.); Women Airforce Service Pilots
2011 Natalie W. Crawford; Lt. Gen. Thomas P. Stafford, USAF (Ret.); Gen. Larry D. Welch, USAF (Ret.); Heavy Bombardment Crews of WWII; Commando Sabre Operation-Call Sign Misty
2012 Gen. James P. McCarthy, USAF (Ret.); Vietnam War POWs; Berlin Airlift Aircrews; Korean War Airmen; Fighter Pilots of World War II
2013 Maj. Gen. Joe H. Engle, USAF (Ret.); US Rep. Sam Johnson; The Arlington Committee of the Air Force Officers' Wives' Club—"The Arlington Ladies"
2014 Brig. Gen. James A. McDivitt, USAF (Ret.); Civil Air Patrol—World War II veterans; American Fighter Aces
2015 R. A. "Bob" Hoover; Eugene F. "Gene" Kranz; Gen. M chael V. Hayden, USAF (Ret.)
2016 Maj. Gen. Claude M. Bolton Jr., USAF (Ret.); Lt. Col. John T. Correll, USAF (Ret.); Gen. Charles A. Horner, USAF (Ret.); Lt. Gen. James M. Keck, USAF (Ret.); Gen. Richard B. Myers, USAF (Ret.)

Gold Life Member Card Recipients

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

Name	Year	Card No.	Name	Year	Card No.
Gill Robb Wilson	1957	1	Sam E. Keith Jr.	1990	12
Jimmy Doolittle	1959	2	Edward A. Stearn	1992	13
Arthur C. Storz Sr.	1961	3	Dorothy L. Flanagan	1994	14
Julian B. Rosenthal	1962	4	John O. Gray	1996	15
Jack B. Gross	1964	5	Jack C. Price	1997	16
George D. Hardy	1965	6	Nathan H. Mazer	2002	17
Jess Larson	1967	7	John R. Alison	2004	18
Robert W. Smart	1968	8	Donald J. Harlin	2009	19
Martin M. Ostrow	1973	9	James M. McCoy	2013	20
James H. Straubel	1980	10	George M. Douglas	2014	21
Martin H. Harris	1988	11	John A. Shaud	2016	22

AFA Chairman's Aerospace Education Achievement Award

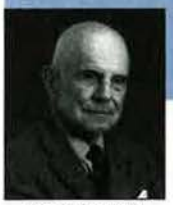
For long-term commitment to aerospace education, making a significant impact nationwide.

2009 ExxonMobil Foundation
2010 *USA Today*
2011 The National Science Foundation
2012 The Military Channel
2013 The Civil Air Patrol Aerospace Education Program
2014 Department of Defense STARBASE Program
2015 Northrop Grumman Foundation
2016 Harry Talbot

The Twelve Founders

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

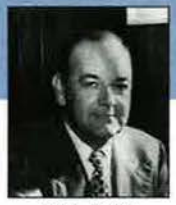
AFA Chairmen of the Board and National Presidents



Jimmy Doolittle
President, 1946-47
Chairman, 1947-49

Edward P. Curtis
Chairman, 1946-47

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



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

Robert S. Johnson
President, 1949-51

Carl A. Spaatz
Chairman, 1950-51

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

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

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

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

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

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

Peter J. Schenk
President, 1957-59

James M. Trail
Chairman, 1958-59

AIR FORCE ASSOCIATION
Membership Application

Join online at www.afa.org/join

Stop by the AFA booth in the Exhibit Hall to learn more about AFA membership and other AFA initiatives. Take advantage of our special offer and join AFA at half the regular price. The special ends Wednesday, Sept. 21, at 4:00 p.m.

Air Force Association members receive 12 monthly issues of *Air Force Magazine* and a number of other benefits, including up-to-the-minute information and access to discounts on products and services that you use daily.

NAME

RANK (IF APPLICABLE)

ADDRESS

CITY

STATE

ZIP

DATE OF BIRTH

PHONE

EMAIL

MAKE A DONATION

I wish to include a charitable donation to support AFA.

☐ $10 ☐ $25 ☐ $50 ☐ Other $_____

Contributions to AFA are fully tax deductible for federal income tax purposes.

PAYMENT OPTIONS

☐ ~~$45~~ $22.50 for one year

☐ ~~$110~~ $55 for three years

☐ ~~$30~~ $15 for one year eMembership

☐ ~~$75~~ $37.50 for three years eMembership

☐ ~~$22.50~~ $11.25 for 1 year for: (please check one)

- ○ Current E-4 & below
- ○ Current GS-4 & below
- ○ Current WG-4 & below
- ○ Cadets (please check one)
  - ○ ROTC ○ JROTC ○ CAP ○ Silver Wings
- ○ Other Students

LIFE MEMBERSHIP

☐ $600 single payment

☐ $400 eLife Membership, single payment

☐ $300 ages 70+, single payment

☐ $630 extended payments

- ○ Initial payment of $90 with four quarterly payments of $135 each
- ○ Initial payment of $90 with eight quarterly payments of $67.50 each

METHOD OF PAYMENT

☐ Check enclosed (not cash) ☐ American Express ☐ MasterCard ☐ Visa EXP. DATE _____

ACCOUNT NUMBER SIGNATURE DATE

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

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

Julian B. Rosenthal
Chairman, 1959-60

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

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

John B. Montgomery
President, 1962-63

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

Jack B. Gross
Chairman, 1963-64

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

Robert W. Smart
President, 1967-69

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

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

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

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

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

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

Daniel F. Callahan
Chairman, 1979-81

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

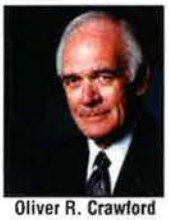
David L. Blankenship
President, 1982-84
Chairman, 1984-85

Edward A. Stearn
Chairman, 1985-86

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

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

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



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

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

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

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

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

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

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

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

Joseph E. Sutter
Chairman, 2008-10

S. Sanford Schlitt
Chairman, 2010-12

George K. Muellner
Chairman, 2012-14

Scott P. Van Cleef
Chairman, 2014-16

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

AFA Executive Directors/Presidents/CEOs

Willis S. Fitch
Executive Director
1946-47

James H. Straubel
Executive Director
1948-80

Russell E. Dougherty
Executive Director
1980-86

David L. Gray
Executive Director
1986-87

John O. Gray
Acting Executive Director
1987-88, 1989-90

Charles L. Donnelly Jr.
Executive Director
1988-89

Monroe W. Hatch Jr.
Executive Director
1990-95

AFA Executive Directors/Presidents/CEOs (cont.)

John A. Shaud
Executive Director
1995-2002

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

Michael M. Dunn
President-CEO
2007-12

Craig R. McKinley
President
2012-15

Mark A. Barrett
Acting President
2015

Larry O. Spencer
President
2015-

[c] The position of Executive Director was replaced in 2006 by President-CEO. In 2012, the position was redesignated President.

Vice Chairmen for Field Operations

Joseph E. Sutter	2006-08
James R. Lauducci	2008-10
Justin M. Faiferlick	2010-12
Scott P. Van Cleef	2012-14
David A. Dietsch	2014-16

Vice Chairmen for Aerospace Education

L. Boyd Anderson	2006-07
S. Sanford Schlitt	2007-10
George K. Muellner	2010-12
Jerry E. White	2012-15
Richard B. Bundy	2015-

National Secretaries

Sol A. Rosenblatt	1946-47	Thomas W. Henderson	1990-91
Julian B. Rosenthal	1947-59	Mary Ann Seibel	1991-94
George D. Hardy	1959-66	Mary Anne Thompson	1994-97
Joseph L. Hodges	1966-68	William D. Croom Jr.	1997-2000
Glenn D. Mishler	1968-70	Daniel C. Hendrickson	2000-03
Nathan H. Mazer	1970-72	Thomas J. Kemp	2003-06
Martin H. Harris	1972-76	Judy K. Church	2006-09
Jack C. Price	1976-79	Joan Seli	2009-11
Earl D. Clark Jr.	1979-82	Edward W. Garland	2011-14
Sherman W. Wilkins	1982-85	Marvin L. Tooman	2014-15
A. A. "Bud" West	1985-87	John T. Brock	2015-
Thomas J. McKee	1987-90		

National Treasurers

W. Deering Howe	1946-47	George H. Chabbott	1981-87
G. Warfield Hobbs	1947-49	William N. Webb	1987-95
Benjamin Brinton	1949-52	Charles H. Church Jr.	1995-2000
George H. Haddock	1952-53	Charles A. Nelson	2000-05
Samuel M. Hecht	1953-57	Steven R. Lundgren	2005-10
Jack B. Gross	1957-62	Leonard R. Vernamonti	2010-14
Paul S. Zuckerman	1962-66	Nora Ruebrook	2014-16
Jack B. Gross	1966-81	Charles L. Martin Jr.	2016-

AFA's Regions, States, and Chapters

These figures indicate the number of affiliated members as of June 2016. Listed below the name of each region is the region president.

CENTRAL EAST REGION 11,101
F. Gavin MacAloon

Delaware	**443**
Brig. Gen. Bill Spruance	113
Delaware Galaxy	330
District of Columbia	**380**
Nation's Capital	380
Maryland	**2,115**
Baltimore*	775
Central Maryland	441
Thomas W. Anthony	899
Virginia	**7,968**
Danville	40
Donald W. Steele Sr. Memorial	3,610
Gen. Charles A. Gabriel	1,303
Langley	1,557
Leigh Wade	96
Northern Shenandoah Valley	260
Richmond	521
Roanoke	278
Tidewater	303
West Virginia	**195**
Chuck Yeager	195

FAR WEST REGION 8,908
Wayne R. Kauffman

California	**8,191**
Bob Hope	558
Brig. Gen. Robert F. Travis	514
C. Farinha Gold Rush	1,023
David J. Price/Beale	291
Fresno*	498
Gen. B. A. Schriever Los Angeles	740
General Doolittle Los Angeles Area*	850
Golden Gate*	440
High Desert	150
Orange County/Gen. Curtis E. LeMay	539
Palm Springs	329
Robert H. Goddard	589
San Diego	737
Stan Hryn Monterey Bay	167
Tennessee Ernie Ford	468
William J. "Pete" Knight	298
Hawaii	**717**
Hawaii*	717

FLORIDA REGION 8,121
William A. Yucuis

Florida	**8,121**
Brig. Gen. James R. McCarthy	262
Cape Canaveral	827
Central Florida	1,075
Col. H. M. "Bud" West	208
Col. Loren D. Evenson	315
Eglin	1,041
Falcon	496
Florida Highlands	259
Gold Coast	573
Hurlburt	753
Miami-Homestead	366
Red Tail Memorial	498
Sarasota-Manatee	296
Waterman-Twining	1,152

GREAT LAKES REGION 6,414
Paul A. Lyons

Indiana	**1,175**
Central Indiana	366
Fort Wayne	177
Grissom Memorial	197
Lawrence D. Bell Museum	181
Southern Indiana	254
Kentucky	**651**
Gen. Russell E. Dougherty	393
Lexington	258
Michigan	**1,341**
Battle Creek	69
Lake Superior Northland	118
Lloyd R. Leavitt Jr.	283
Mount Clemens	871
Ohio	**3,247**
Capt. Eddie Rickenbacker Memorial*	493
Frank P. Lahm	364
Gen. Joseph W. Ralston	362
North Coast*	183
Steel Valley	103
Wright Memorial*	1,742

MIDWEST REGION 5,812
Russell A. Klatt

Illinois	**2,184**
Chicagoland-O'Hare	1,018
Scott Memorial	1,166
Iowa	**473**
Fort Dodge	39
Gen. Charles A. Horner	184
Northeast Iowa	188
Richard D. Kisling	62
Kansas	**548**
Lt. Erwin R. Bleckley	368
Maj. Gen. Edward R. Fry	180
Missouri	**1,409**
Whiteman	415
Harry S. Truman	488
Spirit of St. Louis	506
Nebraska	**1,198**
Ak-Sar-Ben	988
Lincoln	210

NEW ENGLAND REGION 3,234
Kevin M. Grady

Connecticut	**573**
Flying Yankees/Gen. George C. Kenney	333
Lindbergh/Sikorsky	240
Massachusetts	**1,621**
Minuteman	242
Otis	223
Paul Revere	876
Pioneer Valley	280
New Hampshire	**652**
Brig. Gen. Harrison R. Thyng	652
Rhode Island	**205**
Metro Rhode Island	166
Newport Blue & Gold	39
Vermont	**183**
Green Mountain	183

NORTH CENTRAL REGION 2,816
Ronald W. Mielke

Minnesota **921**
Gen. E. W. Rawlings 759
Richard I. Bong 162

Montana **327**
Big Sky 240
Bozeman 87

North Dakota **350**
Gen. David C. Jones 174
Happy Hooligan 92
Red River Valley 84

South Dakota **399**
Dacotah 192
Rushmore 207

Wisconsin **819**
Billy Mitchell 819

NORTHEAST REGION 5,675
Maxine Rauch

New Jersey **1,332**
Brig. Gen. Frederick W. Castle 247
Hangar One 165
Highpoint 68
Mercer County 110
Sal Capriglione 235
Shooting Star 189
Thomas B. McGuire Jr. 318

New York **2,108**
Albany-Hudson Valley* 352
Finger Lakes 270
Gen. Carl A. Spaatz 148
Genesee Valley 184
Iron Gate 251
L. D. Bell-Niagara Frontier 289
Long Island 520
Pride of the Adirondacks 94

Pennsylvania **2,235**
Altoona 109
Joe Walker-Mon Valley 218
Lehigh Valley 168
Liberty Bell 508
Lt. Col. B. D. "Buzz" Wagner 144
Mifflin County* 97
Olmsted 262
Pocono Northeast 182
Total Force 304
York-Lancaster 243

NORTHWEST REGION 4,343
Mary J. Mayer

Alaska **579**
Edward J. Monaghan 429
Fairbanks Midnight Sun 150

Idaho **438**
Snake River Valley 438

Oregon **798**
Bill Harris 217
Columbia Gorge* 581

Washington **2,528**
Greater Seattle 813
Inland Empire 702
McChord Field 1,013

ROCKY MOUNTAIN REGION 5,054
Robert E. George

Colorado **3,620**
Gen. Robert E. Huyser 118
Lance P. Sijan 1,989
Mel Harmon 152
Mile High 1,361

Utah **1,113**
Northern Utah 399
Salt Lake City 402
Ute-Rocky Mountain 312

Wyoming **321**
Cheyenne Cowboy 321

SOUTH CENTRAL REGION 6,395
James M. Mungenast

Alabama **2,137**
Birmingham 295
Montgomery 1,103
South Alabama 185
Tennessee Valley 554

Arkansas **825**
David D. Terry Jr. 488
Lewis E. Lyle 337

Louisiana **974**
Ark-La-Tex 544
Maj. Gen. Oris B. Johnson 430

Mississippi **853**
Golden Triangle 263
John C. Stennis 397
Meridian 193

Tennessee **1,606**
Chattanooga 123
Everett R. Cook 349
Gen. Bruce K. Holloway 597
H. H. Arnold Memorial 120
Maj. Gen. Dan F. Callahan 417

SOUTHEAST REGION 6,804
Rodgers K. Greenawalt

Georgia **2,849**
Carl Vinson Memorial 922
Dobbins 1,404
Savannah 312
South Georgia 211

North Carolina **2,288**
Blue Ridge 442
Cape Fear 238
Kitty Hawk 65
Pope 575
Scott Berkeley 307
Tarheel 661

South Carolina **1,667**
Charleston 534
Columbia Palmetto 370
Strom Thurmond 367
Swamp Fox 396

SOUTHWEST REGION 6,264
John A. Toohey

Arizona **3,335**
Cochise 128
Frank Luke 1,842
Prescott/Goldwater 297
Tucson 1,068

Nevada **1,509**
Thunderbird 1,509

New Mexico **1,420**
Albuquerque 991
Fran Parker 298
Llano Estacado 131

TEXOMA REGION 12,196
Gary L. Copsey

Oklahoma **2,055**
Altus 190
Central Oklahoma (Gerrity) 1,308
Enid 216
Tulsa 341

Texas **10,141**
Abilene 350
Aggieland 161
Alamo 3,775
Austin 1,037
Concho 546
Del Rio 129
Denton 439
Fort Worth 1,332
Gen. Charles L. Donnelly Jr. 212
Northeast Texas 375
San Jacinto 837
Seidel-AFA Dallas 758

OVERSEAS CHAPTERS

US Air Forces in Europe

Charlemagne	Geilenkirchen, Germany
Dolomiti	Aviano AB, Italy
Ramstein	Ramstein AB, Germany
Spangdahlem	Spangdahlem AB, Germany
United Kingdom	RAF Lakenheath, UK

Pacific Air Forces

Keystone	Kadena AB, Japan
MiG Alley	Osan AB, South Korea
Tokyo	Tokyo, Japan

Dottie Flanagan Staff Award of the Year

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

1992	Doreatha Major	2004	Pearlie Draughn
1993	Jancy Bell	2005	Ursula Smith
1994	Gilbert Burgess	2006	Susan Rubel
1995	David Huynh	2007	Ed Cook
1996	Sherry Coombs	2008	Michael Davis
1997	Katherine DuGarm	2009	Chris Saik
1998	Suzann Chapman	2010	Bridget Wagner
1999	Frances McKenney	2011	Merri Shaffer
2000	Ed Cook	2012	Caitie Craumer
2001	Katie Doyle	2013	Pamela Braithwaite
2002	Jeneathia Wright	2014	Bridget Dongu
2003	Jim Brown	2015	Nathaniel Davis

AFA Member of the Year Award Recipients

Year	Recipient(s)	Year	Recipient(s)
1953	Julian B. Rosenthal (N.Y.)	1985	George H. Chabbott (Del.) and Hugh L. Enyart (Ill.)
1954	George A. Anderl (Ill.)		
1955	Arthur C. Storz (Neb.)	1986	John P. E. Kruse (N.J.)
1956	Thos. F. Stack (Calif.)	1987	Jack K. Westbrook (Tenn.)
1957	George D. Hardy (Md.)	1988	Charles G. Durazo (Va.)
1958	Jack B. Gross (Pa.)	1989	Oliver R. Crawford (Texas)
1959	Carl J. Long (Pa.)	1990	Cecil H. Hopper (Ohio)
1960	O. Donald Olson (Colo.)	1991	George M. Douglas (Colo.)
1961	Robert P. Stewart (Utah)	1992	Jack C. Price (Utah)
1962	*(no presentation)*	1993	Lt. Col. James G. Clark (D.C.)
1963	N. W. DeBerardinis (La.) and Joe L. Shosid (Texas)	1994	William A. Lafferty (Ariz.)
		1995	William N. Webb (Okla.)
1964	Maxwell A. Kriendler (N.Y.)	1996	Tommy G. Harrison (Fla.)
1965	Milton Caniff (N.Y.)	1997	James M. McCoy (Neb.)
1966	William W. Spruance (Del.)	1998	Ivan L. McKinney (La.)
1967	Sam E. Keith Jr. (Texas)	1999	Jack H. Steed (Ga.)
1968	Marjorie O. Hunt (Mich.)	2000	Mary Anne Thompson (Va.)
1969	*(no presentation)*	2001	Charles H. Church Jr. (Kan.)
1970	Lester C. Curl (Fla.)	2002	Thomas J. Kemp (Texas)
1971	Paul W. Gaillard (Neb.)	2003	W. Ron Goerges (Ohio)
1972	J. Raymond Bell (N.Y.) and Martin H. Harris (Fla.)	2004	Doyle E. Larson (Minn.)
		2005	Charles A. Nelson (S.D.)
1973	Joe Higgins (Calif.)	2006	Craig E. Allen (Utah)
1974	Howard T. Markey (D.C.)	2007	William D. Croom Jr. (Texas)
1975	Martin M. Ostrow (Calif.)	2008	John J. Politi (Texas)
1976	Victor R. Kregel (Texas)	2009	David R. Cummock (Fla.)
1977	Edward A. Stearn (Calif.)	2010	L. Boyd Anderson (Utah)
1978	William J. Demas (N.J.)	2011	Steven R. Lundgren (Alaska)
1979	Alexander C. Field Jr. (Ill.)	2012	S. Sanford Schlitt (Fla.)
1980	David C. Noerr (Calif.)	2013	Tim Brock (Fla.)
1981	Daniel F. Callahan (Fla.)	2014	James W. Simons (N.D.)
1982	Thomas W. Anthony (Md.)	2015	James R. Lauducci (Va.)
1983	Richard H. Becker (Ill.)	2016	David T. Buckwalter (Texas)
1984	Earl D. Clark Jr. (Kan.)		

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

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

A Sparkling Show of Support for Those Who Serve

U.S. AIR FORCE
Women's Embrace Ring

Set with genuine diamonds

Sculpted Air Force symbol

Finely hand-crafted in solid sterling silver with 18K-gold plating

Engraved inside with SERVICE BEFORE SELF

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The United States Air Force has a long and proud tradition. From the earliest days of the Air Force to today, those who serve have made the ultimate sacrifice, putting country before self. Now, you can show your pride and let the spirit of the United States Air Force soar—with our *"U.S. Air Force" Embrace Ring*, an exclusive design from The Bradford Exchange.

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Mrs. Mr. Ms. _____
Name (Please Print Clearly)

Address _____

City _____ State _____ Zip _____

E-Mail (Optional) _____

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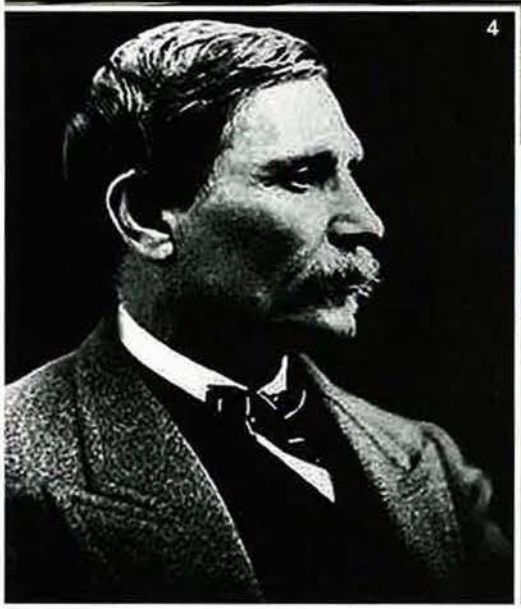

BEALE

Rancher, Sailor, Soldier, ... Camel Driver

Beale Air Force Base, near Sacramento, bears the name of a legendary American of the 19th century—a hero in war, explorer and frontiersman, close friend of the famous, advisor to presidents, rancher, multimillionaire, and diplomat extraordinaire.

Who exactly was Edward Fitzgerald Beale?

Beale—"Ned" to his friends—was the son of George Beale, a prominent naval officer in the War of 1812. The son, too, became a naval officer, sailing to Russia, Brazil, and Europe. He also acted for a time as naval spy in London for President James Polk.

While on detachment from his ship in San Diego, he fought in the 1846-48 Mexican War, emerging as a hero in the Battle of San Pasqual. He became famous in 1848 for carrying east the first gold samples from the California strikes.

Beale left the Navy in 1851 and settled in California. He became the state's first superintendent of Indian Affairs, and was made a brigadier general in the California Militia.

In the late 1850s, he surveyed Beale's Wagon Road, a 1,000-mile trail from New Mexico to California. For this, he enlisted as pack animals 25 camels imported from Egypt and Turkey. Beale thought highly of "this noble and useful brute," but his view was not universally shared.

In the 1860s, Beale founded Tejon Ranch in California, at the time the largest private landholding in the United States. (He kept some of the camels there.) He soon became one of the nation's richest men.

In his lifetime, Beale received personal appointments from five Presidents: Andrew Jackson (to Philadelphia Naval School); Millard Fillmore (as Indian Affairs superintendent in California); James Buchanan (to map the wagon road); Abraham Lincoln (as surveyor general of California and Nevada); and Ulysses S. Grant (as US envoy to Austria-Hungary). He had other famous friends (see right).

In retirement, Beale lived at Decatur House, near the White House, until his death in 1893. The men who witnessed his will were Grant and Gen. William Tecumseh Sherman.

The name of Beale was also lent to a famous street in San Francisco and a mountain chain in California.

Camp Beale, established by the Army in World War II for armor training, passed officially to the new US Air Force and became a full-fledged air base in 1948. It long served as a Strategic Air Command facility and now is home of Air Combat Command's 9th Reconnaissance Wing.

EDWARD FITZGERALD BEALE

Born: Feb. 4, 1822, Washington, D.C.
Died: April 22, 1893, Washington, D.C.
College: Philadelphia Naval School
Service: US Navy, California Militia
Grade: Lieutenant (Navy); brigadier general (Militia)
Honors: US ambassador
Occupations: Naval officer, surveyor, rancher, diplomat
Famous Friends: Kit Carson, Buffalo Bill Cody, Ulysses S. Grant, Franz Josef

BEALE AIR FORCE BASE

State: California
Status: Operational
Opened: (by Army) October 1942
Original Name: Camp Beale
Closed: (by Army) May 1947
Reopened: (by USAF) January 1948
Named as AFB: April 1951
Area: 36 sq mi / 23,000 acres
Nearest City: Sacramento
Current Owner: Air Combat Command
Former Owners: Air Training Command, Continental Air Command, Strategic Air Command
Home Of: 9th Reconnaissance Wing

1. U-2 Dragon Lady at Beale AFB, Calif. **2.** An artist's conception of the Beale camel train deployed to survey the 1,000-mile trail from New Mexico to California. **3.** U-2 pilots with a spyplane at Beale. **4.** Edward Fitzgerald "Ned" Beale.


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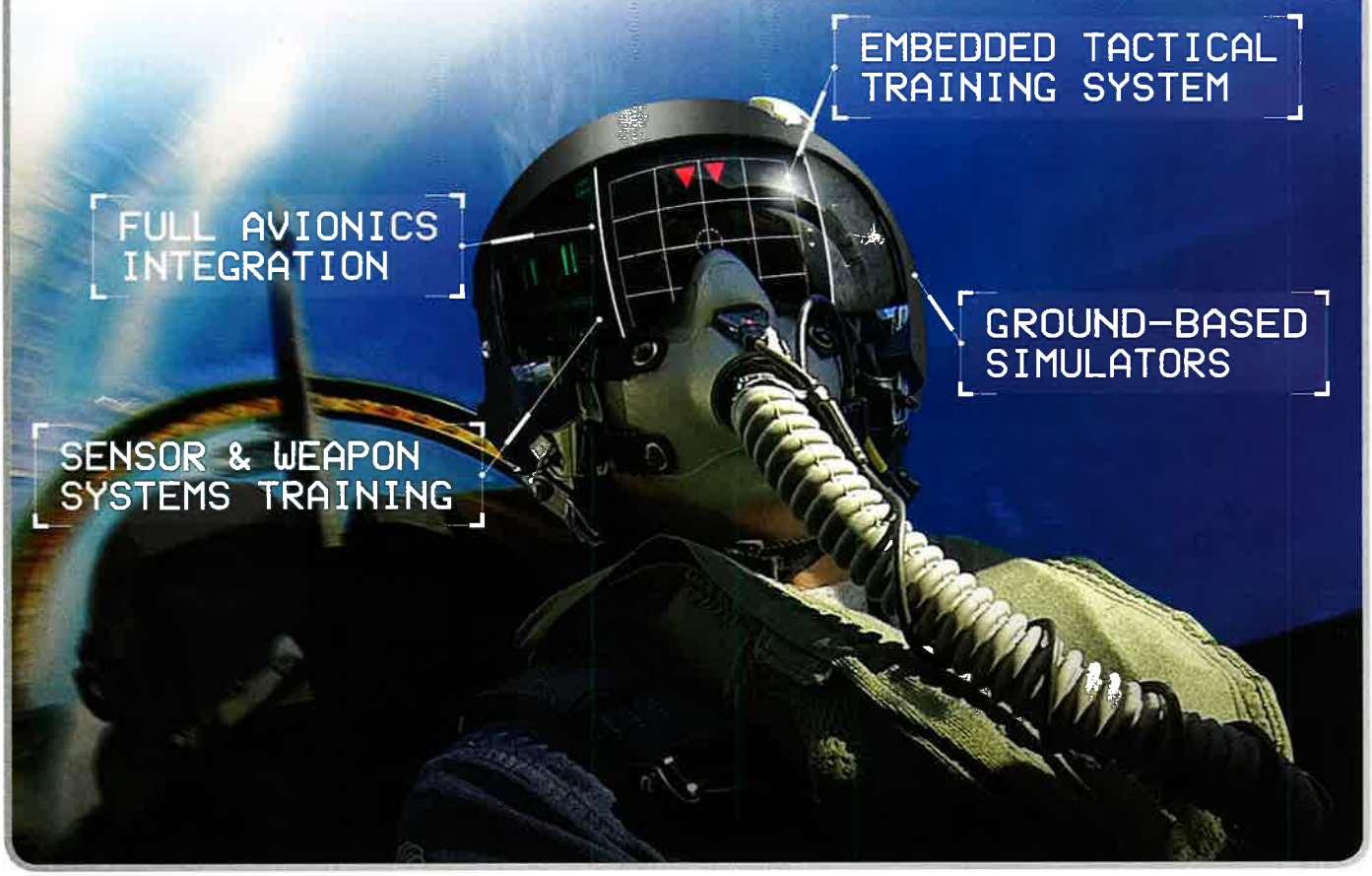

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