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ON THE COVER: Say "Cheese!" The GEICO Skytypers Air Show Team lines up for the camera plane. (Photo by Chris Parya/Courtesy of GEICO Air Show Team)
THIS PAGE: At events like SUN 'n FUN, spectators can experience the thrill of aviation. (Photo courtesy of SUN 'n FUN Aerospace Expo)

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A Century of American Airshows

BY DEBRA CLEGHORN

That thrilling engine rumble of vintage warbirds! Gravity-defying aerobatics! The sheer speed and precision of modern jet fighters! Now add all that to the opportunity to get up close and personal with aviation's finest. As most *Flight Journal* readers know, airshows offer a unique combination of exhilaration with an appreciation of our aviation history. In this issue, "Aviation's Living History" highlights some of the outstanding airshows around the country. These great American aviation exhibitions go back to 1910, when the first major airshow in the United States took place at Dominguez Field, just south of Los Angeles. Recall that Wilbur and Orville Wright first flew in 1903, and just seven years later, airplanes had literally and figuratively taken off!

The 1910 Dominguez Aviation Meet was highly successful, and it profoundly affected the future of American aviation. The event included monoplanes, biplanes, hot air balloons, and hydrogen-filled dirigibles. Between a quarter million to a half a million spectators turned out for the Meet, and this was the first time most of them had ever seen an aircraft in reality. The *Los Angeles Times* called it "one of the greatest public events in the history of the West."

Big dollar prizes for setting new world records at the Aviation Meet attracted the era's top aviators to Dominguez Field, putting their lives on



the line as they sought both fame and fortune. The most highly anticipated event was the challenge to set a new altitude record for a \$5,000 prize. (That's \$135,000 in today's dollars!) Louis Paulhan, a French pilot who had worked in a military balloon factory and taught himself to fly, dominated the competitions. First, he set a new flight endurance record by carrying a passenger more than 110 miles in his Farman III biplane in just under two hours. Then, he went on to achieve the new altitude mark of approximately 4,164 feet, winning the \$5,000 prize. Interestingly, toward the end of the show Paulhan carried U.S. Army officers aloft to perform one of the very first bomb drop flight tests, using weights to simulate bombs.

More than a century later, planes and pilots continue to entertain crowds across the country. Check out our feature story and mark your calendar! In our opinion, you can never experience too many of these live aviation events.✈

Above: This poster advertised the first U.S. airshow, the 1910 Dominguez Aviation Meet in California. **Top left:** A postcard of early aviator Louis Paulhan in a Farman III biplane.



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PHOTO COURTESY OF JACK COOK

Fond Memories

Read with great interest the article "Jugs Over the Battle of the Bulge" in the February issue. I was stationed at Spangduhlen AFB, 45 miles east of the Luxembourg border. I have visited several of the cities in the article during my tour from 1959–1962: Echternach, Bastonge, Wiltz, and Etain. I sent one week at Etain while TDY [temporary duty travel] during an exercise. I also had the honor to have visited the American veterans cemeteries in Belgium and Luxembourg. I stood at the gravesite of General Patton and looked out at the thousands of young soldiers laid to rest from the Bulge battle. Your magazine never fails to deliver excellent stories!

Bob Bowers, Hollywood, Florida

Spitfire Variant?

On page 15 of the December 2019 issue, the Spitfire photo labels it as a Mark VC. As far as I know these did not have 4-blade propellers or six direct exhaust stacks on each side. The props were all 3-blade and there were only three stacks on each side in which each stack was fed by the exhaust output of two cylinders each joined together (typical). Now I am not saying that there were not some special modified Spits, where, say, a 4-blade prop was installed or other mods.

P.S. As a child I spent some years working on and flying my dad's Vultee BT-13B, until it was sold to 20th Century Fox, one of many used in the movie *Tora, Tora, Tora*.

Reese Pratt [email]

Thanks for setting us straight. Careful readers like you keep us on our toes!—DC

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PHOTO BY BILL CRUMP

Mission Complete

Col. Walter J. Boyne, distinguished bomber pilot and prolific aviation author, died on January 9, 2020 at the age of 90. "Today I regretfully and sadly announce that Col. Walter James Boyne has flown his last mission," his son Bill said in a post on Boyne's official Facebook page. Boyne died in Silver Spring, Maryland, and will be interred at Arlington National Cemetery.

After joining the Air Force in 1951, Boyne flew as a B-50 and B-47 combat crew member, and later became a nuclear test pilot, flying both the B-47 and B-52. After serving in Vietnam, Colonel Boyne retired and joined the National Air and Space Museum as an assistant curator, and was eventually appointed as its director. In 1962, he began a prolific research and writing career, authoring more than 500 feature articles—many were published in *Flight Journal*—as well as dozens of books, some of which were on the *New York Times* Best Sellers list.

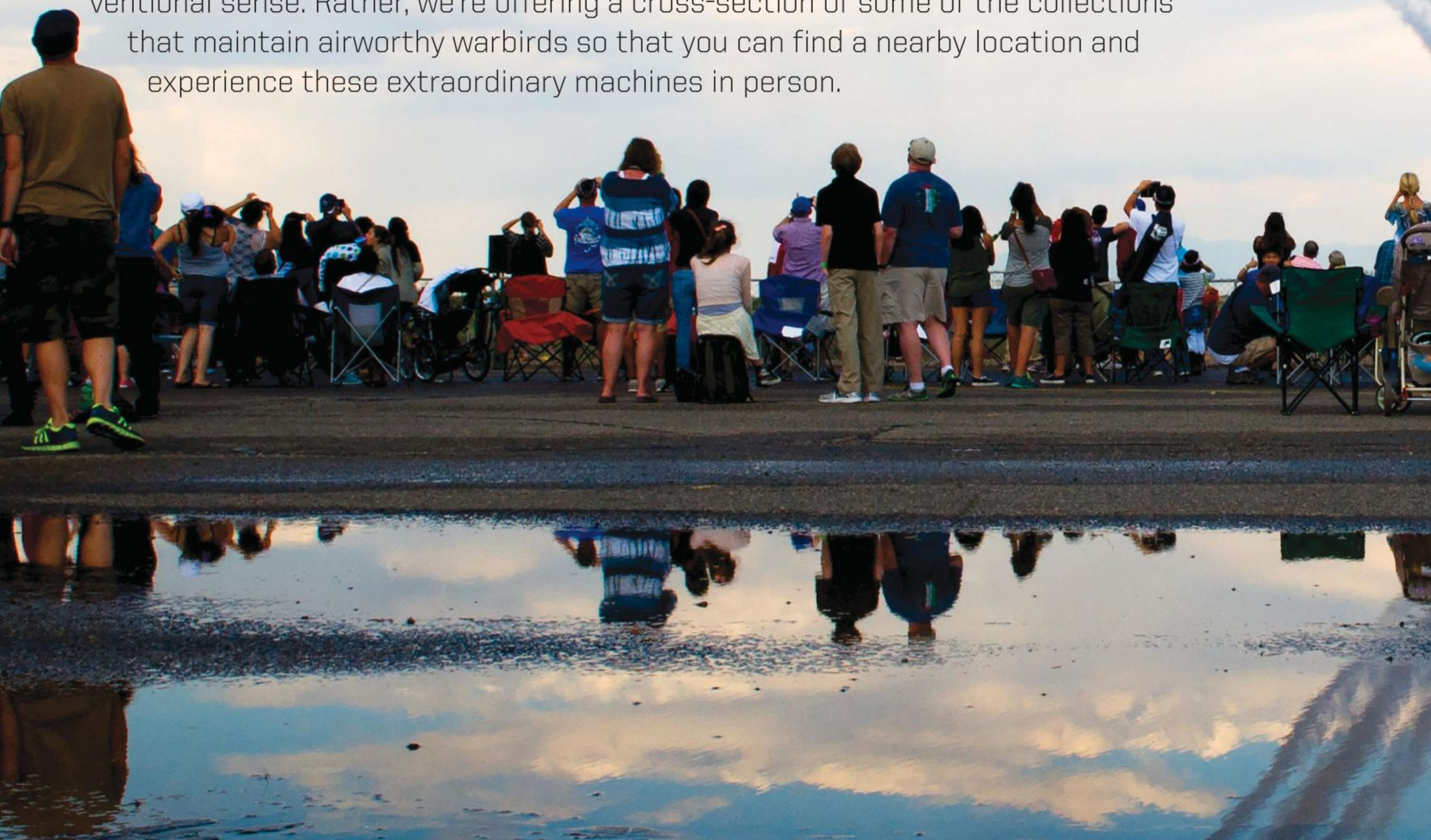
The *Flight Journal* crew considered working with Colonel Boyne to be a true honor and privilege, and our thoughts are with his family and friends.

AVIATION'S LIVING HISTORY

The museums and tours that are keeping warbirds alive and aloft!

BY MATT BOYD

Every year, hundreds of airshows and flight demonstrations take place across the United States, showcasing the glory of aviation's past. With so many choices available to enthusiasts wishing to see history come alive and take wing, we decided to provide our readers with a highlighted selection of museums and private organizations that preserve, restore, and fly classic military aircraft from every era since the dawn of flight. Some operate out of a home location, but many tour around the country to airshows—national and regional—bringing that glorious history to us. Some even offer rides in these exquisitely restored and preserved warbirds. This is by no means a comprehensive list—or even a ranking in the conventional sense. Rather, we're offering a cross-section of some of the collections that maintain airworthy warbirds so that you can find a nearby location and experience these extraordinary machines in person.



FLIGHT TEAMS & ORGANIZATIONS

AMERICAN AIRPOWER MUSEUM

Farmingdale, NY | americanairpowermuseum.com

Located on the grounds of Republic Airport in the town of Farmingdale, New York, the American Airpower Museum might seem oddly situated by today's standards, sitting as it does on Long Island, just a scant 30 miles from the heart of New York City. But during World War II the site was home to Republic Aviation, where more than 9,000 copies of the burly Republic P-47 Thunderbolt rolled off the assembly line and onto the very runways where the museum now stands. More than a dozen warbirds spanning WW II through the Vietnam era are on display in and around the museum's hangar. In addition, the museum offers a Flight Experience (ride) in some of its restored aircraft, including a T-6 Texan trainer, a WACO biplane, and a D-Day reenactment in its C-47 Skytrain.

2020 APPEARANCES (announced as of this writing)

DATE	EVENT	LOCATION
March 31-April 5	SUN 'n FUN Aerospace Expo	Lakeland, FL
May 23-24	Bethpage Air Show	Wantagh, NY
June 5-7	A Gathering of Warbirds	Reading, PA

CLASS OF '45

classof45.com

The Class of '45 is unlike most of the other organizations on this list in that it is built around just two aircraft: the F4U-4 Corsair known as *Korean War Hero*, and a P-51D Mustang named *Quick Silver*. Both planes were built in 1945 (hence the name), and according to the founders, the idea for Class of '45 came about when the pilots of the Corsair and Mustang (Jim Tobul and Scott Yoak, respectively) were watching practice flights at the 2013 Wings over North Georgia event. They had a stroke of inspiration—why not perform a formation flight together to honor the history of both the planes themselves and the Air Force and Navy personnel who originally flew and maintained them! Since then, the inspiration has expanded to formation demonstrations at more than a dozen events per season, where fans of these immaculately prepared warbirds can see them in all their glory.

2020 APPEARANCES (announced as of this writing)

DATE	EVENT	LOCATION
April 25-26	Vero Beach Air Show	Vero Beach, FL
March 31-April 5	SUN 'n FUN Aerospace Expo	Lakeland, FL
May 9-10	Wings over North Georgia	Dalton, GA
July 20-26	EAA Air Venture Oshkosh 2020	Oshkosh, WI



COLLINGS FOUNDATION WINGS OF FREEDOM TOUR

Hudson, MA | collingsfoundation.org

The mission statement of the Collings Foundation emphasizes the organization's focus on promoting living history and direct participation as a means of learning and appreciating our nation's history. It's hard to imagine a more visceral form of living history than feeling the thrum of powerful engines as a beautifully restored warbird swoops past—unless it's experiencing those same sensations from inside the aircraft during one of the flight experiences that are a centerpiece of the Foundation's Wings of Freedom Tour! They offer flightline walking tours aboard the B-24 Liberator, and individual one-on-one instruction at the sticks of a dual-control P-51 Mustang. As 2020 progresses, the Collings Foundation will be adding more locations and flight opportunities.

2020 APPEARANCES (announced as of this writing)

DATE	EVENT	LOCATION
March 13-17	Frontiers of Flight Museum Demo	Dallas, TX
July 17-19	Wings of the North AirExpo 2020	Eden Prairie, MN
August 14	MAPS Air Museum Demo	North Canton, OH
September 4	NAS Wildwood	Cape May, NJ





COMMEMORATIVE AIR FORCE AIRPOWER HISTORY TOUR

Fort Worth, TX | airpowersquadron.org

Don't have an aviation museum near you? No problem! In many areas the CAF will bring one to you and set it up on the runway of your local municipal airport. That's the idea behind the AirPower History Tour, which includes an impressive squadron of vintage military aircraft to explore firsthand, and you can even take a ride in some of them. The lineup varies from event to event, but the fleet includes a PT-13 Stearman open biplane; a T-6 Texan; the famous P-51D Mustang, *Gunfighter*; and two rare and exceptional bombers: the B-24A Liberator known as *Diamond Lil*, and what the CAF bills as "the World's Most Famous Flying B-29 Superfortress," known as *Fifi*. For 2020, the tour has more than a dozen stops at local airports and big air shows around the country, and when the bombers are not on tour they can also be visited at CAF's home base, the Vintage Flying Museum, on the grounds of Fort Worth Meacham International Airport.

2020 APPEARANCES (announced as of this writing)

Check schedule on website to see which airplanes will be appearing on which days

DATE	EVENT	LOCATION
March 7-8	Kerrville Aviation Historical.....	Kerrville, TX
	Flight Demo and Rides	
March 14-15	New Braunfels Historical	New Braunfels, TX
	Flight Demo and Rides	
March 21	Vintage Flying Museum Historical	Fort Worth, TX
	Historical Flight Demo and Rides	
March 28-29	Astin Aviation Historical.....	College Station, TX
	Flight Demo and Rides	
April 3-5	Historic Aviation Memorial.....	Tyler, TX
	Museum Historical Flight	
	Demo and Rides	
May 20-24	Newport News Historical	Newport News, VA
	Flight Demo and Rides	
May 27-31	Hagerstown Historical.....	Hagerstown, MD
	Flight Demo and Rides	
June 1-3	Morristown Historical.....	Morristown, NJ
	Flight Demo and Rides	
June 6-7	A Gathering of Warbirds.....	Reading, PA
	Demo and Rides	
July 13-14	Nashua Historical	Nashua, NH
	Flight Demo and Rides	
July 15-19	Fort Wayne Historical	Fort Wayne, IN
	Flight Demo and Rides	
July 22-26	Terre Haute Historical.....	Terre Haute, IN
	Flight Demo and Rides	
July 29-August 2	Peoria Historical.....	Peoria, IL
	Flight Demo and Rides	
August 26-30	St. Joseph Historical.....	St. Joseph, MO
	Flight Demo and Rides	
October 3-4	CAF-RGV Wing Airshow	Los Fresnos, TX
October 23-25	CAF Wings over Dallas.....	Dallas, TX
	WW II Airshow	

COMMEMORATIVE AIR FORCE TORA TORA TORA AIR SHOWS

Morton, IL | toratoratora.com

The CAF describes the Tora Tora Tora show as a living history lesson, as the group recreates Japan's attack on the U.S. naval base at Pearl Harbor, Hawaii. The show began in 1972 with six of the replicas used in the 1970 motion picture, *Tora! Tora! Tora!*, and has grown to include eight to ten aircraft in most appearances, comprised of Mitsubishi A6M Zero fighters, Nakajima B5N "Kate" torpedo bombers, Aichi D3A "Val" bombers, and Curtiss P-36 Hawk fighters. Some select shows also include a Curtiss P-40 Warhawk and a Boeing B-17 Flying Fortress. CAF has been recruited to work on numerous documentaries, and in 2000 they returned to Hollywood feature film duty for Disney's blockbuster, *Pearl Harbor*. The troupe typically makes the rounds to more than a dozen air shows and appearances including the MCAS Yuma Air Show, Dayton, and Oshkosh.

2020 APPEARANCES (announced as of this writing)

DATE	EVENT	LOCATION
March 13-14.....	MCAS Yuma Air Show	Yuma, AZ
March 21-22	"Aerospace Valley" Air Show	Lancaster, CA
May 9-10.....	Wings over Dalton Georgia.....	Dalton, GA
June 27-28	Vectren Dayton Air Show.....	Dayton, OH
July 20-26.....	EAA Air Venture Oshkosh 2020	Oshkosh, WI
October 3-4.....	CAF-RGV Wing Airshow	Los Fresnos, TX
October 23-25.....	CAF Wings over Dallas.....	Dallas, TX

The Tora Tora Tora show got its start with A6M Zero, B5N "Kate," and D3A "Val" replicas from the movie, *Tora! Tora! Tora!* They don't just fly them in demonstrations, they recreate the Pearl Harbor attack as a living history lesson complete with spectacular pyrotechnics!



PHOTO COURTESY OF COMMEMORATIVE AIR FORCE TORA TORA TORA



Planes of Fame maintains one of the largest fleets of classic warbirds. Their 150-plane collection includes more than 30 airworthy aircraft—many of which are showcased at the annual Chino Airshow, which draws huge crowds.

MILITARY AVIATION MUSEUM

Virginia Beach, VA | militaryaviationmuseum.org

What began in the 1990s with an enthusiast's search for his first flyable warbird—a salvaged and restored P-40 Warhawk—has since grown into one of the largest collections of vintage aircraft in the United States, and it is open to the public at the Military Aviation Museum in Virginia Beach. The collection comprises more than 40 WW II-era aircraft alone, along with nearly 20 WW I biplanes and other period aircraft. It's an extraordinary collection; you can see that for yourself just by going to the museum's live streaming page at militaryaviationmuseum.org/stream and viewing the live cameras from four different hangars. But to really appreciate the breadth of the collection you need to visit it in person. While there, you can book a ride in the resident 1941 PT-17 Boeing-Stearman Model 75 or the special three-seat WACO biplane. And if you want to see multiple planes in action, consider attending the museum's annual Warbirds over the Beach Air Show in mid-May.

2020 APPEARANCES (announced as of this writing)

DATE	EVENT	LOCATION
May 15-17	Warbirds over the Beach	Virginia Beach, VA
June 5-7	A Gathering of Warbirds	Reading, PA
September 30-October 4	Mid Atlantic Dawn Patrol	Virginia Beach, VA

NATIONAL WARPLANE MUSEUM

Geneseo, NY | nationalwarplanemuseum.com

The focus of the National Warplane Museum in upstate New York near Rochester is restoring, displaying, and flying WW II and Korean War-era aircraft. The majority are warbirds, as the museum's name implies, and the list includes some notable planes—and one movie star! The airworthy aircraft include an Antonov AN-2 called *Natasha*; a Beechcraft C-45 Expeditor (a militarized Twin Beech); a Beechcraft UC-43 (a militarized Staggerwing); a Piper L-21 (a militarized Super Cub); plus an Aeronca L-16A, and the C-47A Skytrain named *Whiskey 7*. The star of the collection is the B-17G Flying Fortress used in the 1990 feature film, *Memphis Belle*. These last three are available for rides off the grass strip at the museum's home field in Geneseo, New York. In addition, the museum has numerous other planes on display and several currently undergoing restoration, including a Fairchild Flying Boxcar and a C-130A Hercules nicknamed *Saigon Lady*. The museum also hosts an annual airshow in mid-July dubbed "the Greatest Show on Turf."

2020 APPEARANCES (announced as of this writing)

DATE	EVENT	LOCATION
June 5-7	A Gathering of Warbirds	Reading, PA
July 11-12	National Warplane Museum Airshow	Geneseo, NY

PLANES OF FAME AIR MUSEUM

Chino, CA | planesoffame.org

Planes of Fame is one of the oldest continuously operated air museums dedicated to preserving and restoring vintage aircraft, and houses an extensive collection, including what is claimed to be the largest gathering of Japanese WW II aircraft. The collection includes the only authentic flying Mitsubishi A6M Zero in the world. All told, the collection numbers nearly 150 planes housed in two locations: the primary facility at the Chino Airport in Southern California, and a satellite location at the airport in Valle, Arizona, not far from the Grand Canyon. Between the two there are more than 30 flying classics, and the Chino location puts on a monthly Living History Flying Day as well as a huge annual event during the first weekend in May. This event draws many other participants, including the Air Force's A-10 Warthog Demonstration Flight Team.

2020 APPEARANCES (announced as of this writing)		
DATE	EVENT	LOCATION
March 7	Living History Flying Day, P-38 Lightning	Chino, CA
March 13-14	MCAS Yuma Air Show	MCAS Yuma, AZ
March 21-22	"Aerospace Valley" Air Show	Lancaster, CA
April 4	Living History Flying Day, B-25 Mitchell	Chino, CA
May 2-3	Planes of Fame Air Show	Chino, CA
June 6	Living History Flying Day, P-47 Thunderbolt	Chino, CA
July 4	Living History Flying Day, P-40 Warhawk	Chino, CA
August 1	Living History Flying Day, P-51 Mustang	Chino, CA
September 5	Living History Flying Day, AD-4 Skyraider	Chino, CA
September 25-27	MCAS Miramar Air Show	San Diego, CA
October 3	Living History Flying Day, F-86 Sabre	Chino, CA
November 7	Living History Flying Day, WW I	Chino, CA
December 5	Living History Flying Day, A6M5 Zero	Chino, CA

OLD RHINEBECK AERODROME

Red Hook, NY | oldrhinebeck.org

Most of the organizations here focus on WW II aircraft. Not so at Rhinebeck! Per the mission defined by original founder Cole Palen, the goal of the Aerodrome and the associated museum, both located in Red Hook, New York, is to preserve, restore, and fly aircraft from the dawn of aviation, WW I, and the Golden Age prior to WW II. For that reason, Rhinebeck is where you can see one of the most diverse collections of restored and replica antique aircraft in the air. Rhinebeck also has a flair for showmanship, so their fight demonstrations are often strung together in entertaining narratives designed to add a level of fun and engagement for audiences, as well as to keep the action flowing. The museum and shows are seasonal—the museum is open daily May 1 through October 31, and the weekend air show schedule starts in late June and runs through mid-October. In addition, biplane rides are available aboard a 1929 New Standard D-25 barnstormer.



Ground crew moves the Curtiss Pusher on the Aerodrome's flightline.

PHOTO BY GERRY VARRISH





Each summer fans come to Willow Run Airport for the Yankee Air Museum's home show—Thunder Over Michigan. In addition to the museum's collection they are treated to numerous flight demonstrations, including shows put on by the USAF's Thunderbirds (shown) or the Blue Angels. (Photo by Nick Chute/ Courtesy of Yankee Air Museum)

YANKEE AIR FORCE

Belleville, MI | yankeeamuseum.org

The grounds of the museum that maintains the Yankee Air Force fleet provides nearly as much history as the aircraft themselves. The museum sits on the edge of the Willow Run Airport, which was originally built during WW II as the Ford Willow Run facility to build B-24 Liberator bombers. After the war, it was purchased by General Motors and converted into a transmission assembly plant, but the historic original bomber factory building was preserved. When GM closed the plant in 2009, the Yankee Air Museum entered negotiations to purchase the old bomber facility and make it the fleet's new home. Today, that collection includes more than 30 warbirds, including an impressive array of early jets from the 1950s and a mammoth Boeing B-52D Stratofortress. In addition to the planes on display, the museum operates several flying aircraft, including a WACO YMF-5C biplane; a C-47D Skytrain called *Hairless Joe*; a B-25D Mitchell nicknamed *Yankee Warrior*; and the B-52's ancestor, the B-17G Flying Fortress (converted back from a PB-1G assigned to the Coast Guard) named *Yankee Lady*. All four are available to be booked for Flight Experience rides at the Willow Run field as well as select airshows.

2020 APPEARANCES (announced as of this writing)

DATE	EVENT	LOCATION	B-17 YANKEE LADY	B-25 YANKEE WARRIOR	C-47 HAIRLESS JOE	WACO BIPLANE
May 16-17	Yankee Air Force Flight Experience	Ypsilanti, MI	May 17	May 17	May 17	May 16
June 5-6	A Gathering of Warbirds	Reading, PA	June 5	NA	June 5-6	NA
June 27-29	Wurtsmith Air Museum Flight Experience	Oscoda, MI	NA	NA	June 27-29	NA
Aug 29-30	Thunder over Michigan	Ypsilanti, MI	Aug 29-30	Aug 29-30	NA	Aug 29-30



MILITARY ORGANIZATIONS

USN BLUE ANGELS
blueangels.navy.mil

USAF THUNDERBIRDS
afthunderbirds.com

AIR COMBAT COMMAND
acc.af.mil/Home/Aerial-Events

- USAF A-10 WARTHOG DEMO TEAM
- USAF F-22 RAPTOR DEMO TEAM
- USAF F-35A LIGHTNING II DEMO TEAM
- USAF F-16 VIPER DEMO TEAM
- USAF HERITAGE FLIGHT PROGRAM



The U.S. Navy's Blue Angels appear at numerous shows throughout the season, including this appearance at the SUN n' FUN Aerospace Expo. This year the USAF Thunderbirds will be flying at the Lakeland, Florida event taking place March 31 through April 5.

U.S. Modern Military Might in Action

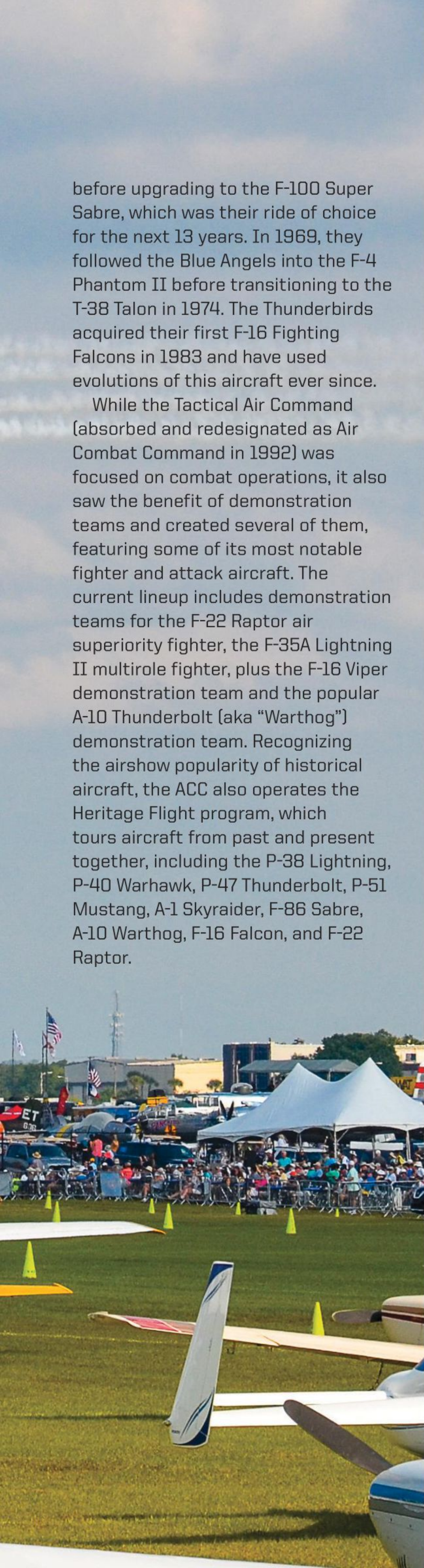
Airworthy vintage warbirds operated by museums and private restoration organizations are the focus of this story, but aircraft—both classic and modern—flown by our military, make up a significant portion of the demonstration flights that perform at airshows throughout the year. The origins of these world-famous demonstration teams goes back to the days following WW II, at the dawn of the jet age. The first team to be established was the U.S. Navy's Blue

Angels in 1946, the same year the Tactical Air Command was created to oversee air combat roles of conventional (non-nuclear) weapons. A year later, the Air Force was spun off from the Army into its own U.S. Armed Forces branch, and in 1953 it received its own demonstration team, the Thunderbirds. The purpose of the Blue Angels and the Thunderbirds was similar—to excite public interest and boost morale within their respective branches.

In the years since, the Blue Angels have flown numerous different naval aircraft, starting with the prop-driven F6 Hellcat and F8 Bearcat before switching to the F9 Panther (which evolved into the F9 Cougar), the F-11 Tiger, F-4 Phantom, A-4 Skyhawk, and finally, its current plane of choice—the F/A-18 Hornet.

From the outset, the Thunderbirds chose jet aircraft: the F-84G Thunderjet was followed briefly by the swept-wing F-84F Thunderstreak





before upgrading to the F-100 Super Sabre, which was their ride of choice for the next 13 years. In 1969, they followed the Blue Angels into the F-4 Phantom II before transitioning to the T-38 Talon in 1974. The Thunderbirds acquired their first F-16 Fighting Falcons in 1983 and have used evolutions of this aircraft ever since.

While the Tactical Air Command (absorbed and redesignated as Air Combat Command in 1992) was focused on combat operations, it also saw the benefit of demonstration teams and created several of them, featuring some of its most notable fighter and attack aircraft. The current lineup includes demonstration teams for the F-22 Raptor air superiority fighter, the F-35A Lightning II multirole fighter, plus the F-16 Viper demonstration team and the popular A-10 Thunderbolt (aka “Warthog”) demonstration team. Recognizing the airshow popularity of historical aircraft, the ACC also operates the Heritage Flight program, which tours aircraft from past and present together, including the P-38 Lightning, P-40 Warhawk, P-47 Thunderbolt, P-51 Mustang, A-1 Skyraider, F-86 Sabre, A-10 Warthog, F-16 Falcon, and F-22 Raptor.

2020 SCHEDULE/ ■ BLUE ANGELS/ ■ THUNDERBIRDS

DATE	EVENT	LOCATION	ADDITIONAL ACC DEMO TEAMS
■ March 14.....	Laughlin AFB Fiesta of Flight 2020.....	Del Rio, TX.....	●
■ March 14.....	Wings over the Desert/NAF El Centro Air Show	Centro, CA.....	A-10
■ March 21-22.....	LA County - Aerospace Valley Air Show.....	Palmdale, CA.....	F-22
■ March 21-22.....	Luke Days Air and Space Expo 2020	Luke AFB, AZ.....	●
■ March 28-29	MacDill AFB Tampa Bay AirFest 2020	Tampa, FL.....	F-22
■ March 28-29	March Field AirFest 2020	March ARB, CA.....	A-10
■ March 31-April 5.....	SUN 'n FUN Aerospace Expo.....	Lakeland, FL	●
■ April 4-5.....	Wings over South Texas.....	Kingsville, TX.....	●
■ April 18-19	Beyond the Horizon Maxwell AFB Airshow.....	Montgomery, AL	●
■ April 18-19	JB Charleston Air & Space Expo 2020	Charleston, SC	●
■ April 25-26.....	Vero Beach Air Show	Vero Beach, FL.....	F-16
■ April 25-26.....	Wings over Columbus AFB Air & Space Show	Columbus, MS.....	●
■ May 1-3	MCAS Cherry Point Air Show	Cherry Point, NC	F-22
■ May 2-3	Fort Lauderdale Air Show 2020.....	Fort Lauderdale, FL.....	●
■ May 9-10	Dyess Big Country Airfest 2020	Abilene, TX.....	F-22
■ May 9-10	Wings over Recce Town (Beale AFB)	Beale AFB, CA.....	●
■ May 16-17	Power in the Pines Air Show	Wrightstown, NJ.....	A-10
■ May 16-17	Shaw Air and Space Expo 2020.....	Sumter, SC.....	F-16
■ May 23-24	Bethpage Air Show at Jones Beach.....	Wantagh, NY	A-10
■ May 23-24	Miami Beach Air & Sea Show 2020.....	Miami Beach, FL	●
■ June 6-7.....	California International Airshow.....	Salinas, CA.....	●
■ June 6-7.....	Scott AFB Air and Space Show.....	Belleville, IL.....	●
■ June 13-14.....	Chippewa Valley Air Show.....	Eau Claire, WI.....	F-16
■ June 13-14.....	Ocean City Air Show 2020.....	Ocean City, MD.....	A-10
■ June 20-21.....	Memphis Air Show.....	Millington, TN	F-22
■ June 20-21.....	Youngstown ARB Thunder over the Valley	Youngstown ARB, OH	●
■ June 27-28.....	Warriors over the Wasatch.....	Ogden, UT.....	●
■ June 27-28.....	Vectren Dayton Air Show	Dayton, OH.....	A-10
■ July 1-5.....	Field of Flight Air Show & Balloon Festival.....	Battle Creek, MI.....	F-22
■ July 4-5.....	National Cherry Festival Air Show.....	Traverse City, MI	F-16
■ July 11.....	Pensacola Beach Air Show	Pensacola Beach, FL.....	●
■ July 11-12.....	Arctic Thunder Air Show 2020.....	Elmendorf, AK.....	F-22
■ July 18-19.....	Cold Lake Air Show	Alberta, Canada.....	●
■ July 18-19.....	Duluth Air & Aviation Expo.....	Duluth, MN.....	F-22
■ July 22.....	Cheyenne Frontier Days.....	Cheyenne, WY	●
■ July 25-26	Ellsworth AFB Air & Space Show.....	Ellsworth AFB, SD.....	●
■ July 25-26	Milwaukee Air & Water Show	Milwaukee, WI	F16 & F-22
■ August 1-2	Boeing Seafair 2020 Air Show.....	Seattle, WA.....	F-22
■ August 1-2	Grand Forks AFB Air Show	Grand Forks AFB, ND	F-16
■ August 15-16	Chicago Air & Water Show.....	Chicago, IL.....	●
■ August 15-16	Great State of Maine Air Show.....	Brunswick, ME	F-16
■ August 22-23.....	Northeastern PA Armed Forces Air Show.....	Avoca, PA.....	●
■ August 26.....	Atlantic City Air Show	Atlantic City, NJ.....	A-10
■ August 29-30	New York International Air Show	Newburgh, NY	F-22
■ August 29-30	Thunder over Michigan	Ypsilanti, MI.....	●
■ September 5-6	Kansas City Air Show	Gardner, KS.....	●
■ September 5-7	Cleveland National Air Show	Cleveland, OH.....	F-16
■ September 9-14	Maryland Fleet Week & Air Show Baltimore.....	Baltimore, MD	A-10
■ September 11-13.....	Airshow London.....	Ontario, Canada.....	●
■ September 19-20	NAS Oceana Air Show.....	Virginia Beach, VA	A-10
■ September 19-20	The Great Pacific Airshow.....	Huntington Beach, CA.....	F-16
■ September 25-27	MCAS Miramar Air Show	San Diego, CA	F-22
■ October 3-4	Minden-Tahoe Aviation Roundup.....	Minden, NV	●
■ October 3-4	Naval Base Ventura County Air Show 2020	Pt. Mugu, CA.....	F-16
■ October 9-11.....	San Francisco Fleet Week Air Show	San Francisco, CA	F-16
■ October 10-11.....	Edwards AFB - Aerospace Valley Air Show.....	Edwards AFB, CA.....	●
■ October 16-17.....	Blue Angels Homecoming Air Show.....	Pensacola, FL.....	●
■ October 17-18.....	Bell Fort Worth Alliance Air Show.....	Dallas, TX.....	A-10
■ October 24-25.....	Wings over North Georgia.....	Rome, GA.....	●
■ Oct. 30-Nov. 1.....	Lockheed Martin Space & Air Show	Sanford, FL.....	●
■ November 7-8.....	NAS JRB New Orleans Air Show	Belle Chasse, LA	F-22
■ November 14-15	Joint Base San Antonio Air & Space Show	San Antonio, TX.....	F-22

AIRSHOWS

SUN 'N FUN AEROSPACE EXPO

Lakeland Linder International Airport | Lakeland, FL
March 31-April 5, 2020
flysnf.org

We think of SUN 'n FUN in terms of the world-famous airshow, but that spectacular event also serves a greater purpose. It is the primary fundraiser for the Aerospace Center for Excellence (ACE)—a nonprofit education center operating in connection with Florida's official Air Museum with the expressed goal to “engage, educate, accelerate the next generation of aerospace professionals.” One of the primary ways they achieve this goal is by inspiring kids to become aviation enthusiasts early in life, and giving them the passion and tools to grow into professionals in the field. Their youth programs reach a staggering 50,000 students a year! So, while the event supports a great cause, all that would be for naught if it wasn't also a great show. In its 45 years of operation, it has grown into the second-largest airshow in the United States (after Oshkosh), and this year's event will feature nearly 40 performers, more than 500 exhibitors, and hundreds of thousands of attendees. Why not be among them?

THUNDER OVER LOUISVILLE

Kentucky Derby Festival | Louisville, KY
Saturday, April 18, 2020
thunderoverlouisville.org

Louisville's most prestigious sporting event—the Kentucky Derby—happens each year on the first Saturday of May, but the run-up to the most famous horse race in the world kicks off two weeks earlier with Thunder over Louisville. There, you can see Mustangs of a different sort, not to mention all manner of other wildlife, including Warthogs, Hornets, Eagles, Cobras, Falcons, Seahawks, and Raptors. Some might suppose the “thunder” in the name refers to the spectacular evening fireworks show, but the real thunder comes during the daytime airshow.



EAA AirVenture Oshkosh is the largest airshow in the country, and boasts more than 2,700 show planes—including flight demonstrations and ground tours of classics like this B-17 Flying Fortress.

PHOTO COURTESY OF EAA

30TH ANNUAL WW II WEEKEND—A GATHERING OF Warbirds

**Reading Regional Airport/
 Carl A. Spaatz Field | Reading, PA**
June 5-7, 2020
maam.org/wwii/ww2_sched.htm

Organized by the Mid-Atlantic Air Museum, the Annual World War II Weekend is exceptional in that it goes beyond the usual displays of planes and military equipment to include more than 1,700 re-enactors bringing the past to life. The Gathering of Warbirds draws a number of the organizations profiled in this article that tour with classic aircraft, performing demos and in many cases offering rides to attendees. The CAF's B-29, *Fifi*, makes an appearance as well as their other airworthy B-29, *Doc*. Joining the two Superfortresses are other planes from the CAF's AirPower squadron, the Collings Foundation, Yankee Air Force, American Airpower Museum, and a number of planes from the Mid-Atlantic Air Museum's own collection. All told, more than 50 WW II-era warbirds will take part.

EAA AIRVENTURE OSHKOSH

Wittman Regional Airport | Oshkosh, WI
July 20-26, 2020
eaa.org/airventure

Billed as “the World's Greatest Aviation Celebration,” over 600,000 enthusiasts from an estimated 80 different countries will gather at Oshkosh to enjoy a week of airshows featuring civil, military, modern, historic, aerobatic, and every other form of flight demonstration. There will also be forums, workshops, films, a special kids' program, the Experimental Aircraft Association (EAA) Museum itself, and much more. With over 2,700 show planes participating, it is the largest and most comprehensive airshow not just in the country, but in the world! An estimated 10,000 individual flights bring many of the attendees in by air. Add to that literally thousands of ride flights during the event, and for the week of the show Wittman becomes the busiest airport in the world. If you're only going to attend one airshow, then Oshkosh is probably the one to pick. ✈



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EYES IN THE SKY

The Smithsonian Institution's National Air and Space Museum is a repository of the country's most historic aviation artifacts. It has begun adding remotely piloted aircraft to its collection as drones have become a prominent part of the aviation community.

An inside look at the Smithsonian's National Air and Space Museum's modern drone collection BY PATRICK SHERMAN

In this special report from the Smithsonian Institution's National Air and Space Museum in Washington, D.C., Patrick Sherman of the Roswell Flight Test Crew sits down with curator Roger Connor to talk about the museum's rapidly expanding collection of modern uncrewed aircraft systems (UAS).



Roger Connor curates the remotely piloted aircraft collection at the Smithsonian Institution's National Air and Space Museum.

The Smithsonian Institution's National Air and Space Museum maintains two locations to store and display its collection. The first is located on the National Mall in Washington, D.C. This is widely recognized for its collection of aviation artifacts. Less well known is the Udvar-Hazy Center in Chantilly, Virginia. The aircraft on display include an SR-71 Blackbird, a Concorde supersonic transport, and the Space Shuttle *Discovery*.





PHOTOS COURTESY OF THE NATIONAL AIR AND SPACE MUSEUM

When he was designing the xenomorph for Ridley Scott's iconic 1979 science fiction-horror classic *Alien*, Swiss artist H.R. Giger omitted one feature shared by virtually every macroscopic life form on Earth: eyes. Interviewed later about his work, Giger said, "We came to the conclusion that a creature without eyes, driven by instinct alone, would be far more frightening. That's why I painted a second version of the alien that has no eyes."

When the word "drone" burst into the public consciousness during the wars in Afghanistan and Iraq in the early 2000s, it was associated with a singular aircraft: the MQ-1 Predator. Even apart from the fact that there was no pilot on board, its configuration was unfamiliar to the general public: straight, narrow wings, like a glider, for long endurance; a V-tail slung beneath the airframe; a pusher-type propeller at the rear; and, in front, a sleek, featureless dome.

Where the cockpit would have been on a crewed aircraft, there was nothing but

a smooth surface painted Air Force gray. Like Giger's alien, it had no eyes and—like the crew of the film's ship, *Nostromo*—the American public did not enjoy what it saw. Detractors labeled military drones "flying death robots," and to this day there remains deep suspicion about their potential abuse, whether launching lethal strikes abroad or conducting surveillance at home.

Nevertheless, the curators of the Smithsonian Institution's National Air and Space Museum recognized that military drones represented the dawning of a new era in aviation, and they knew they needed to begin collecting artifacts that reflected the change happening in the skies over America's distant battlefields.

"Before 2000, there had been some incidental inclusion of drones among our acquisitions, but no effort to systematically collect them," said Roger Connor, who curates the museum's Uncrewed Aircraft Systems (UAS) inventory. "After 9/11, it was clear that

When the National Air and Space Museum on the National Mall began a major remodel in 2016, the existing UAS display was carefully disassembled and placed into storage. When work is complete, drones will be featured even more prominently among its collection of artifacts.



The RQ-7 Shadow UAS *Scream Demon* is a part of the National Air and Space Museum's permanent collection of military drones. The platform first flew in 1991, and is based on an earlier Israeli design: the RQ-2 Pioneer. Operating as a brigade-level asset, the Shadow has flown for the U.S. Army and Marine Corps.

these were going to be a new reality in warfare, and we began the wholesale collection of Remotely Piloted Aircraft Systems [RPAS]," he said.

Among the early standouts in the National Air and Space Museum's efforts: Predator 3034, the first of its type to fire a Hellfire missile in combat. On October 7, 2001, it destroyed an enemy vehicle near Kandahar, Afghanistan. The sequence of events leading up to that strike began 24 years earlier, in the garage of a single-family home in the Hacienda Heights neighborhood of Los Angeles.

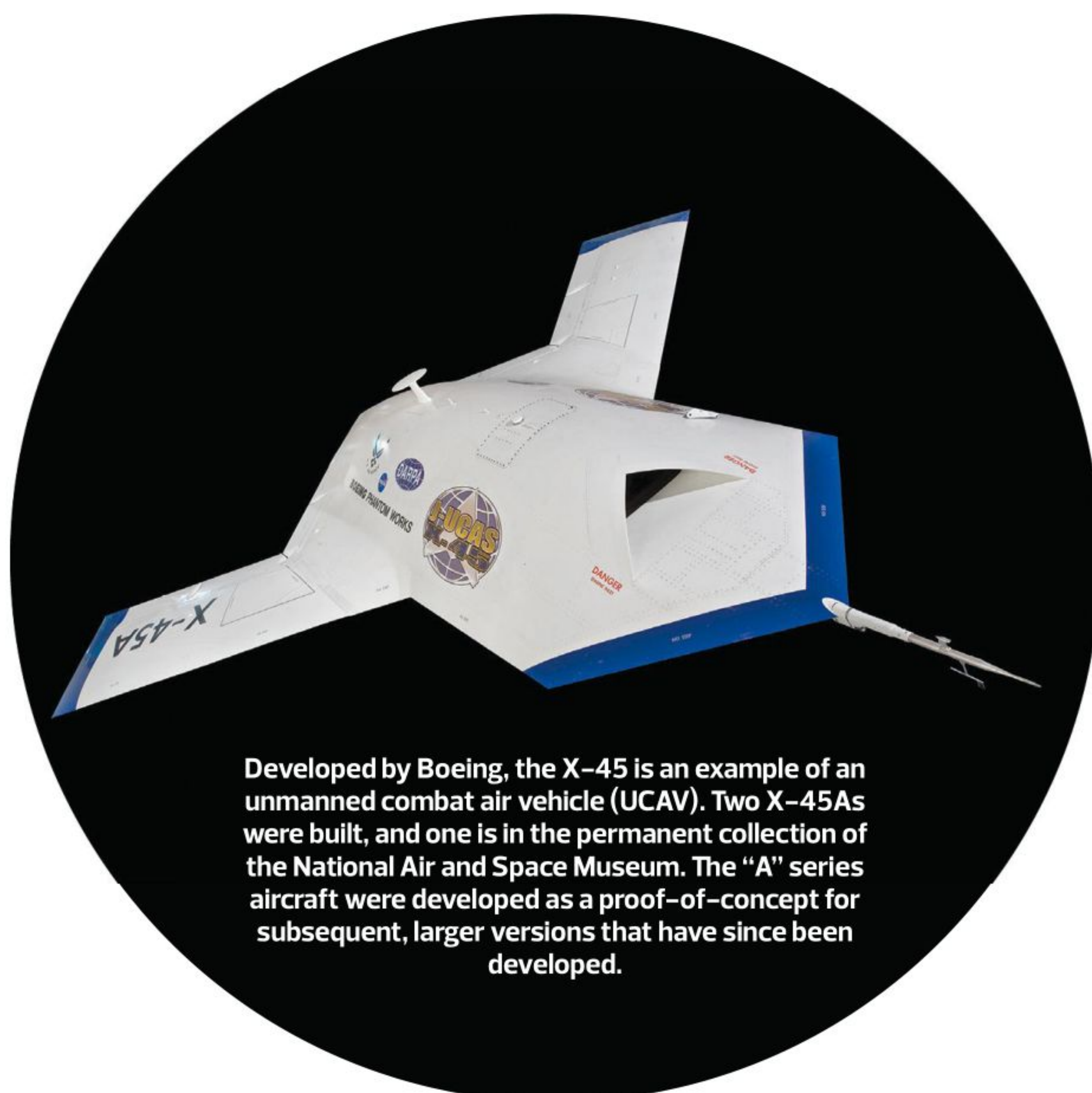
"The Dronefather"

Abraham Karem was born in Baghdad, Iraq, on June 27, 1937. Being Jewish, his family moved to the newly established state of Israel in 1951. Karem had a passion for aviation as a child, building model airplanes beginning at the age of 14 and serving as an instructor for his high school aero club. He became a private pilot and graduated from the prestigious Technion-Israel Institute of Technology with a degree in aeronautical engineering.

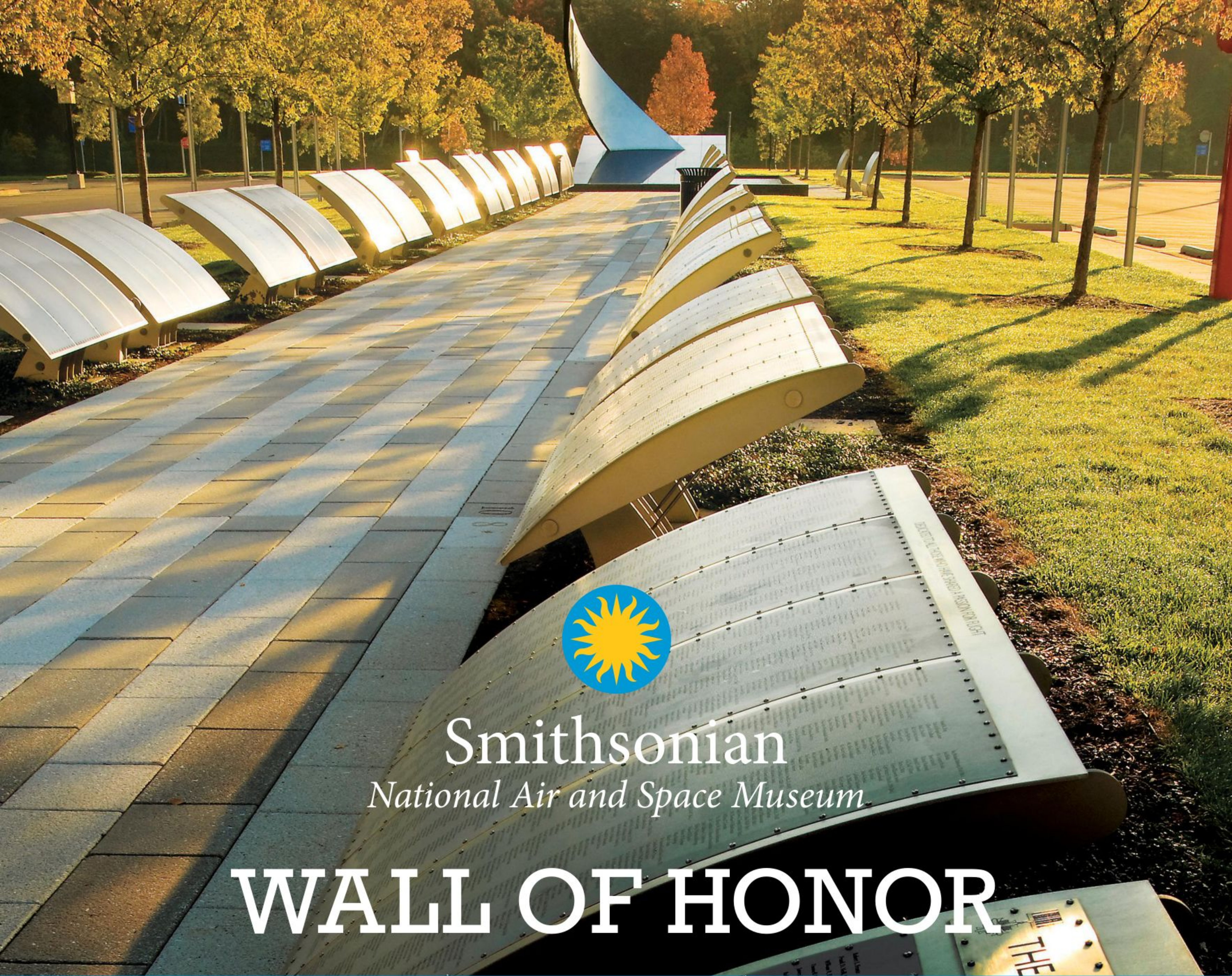
Karem did pioneering work on drone technology in Israel, but ultimately became disenchanted with the Israeli Defense Forces acquisition policies and moved his family to the United States in 1977. Working with a small team in his garage, Karem built a 200-pound drone with a television camera in its nose, capable of flying for 56 hours—a substantial achievement at the time. He named his creation "Albatross."

The United States' Defense Advanced Research Projects Agency (DARPA) paid for a series of test flights with the Albatross, and they came away so impressed that they funded the development of a second airframe by Karem, called "Amber." There was interest both from the U.S. Navy, looking to improve the accuracy of naval gunfire, as well as the U.S. Southern Command, which wanted to maintain persistent surveillance of the country's border with Mexico to interdict drug shipments.

However, none of those contracts



Developed by Boeing, the X-45 is an example of an unmanned combat air vehicle (UCAV). Two X-45As were built, and one is in the permanent collection of the National Air and Space Museum. The "A" series aircraft were developed as a proof-of-concept for subsequent, larger versions that have since been developed.



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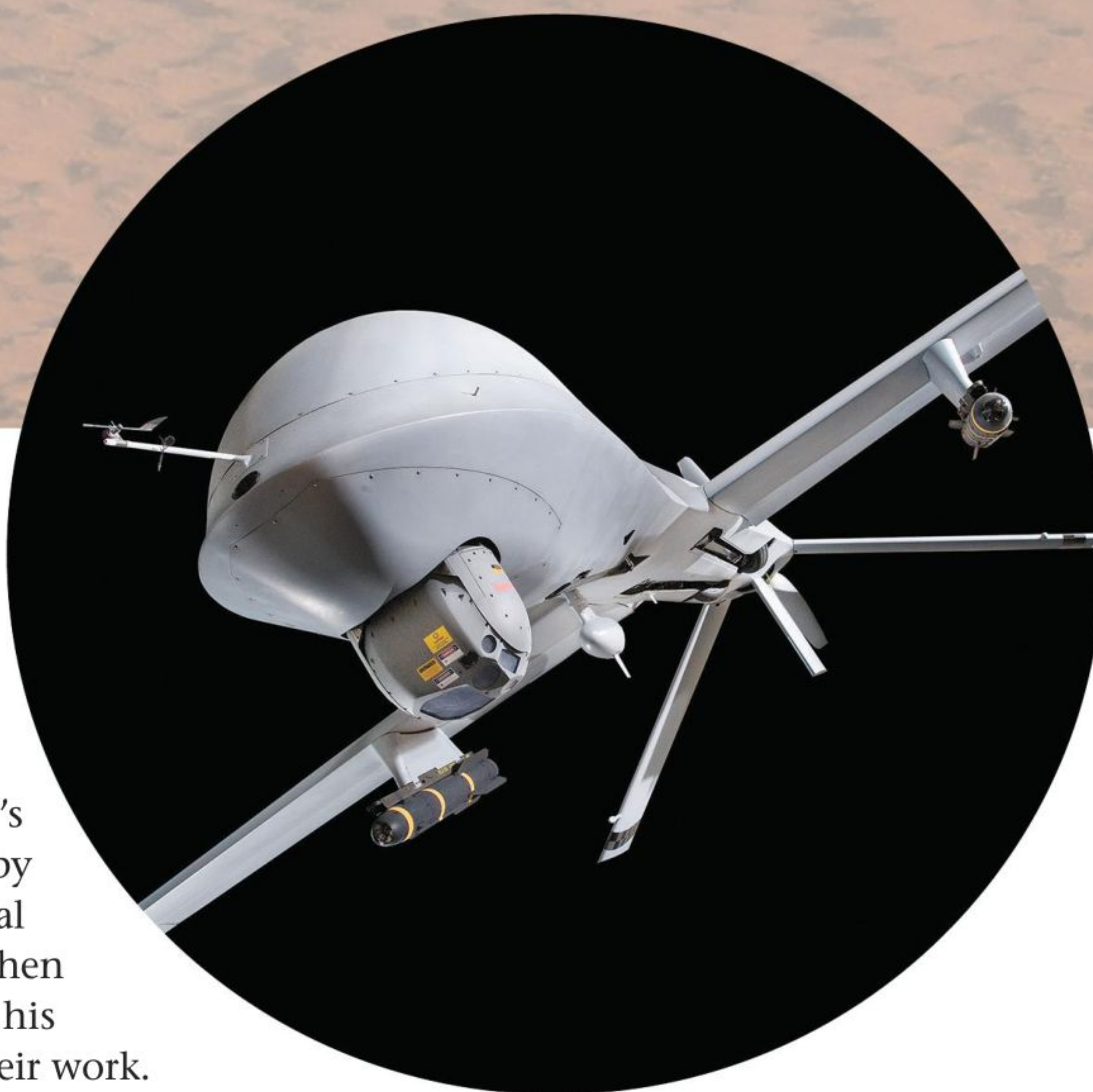
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PHOTO COURTESY OF THE U.S. AIR FORCE



materialized, and Karem's company was forced into bankruptcy. He, and his innovative designs, might have become a footnote to history, had his company's assets not been acquired by defense contractor General Atomics in 1990, which then hired Karem and eight of his colleagues to continue their work.

The following year, a brutal civil war erupted in Yugoslavia, fracturing the nation along ethnic lines. Then CIA Director James Woolsey sought a low-risk means of monitoring the conflict, and remembered Karem's groundbreaking work. The agency purchased two Gnat-750 drones—the immediate precursor to the Predator—from General Atomics, and deployed them in the skies over Bosnia.

The platform's greatest weakness proved to be the radio links that connected the remote pilots to the

aircraft, which limited how far it was able to fly from its home base. To address this issue, Karem incorporated a satellite antenna, enabling worldwide operations. However, to fit the new hardware on board the existing airframe required the addition of the distinctive dome on the nose of the aircraft.

Thus, the Predator was born, leading to Karem's eventual recognition as "the Dronefather," and cementing his place among the giants of American

Above: With two Hellfire missiles slung beneath its wings, an MQ-1 Predator drone patrols the skies over southern Afghanistan on a combat mission.

Left: The MQ-1 Predator 3034 was selected for the National Air and Space Museum's collection after becoming the first UAS in history to attack hostile forces, on October 7, 2001, near the city of Kandahar, Afghanistan.

PHOTOS COURTESY OF THE SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM



The RQ-14 Dragon Eye in the National Air and Space Museum's collection reveals ample evidence of its service overseas, including a bullet hole patched with epoxy and structural reinforcement using duct tape.

aeronautical engineering. He left General Atomics before the first flight of the Predator to found a new company, developing a UAS for the U.S. Army. His work was acquired by Boeing in 2004 and designated the A160 Hummingbird, only to be canceled by the Pentagon the following year.

At last report, Karem was still hard at work, developing a tilt-rotor aircraft the size of a 737, which he intends to compete with regional jets providing commercial air service between cities.

Suddenly, Drones!

"In the year 2000, there were only 90 remotely piloted aircraft in the entire U.S. military arsenal capable of conducting reconnaissance missions," said Connor. "Ten years later, there were 11,000 aircraft in the Department of Defense performing the same job."

These varied in size from the Predator—which is approximately the same size as a two-seat general aviation aircraft—to

hand-launched models that would not look out of place at a local Academy of Model Aeronautics flying site.

"One of the smaller UAS we've received is an RQ-14 Dragon Eye, which flew in Afghanistan," Connor explained. "It's got a bullet hole in it, and they repaired it in the field using duct tape."

Built by AeroVironment, the Dragon Eye had its first flight in June 2001 and deployed with the U.S. Marine Corps in 2002. Launched by hand or using a bungee cord, the Dragon Eye appears almost comically simplistic, with twin electric motors turning 8-inch props; a broad, flat wing, 45 inches across; an oversized, rudderless vertical stabilizer; and no horizontal stabilizer at all. You might expect to see the same general configuration rendered in crayon by a young child who recently attended an airshow for the first time.

In spite of its primitive appearance, 6,000 Dragon Eyes were deployed at a cost of \$80,000 each, because they performed a critical function: Giving commanders of small units in the field the ability to look beyond the next hill and scout enemy positions. Remarkably quiet owing to its electric propulsion, the Dragon Eye had a maximum range of six miles, a cruising speed of 40 miles per hour, and a maximum endurance of one hour. It carried visible light and thermal imaging cameras, transmitting live video back to the operator.

Alongside hand-launched fixed-wing platforms, small uncrewed rotorcraft were also being deployed in Afghanistan and Iraq, including the RQ-16 T-Hawk. Named for the tarantula hawk—a wasp species that preys on large spiders—the T-Hawk uses a gasoline-powered engine to turn a single ducted fan mounted in the center of the airframe. Stability and flight maneuvers are achieved by means of louvers that direct the thrust developed by the propeller.

"The T-Hawk was deployed with EOD [explosive ordnance disposal] units. They would use it to check out disturbed earth or suspicious items along the road, which could conceal IEDs [improvised explosive

In addition to the U.S. military, a total of 18 RQ-16 T-Hawks were also deployed with the British Armed Forces as part of the Talisman Suite of Counter-IED equipment.



devices],” said Connor. “One thing about the T-Hawk is that it’s loud. It’s basically a flying lawn mower. I asked if the noise was a problem during their operations, but it turned out they were actually drilling holes in the propeller blades to make it even louder. Apparently, when the enemy heard it coming, they pulled back,” he said.

With a range of six miles, a 40-minute endurance, and a gross takeoff weight of 20 pounds, the T-Hawk is designated a micro air vehicle (MAV) as part of the Army’s Future Combat System (FCS). The Honeywell Corporation began development of RQ-14 in 2003 with \$40 million from DARPA. The first units were deployed to Iraq in 2007, equipped with optical and thermal imaging cameras.

“In 2011, several T-Hawks were sent to Japan following the disaster at the Fukushima Daiichi nuclear power station,” Connor said. “There was so much radiation in the immediate vicinity of the plant it was impossible for people



The RQ-16 T-Hawk on display at the National Air and Space Museum saw duty with an explosive ordnance disposal (EOD) team overseas, prior to joining the Institute’s permanent collection. Subsequent generations of the same aircraft type remain in use by the military today.



to safely get close enough to see what was happening, so having drones available made a big difference.”

On the Home Front

The T-Hawk had proven that small UAS could have civilian applications, far from the battlefield. Ironically, in the United States and Europe, hobbyists—not the aerospace industry—were among the first to explore that potential.

Having founded the Roswell Flight Test Crew the year before, it was in 2011 that I flew my own homebuilt drone alongside

firefighters for the first time, drawing the notice of national public safety officials. Still, it came as quite a shock when an executive from Honeywell called me to discuss the domestic use of drones—conclusive proof that, along with other pioneering hobbyists, we were in the vanguard.

During that same period, changes were happening at the National Air and Space Museum as well, according to Connor.

“In 2012 and 2013, I took over the curation of our UAS collection, and we switched from focusing exclusively on

Weighing less than 55 pounds, the ScanEagle is categorized by the U.S. military as a long-endurance, low-altitude UAS. It is equipped with visible light and thermal imaging cameras, mounted on a gimbal at the nose of the aircraft.



Following successful deployment in Afghanistan and Iraq, the Insitu ScanEagle was repurposed for commercial operations in the United States. This particular aircraft, now part of the National Air and Space Museum's permanent collection, was the first to conduct beyond visual line of sight (BVLOS) flight operations with FAA approval in the contiguous 48 states.



Seen here behind the scenes at the National Air and Space Museum is the DraganFlyer X4-ES, the first small, civilian UAS credited with saving a human life during a 2013 search and rescue operation in the Canadian province of Saskatchewan.

This hexacopter, designed and built by Australian-based start-up Flirtey, earned its place in the National Air and Space Museum's permanent collection by completing the first-ever delivery by drone in the United States.

military drones to acquiring civilian systems as well," he said.

Among the first civilian UAS added to the museum's collection was DraganFly's DraganFlyer X4-ES. Developed by company founder and creator of the world's first quadcopter, Zenon Dragan, of Saskatoon, Saskatchewan, DraganFly's early multirotor platforms became the first ever to save a human life. In 2013, outside the tiny rural community of St. Denis, a nighttime rollover car crash left the injured driver wandering aimlessly through the snowy landscape. When search and rescue teams on foot and

a crewed helicopter equipped with a night vision system were unsuccessful in locating the driver, the Royal Canadian Mounted Police launched an X4-ES equipped with a thermal imaging camera, which located the victim, huddling under a tree.

"The doctors said he was an hour or two away from dying of hypothermia," said Dragan, recalling the episode in news reports.

Another history-making aircraft Connor acquired for the museum is the hexacopter developed by Australian manufacturer Flirtey; it completed the first cargo delivery mission in the United States. On July 17, 2015, the aircraft lifted off from a pharmacy in Wise County, Virginia and flew 35 miles to a rural clinic and dropped off medicine for local patients.

Connor also counts among his trophies a ScanEagle: a long-endurance, low-altitude platform developed by Insitu, which is a Boeing subsidiary based in the Columbia River Gorge on the border between Oregon and Washington State. Designed for military applications, the ScanEagle built upon Insitu's work on a previous platform, the SeaScan, which was created to gather weather data and help fishers track schools of tuna.

The first ScanEagle was deployed in Iraq in 2004, and it remains in active military service today. Then, in 2016, the Federal Aviation Administration (FAA) granted the platform a type certification, permitting its use in commercial operations in the United States. Applications have included oil and gas exploration, wildlife monitoring, and battling forest fires.

"The aircraft that we received was the first one to receive approval from the FAA to fly beyond visual line of sight in the lower 48, doing railroad right-of-way inspections for Burlington Northern Santa Fe as part of the Pathfinder program," said Connor.

The Best of the Best

Another landmark UAS that Connor has added to the museum's collection are



the N500VD quadcopters used by San Diego Gas & Electric to conduct the first FAA-approved utility line inspections, beginning in 2014. The system was developed by InstantEye Robotics of Andover, Massachusetts, and cost \$6,000. The quads replaced crewed helicopters that had previously been used to perform the inspections—saving money, noise pollution, carbon emissions, and risk to pilots' lives.

There is even a celebrity among the drones Connor has acquired: the Amazon Prime Air VTOL platform featured in the 2015 advertisement featuring *Top Gear* television host Jeremy Clarkson. In it, Clarkson deploys his dry wit to describe how Amazon will use UAS to make deliveries within 30 minutes or less—saving the day when the family dog chews up a young girl's soccer shoes ahead of a big match.

"Right now, we're talking to Zipline," Connor said, referring to the California-based company transporting medical supplies by drone to rural villages in Africa. "We're always open to hearing from folks, but there are so many firsts in the drone industry that we need to be pretty selective in terms of what we are taking for our collection," he said.

However, even representing the Smithsonian Institution, Connor reported that there are still some artifacts he would like to acquire, but has not yet succeeded in getting.

"I would like to see if I can get a Yamaha R-MAX," he said, referring to the 200-pound, gas-powered single-rotor helicopter developed by the Japanese industrial giant in the 1990s. It was specifically created for precision crop dusting over the small plots of farmland that dot the island nation's countryside.

In addition, the R-MAX has been fitted with cameras and other sensors for aerial surveys, photography, academic research, and military applications. The R-MAX flew alongside the T-Hawk to assess damage to the Fukushima Daiichi nuclear power plant following the 2011 Tohoku earthquake and tsunami. It had previously been used to observe the



A technician at the National Air and Space Museum carefully inspects an Amazon Prime Air drone donated to the Institution after being featured in an advertisement alongside British presenter Jeremy Clarkson, best known for hosting *Top Gear*.



California-based Zipline is currently using UAS in Rwanda and Ghana to deliver blood for transfusions as well as vaccines and other medicines to remote villages. Here, a Zipline technician carries one of the company's drones back to the hangar.



IMAGE COURTESY OF YAMAHA CORPORATION

The R-MAX was developed in the 1990s by Yamaha to perform precision crop dusting on small parcels of Japanese farmland. The airframe has since logged more than two million flight hours and been deployed across a range of applications, including remote sensing, aerial photography, and scientific research.

eruption of Mount Usu in the spring of 2000. The R-MAX provided valuable scientific data that would have been impossible to gather otherwise, such as the buildup of volcanic ash and the accurate prediction of mudslides.

The Future and the Past

“One of the great things about this job is that you are in a unique position,” said Connor. “You get to be a bridge between the past and the future. You talk to these people who are doing amazing things with drones, but they don’t necessarily understand what has come before, and how they fit into the sweep of history.”

As an example, he cited urban air mobility and the autonomous platforms under development by Airbus, Bell, eHang, Volocopter, and many others, to carry passengers above traffic-clogged streets and highways to their specific destination. It represents the cutting edge of electric-powered VTOL [vertical takeoff and landing] development, but according to Connor, the idea goes back to the 1940s.

“Back then, the idea was that everyone would have a helicopter in their garage,”

he said. “Obviously, it didn’t work out that way, but it’s still useful to understand the history. For example, most people don’t remember that in 1965, 1.25 million people moved by helicopter airline services.”

That tension, between illuminating the past and inspiring the future, lies at the heart of the National Air and Space Museum’s mission—and the institution itself is changing to keep pace with the times. In 2016, the UAS exhibit at the west end of its National Mall location was dismantled and packed away as part of a major remodel.

“One of our new galleries is going to be titled We All Fly, Connor said. “It’s going to look at noncommercial access to aviation, including home builders, general aviation, and hobbyists. We are also going to introduce an innovation gallery that will focus on the latest developments, like autonomy and urban air mobility, and ask questions like, ‘How much autonomy should we embrace?’ and, ‘Who benefits from urban air mobility?’”

According to Connor, drones will continue to be an important and growing focus of the museum’s collection as well.



Prior to beginning a major remodeling project in 2016, the National Air and Space Museum displayed several of its most prominent military UAS together in a gallery at the west end of its building on the National Mall.

“As a historian, I will admit to a certain degree of skepticism regarding the development of UAS,” he said. “It’s our job to distinguish between rhetoric and reality, but I’m continually surprised by how fast this industry is moving forward.”

While continuing to ask important social and ethical questions, Connor believes the institution also has a role to play in helping the public grasp the real-world capabilities, and limitations, of UAS technology.

“We want to make this subject accessible. We want to educate the public—ease apprehension and grow understanding” he said. “People will be a lot more comfortable if they understand the beneficial applications drones are making possible, and that isn’t a message they get on the evening news.”

Perhaps Connor’s greatest hope for the future is the impact the drone revolution is having on the next generation of aviators, innovators, and entrepreneurs.

“Ten to 15 years ago, I would see young people going into aviation get disillusioned almost immediately,” he said. “Just over the past several years, we’ve seen more excitement and interest around this field than at any time since the 1950s and 1960s.”

Connor concluded, “There are opportunities for individuals, people who have good ideas, to come in and really change the whole industry. Today, young people can doodle something in their notebook and make it real. That’s what makes this an extraordinary moment in the history of flight.” ✚

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During a mock dogfight in the sky over England, *Black 2* chases *Big Beautiful Doll*. In a close-in, hard-turning, low-speed dogfight, the 109 would outmaneuver the Mustang because its roll rate and low-speed characteristics are superior. (photo by John Dibbs/planepicture.com)

FLYING THE Bf 109

Two pilots give their reports

BY MARK HANNA AND CAPT. ERIC BROWN | PHOTOS BY JOHN DIBBS

The Bf 109 is, without a doubt, the most satisfying and challenging aircraft I have ever flown. So how does it fly and how does it compare with other WW II fighters?



To my eye, the aircraft looks dangerous, both to the enemy and to its own pilots. Its “difficult” reputation is well-known, and right from the outset, you are aware that it needs to be treated with a great deal of respect.

As you walk up to the 109, you are at first struck by its small size, particularly if it is parked next to a contemporary American fighter. Closer examination reveals a crazy-looking, knock-kneed undercarriage, a very heavily framed, sideways-opening canopy with almost no forward view in the three-point attitude,

a long rear fuselage and tiny tail surfaces.

A walk around reveals ingenious split radiator flaps and ailerons with a lot of movement and rather odd-looking external mass balances. It also has independently operating leading-edge slats. These devices should glide open and shut on the ground with the pressure of a single finger. Other unusual features include the horizontal stabilizer that doubles as the elevator trimmer and the complete absence of a rudder trim system. Overall, the finish is a strange mix of the innovative and archaic.



One of the few remaining airworthy Bf 109s in the world is D-FEHD, a G-10 model that belongs to the Old Flying Machine Co. It was restored by Hans Dittes. (photo by John Dibbs/planepicture.com)

To enter the cockpit, you climb on board and gently lower yourself downward and forward while holding on to the windscreen. Once inside, you are almost lying down, as you would be if driving a racecar. The cockpit is narrow, and if you have broad shoulders (don't all fighter pilots?), it is a tight squeeze. Once strapped in—itsself a knuckle-rapping affair—you can take stock.

First impressions are of its simplicity. From left to right, the co-located elevator trim and flap trim wheels fall easily to hand. You need several turns to get the flaps fully down to 10 degrees, and the idea is that you can crank both together. In practice, this is a little difficult, and I tend to operate them independently.

Coming forward, you see the tailwheel locking lever. This either allows the tailwheel to caster or it locks it dead ahead. Next is the throttle quadrant, which consists of a huge throttle handle and the manual propeller pitch control. Forward and down on the floor is an enormous and very effective Ki-gas primer with a T-shaped handle. Directly above this and in line with the canopy seal is the red hood jettison lever. Pulling this releases two very strong springs in the rear part of the canopy and causes the rear section to come loose and, therefore, the whole main part of the hood is unhinged and can be pushed away into

the airflow. Looking directly forward you see, clustered together, the standard instrument panel with the vertical-select magnetos on the left, starter and booster coil slightly right of center, and engine instruments all grouped on the right-hand side. This aircraft's instrumentation is all German, apart from the altimeter.

The center console under the main instrument panel consists of a 720-channel radio, VOR, ADF and E2B compass. Just to the left of the center console, close to your left knee, is the undercarriage up/down selector and the mechanical and electrical undercarriage position indicator. On D-FEHD, this is a two-button selector. Select the undercarriage up or down position by lifting the guard and simply pushing the relevant button. Radiator flaps are controlled by a four-position selector—"Zu," "Auf," "Auto," and "Ruhe" (rest).

The right side of the cockpit has the electrical switches, battery master, boost pumps, pitot heat, and that's it! There is no rudder trim or rudder pedal adjust; also, the seat can be adjusted only during preflight and offers a choice of only three settings. If you are any bigger than me (six feet tall), it all starts to get a bit confined. Once you are strapped in and comfortable, close the canopy to check your seating position. If you haven't flown the 109 before, you usually get a



COMBAT WARRIOR

THE HISTORICAL VIEW BY CAPT. ERIC BROWN

The Bf 109 came about in very strange circumstances. On February 26, 1935, when the clandestine Luftwaffe officially came into being, it had already issued a requirement for a single-seat, high-speed fighter. This had been sent to three established aircraft manufacturers but not to Professor Willy Messerschmitt's company. Nevertheless, Messerschmitt was eventually invited to submit a design, probably owing to the intervention of famous WW I ace Ernst Udet and the influence of Rudolf Hess, who was a lifelong friend of Willy Messerschmitt.

A NEW FIGHTER COMPANY FOR A NEW LUFTWAFFE

The Messerschmitt design was the unique Bf 109—a cantilevered, low-wing monoplane built of metal with a flush-riveted, stressed skin. The oval-section, monocoque fuselage had an enclosed cockpit; the single-spar wing had automatic leading-edge slats, and the inboard portions of the trailing edge carried slotted flaps. The narrow-track landing gear retracted outward into the wing, but the tailwheel was fixed. Although designed around the 610 hp Junkers Jumo 210A 12-cylinder, inverted-vee, liquid-cooled engine, the prototype was, unbelievably, powered by an imported 695 hp British Rolls-Royce Kestrel V. The first flight was made in early September 1935, and in October, it competed in the comparative trials of the four different fighters.

The second prototype flew in January 1936 with the Jumo 210A, and the third flew in June 1936. These models carried two .30-caliber (7.9 mm) machine guns above the engine cowl. In all, 13 prototype and preproduction aircraft were built before 1938; the main differences between them were armament, engines and propellers.

By autumn 1936, the choice for the new Luftwaffe fighter was between the Messerschmitt Bf 109 and the Heinkel He 112. As inspector of fighters, Lt. Colonel Udet was responsible for the final decision. He tested both types himself and found little to choose between them. He was, however, convinced that the angular and structurally lighter 109 would be easier to mass produce, so the die was cast. Although the test pilots at Rechlin Test Center preferred the Heinkel, the decision in favor of the Messerschmitt was made before their tests had been completed.

THE RACE FOR SPEED IS ON

There then followed an extraordinary series of one-upmanship flights between the two competing companies. On November 11, 1937, Dr. Hermann Wurster—Messerschmitt's chief test pilot—set a new world speed

record of 384mph (620km/h) in a Bf 109 with an uprated DB 601A engine that could produce 1,650 hp for a very short period. Meanwhile, Dr. Heinkel had been redesigning the He 112 and had come up with the He 113, which, for some unknown reason, was redesignated the "He 100." In the summer of 1938, Udet visited the Heinkel facilities in Warnemünde to fly the He 100, and on June 6, he casually increased the world speed record to 394mph (634km/h). On March 30, 1939, however, the Heinkel chief test pilot Dieterle reached 463mph (746.6km/h).

Meanwhile, Messerschmitt had designed the Me 209. This version of the 109 had been specially modified to break the world speed record, and chief test pilot Fritz Wendel did this on April 26, 1939, at Augsburg with 469mph (756km/h). The official world record book gives the record to an Me 109R (research) aircraft, as the Germans were keen to associate the top speed with their Luftwaffe fighter. Because the He 100 had made its record run at sea level and the Me 209 had flown over the much higher elevation of Augsburg, it had a 9mph (13km/h) advantage, and Dr. Heinkel said he intended to fly the He 100 at the same (higher) level. Udet, however, forbade any further record attempt, since the Nazis wanted the world to believe that the Luftwaffe had a world record-beater in service, which was, of course, far from the truth.

The first Bf 109B-1s with 635hp Jumo 210D engines and wooden propellers went into service in 1937, and in the same year, 24 109B-2s with 640hp Jumo 210Es and metal propellers were delivered to the Luftwaffe's Condor Legion, which supported General Franco in the Spanish Civil War. The Bf 109C was similar to the 109B-2 but carried more armament; the D version made a significant change to the 960 hp Daimler-Benz DB 600A engine and an armament of two .30-caliber (7.9 mm) machine guns plus an engine-mounted 20 mm cannon that fired through the airscrew spinner.

REAL PRODUCTION BEGINS

The first major production version of the fighter was the Bf 109E (popularly known as the "Emil"), and it was powered by a 1,100 hp DB 601A with direct fuel injection and improved superchargers. Its engine no longer had a manual, supercharger-shifting mechanism that the pilot had to manage continuously to maintain maximum power as his altitude changed in combat. The Emil's DB 601A engine had an infinitely variable, automatic, hydraulic supercharger transmission that completely relieved the pilot of that onerous duty. The pilot could now concentrate completely on the outside.



The Bf 109E was the first mass-production variant of the 109 series. By January 1940, it had displaced all previous models with 1,540 aircraft produced and 540 in Luftwaffe front-line inventory. The controls, however, became very heavy above 400mph, and this was a deficiency when it was in combat with the Spitfire, which had low, user-friendly, control maneuvering forces throughout its fight envelope. (courtesy of Warren Bodie)

The first prototype for the Emil series appeared in the summer of 1938, and the first production aircraft were put into service in December of that year. By the outbreak of WW II (September 1939), the Luftwaffe had 1,060 Bf 109s of various types.

Willy Messerschmitt wanted to enhance performance by saving weight, and that meant compromising the plane's structural strength. This resulted in accidents during training but was even more evident in operational service, in which the high G-loads of combat led to basic wing failures. Its major design weakness, however, lay in its narrow-track landing gear, which gave it a tendency to ground loop; that was exacerbated by the castering of the tailwheel in the ground attitude when the resultant ground loop could not be stopped with harsh braking and full deflection of the rudder. I feel certain, too, that the landing gear's being slightly splayed outward aggravated the ground looping tendency and contributed to the excessive tire wear and bursts. The Spitfire had a similar, narrow-track landing gear, but it was not splayed out like that of the Bf 109, and the Spitfire didn't show any

ground-looping propensities. In 1939, these problems caused damage to 255 Bf 109s (only 14 percent were damaged during training). Sixty-three percent of the damaged aircraft were Emils, and as a result, a tailwheel lock was fitted to later models.

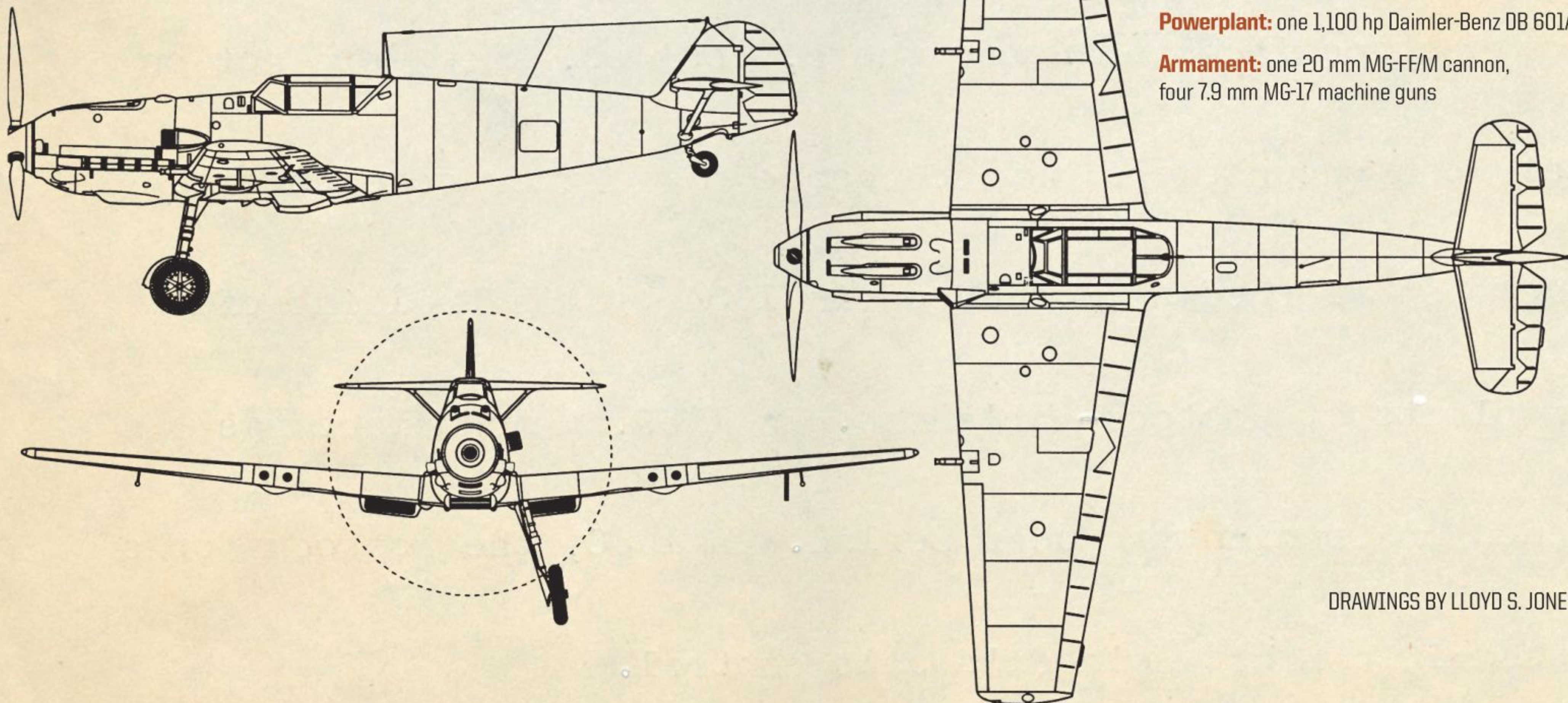
Another problem that arose in training was the difficulty encountered by young, inexperienced pilots in night flying. Owing to the Bf 109's limited forward view and the tendency of its wing slats to snatch in and out near the stall, any flare to land that was held too long and made too high above the ground could result in a wing drop: in severe cases, this could end in a cartwheel when a wingtip dug into the ground.

Because of the frequency of the accidents, a tandem, two-seat, trainer version was eventually developed, and in mid-1945, I had the opportunity to fly this Bf 109G-12.

Once, I was foolish enough to fly it solo from the rear seat; my view for landing was virtually nil, and I had to make three passes before I arrived back in one piece—and this in broad daylight! This airplane must literally have been an instructor's nightmare because the view from the instructor's cockpit was by a periscopic sight—a case of the blind truly leading the blind.

WW II PUTS THE EMIL'S FEET TO THE FIRE

WW II began well for the Luftwaffe against Poland and the Low Countries, where the German fighters rapidly established air superiority. Against France, they ran into potentially sterner opposition in the Dewoitine



Messerschmitt Bf 109E

Wingspan: 32 ft., 4 in.

Length: 28 ft., 4 in.

Maximum speed: 359mph at 12,000 ft.

Powerplant: one 1,100 hp Daimler-Benz DB 601A

Armament: one 20 mm MG-FF/M cannon, four 7.9 mm MG-17 machine guns



clout on the head as you swing the heavy lid over and down. Nobody sits that low in a fighter!

D-FEHD has a beautiful “Galland hood” that offers a much improved view compared with the earlier, heavier frame canopy.

Up, up, and away—almost

It’s getting close to going flying now! OK; open the hood again (in case you have to get out in a hurry). To start, power ON, boost pumps ON. Five good shots on the primer. Set the throttle to IDLE. Energize the starter; when the pitch of its noise reaches its apex, press the starter button. It’s a good starter, and with a brief snort of flame, the 109 fires up immediately.

Check the oil pressure right away to ensure that it is rising, idle initially at 700 rpm, then gently go up to 1,000 rpm, and the whole aeroplane starts to rock from side to side on the gear with some sort of harmonic. This is a most unusual sensation and it is good fun!

After the start, you are immediately aware that the airplane rattles. The engine

canopy and reduction gear all give off little vibrations and shakes that transmit directly to the pilot. Check the red flaps control to “Zu.” Check that they close together. Reopen them now to delay the coolant temperature rise. The 109 needs a lot of power to get moving, so you need to allow the engine to warm up a little before you pile on the power. Throttle up to 1,800 rpm and suddenly, you’re rolling; power back. To turn while taxiing, push the stick forward against the instrument panel to lighten the tail, add some throttle and a jab of brake (do this in a Spitfire and you’re on your nose!). The 109, however, is very tail-heavy and is reluctant to turn; you can very easily lock up a wheel. If you do not use the above technique, you will charge off across the airfield in a straight line!

Forward view is appalling, and because of the tail/brake arrangement, this makes weaving more difficult than on other, similar types. By the time you are at the end of the strip, the aircraft is already starting to get hot. So, quickly on with the run-up.

In the early spring of 1944, Bf 109G-10 production replaced Bf 109G-6 production. The G-10 was to use the DB 605B series engine, which had an increased-diameter supercharger and a raised compression ratio. (photo by John Dibbs/planepicture.com)

I'm sitting as high as I can, and my head is touching the canopy. I am not wearing goggles, as they scratch and catch the hood if they are up on your head. A large bone dome is out of the question and, in my opinion, is a flight safety hazard in this aircraft.

Hood positively locked; push up on it to check. Oil temperature is 50 degrees, coolant temperature is greater than or at 70 degrees. Brakes ON (there is no parking brake), stick back, and power gently up to 30 inches and 2,100rpm. Exercise the prop at least twice, with the rpm falling back to 1,800 each time; keep an eye on the oil pressure. The noise and vibration levels have now increased dramatically. Power back to 1,800 rpm and check the mags. Insignificant drop on each side. You must hurry, as the coolant temperature is at 98 degrees C and going up; you have to get rolling to get some cooling air through the radiators. Pre-takeoff checks: elevator trim set to +1 degree, no rudder trim, throttle friction tight. This is vital, as you will need your left hand for various services immediately after takeoff. Mixture is automatic, pitch

to fine. Fuel cock is ON, both boost pumps are ON, pressure is good, primer is locked. Flaps crank down to 20 degrees for takeoff. Radiator flaps checked at full open; if you take off with them closed, you will certainly boil the engine and are guaranteed to crack a head. Gyros set to Duxford's runway. Instruments: temps and pressures all in the green for takeoff. Radiator is now 102 degrees. Oxygen, you don't have; hood rechecked down and locked; harness tight and secure; hydraulics—no check. Controls full and free, tailwheel locked. Got to go—105 degrees.

There's no time to hang around and worry about the takeoff. Here you go!

Airborne

Power gently up and keep it coming smoothly up to 40 inches. Keep the tail down initially, and keep it straight by feel rather than any positive technique. Tail is coming up now, and the rudder is becoming effective. I'm subconsciously correcting the rudder all the time. It's incredibly entertaining to watch the 109 lift off the ground; the rudder literally

PHOTO BY JOHN DIBBS/PLANEPICTURE.COM





D.520, but France had too few for them to make any real impact. By early May 1940, the six British squadrons of Hawker Hurricanes in France had been increased to 10, and although they put up a good fight, they were not quite a match for the 109E in performance, firepower, or numbers. As they were withdrawn to Britain at the end of May, Spitfire Mk 1s appeared for the first time to cover the evacuation of British ground troops at Dunkirk. This new fighter must have come as a major shock to the Luftwaffe because up to 25,000 feet, the Spitfire could outmaneuver and outperform the Emil. The balance was not all in favor of the British fighter, however, because the 109E had superior firepower, performed better above 25,000 feet and could outdive the Spitfire.

THE SECRET IS OUT AND ITS FAULTS ARE FOUND

While all this was happening, on November 22, 1939, a Bf 109E-3 made a forced landing at Woerth in France. It turned out to be an event of some significance. After being flight-tested by the French Air Force at Orleans/Bricy airfield, it was handed over to the RAF (Amiens, May 2, 1940) and arrived at RAE Farnborough, England, on May 14, for tests—a series of trials that lasted until September 20. These revealed valuable information about its strengths and weaknesses and were passed on to frontline RAF squadrons.

From the handling viewpoint, the Bf 109E had two pluses and four minuses. On the credit side, it had a steep angle of climb that made it difficult to follow, and it could also bunt into a dive without its direct-injection engine cutting out under the negative G, thus leaving a pursuing British fighter behind as its carburetor-fed engine faltered. On the downside, the 109 had poor harmony of control: no rudder trimmer, which meant it was easy to inadvertently pick up skid and ruin one's sighting aim; in tight turns, the slats snatched open, giving lateral twitching and again ruining the pilot's aim. Finally, when the speed was allowed to build up rapidly in a dive, the elevators became increasingly heavy until at 440mph, they became virtually immovable.

This timely analysis of the Emil's handling was made available to the RAF before the Battle of Britain, and it stood the British pilots in good stead because they were up against some experienced pilots who had fought in the Spanish Civil War. The Bf 109E acquitted itself reasonably well in spite of its escort duties (it was assigned to protect the slower German bombers) and the psychological effect of fighting over enemy territory at almost its extreme radius of action. Its stablemate, the Bf 110, was, however, proving useful in the escort role but was a failure as a fighter/bomber, and this resulted in some of the E-series being fitted with bomb racks that could be jettisoned, much to the dismay of their pilots.

In fact, the Bf 109 later proved itself a useful fighter/bomber in conflicts such as in the May 22, 1941, Battle of Crete, in which the British cruiser *Fiji*, escorted by destroyers and withdrawing to Egypt, was severely damaged by a 109E carrying a single 500-pound bomb. The German pilot then summoned another Emil fighter/bomber that scored a direct hit and sank the cruiser.

MOTHER RUSSIA AND NORTH AFRICA MEET THE BF 109E

In June 1941, the 109E figured prominently and with great success in the invasion of the Soviet Union and became associated with the highest-scoring of all fighter pilots, Erich "Bubi" Hartmann (352 kills). With the onset of the Russian winter, it was subjected to the harshest of environments, and its serviceability did not match that of the Focke-Wulf Fw 190. It also showed itself vulnerable to landing problems on Russia's uneven airfields and airstrips.

In early fall 1941, the Emil was subjected to the other end of the climatic scale when a unit equipped with the Bf 109E-4/Trop was based in North Africa. Again, this ubiquitous fighter became closely associated with the most famous German pilot of the North African campaign: Lt. Hans Marseille. Before his untimely death at 22 years of age, Marseille shot down a record 158 aircraft—all flown by British pilots—in less than two years of combat.

The 109 reacted better to heat than to cold, but the Daimler-Benz engine was prone to overheating if running up or taxiing was prolonged.

The Bf 109 was the most prolific fighter aircraft, but was this because it was an aerodynamic masterpiece or because of political decisions? An analysis of its aerodynamic efficiency shows high skin-friction drag and high drag of its exposed parts, especially those of the engine. Politically, the Nazis had a very short time from rising to power to implementing their aggressive plans, so a rapid buildup in Luftwaffe fighter strength was necessary to ensure air superiority, and the Bf 109 was highly suitable for mass production. Proof of this is evident in that the Luftwaffe had only 171 Bf 109s a year before the outbreak of WW II yet had 1,060 a year later.

FLYING THE EMIL

Now let me give my impressions of the Bf 109E purely as a flying machine and taken in the context of its time scale. It was the Luftwaffe's first-generation monoplane fighter, and to any pilot weaned on highly maneuverable but rather slow biplanes, such as the Hawker Fury and Gloster Gladiator, it was a revelation in speed and rate of climb and an exciting handling experience. The roll rate and acceleration in the dive were notable for that era, and the power and flexibility of the direct-injection engine were truly exhilarating, particularly in aerobatics.

However, all was not sugar and spice. The cockpit was claustrophobic in the extreme, as it was small and narrow and was enclosed by a cumbersome hood that was quite difficult to open from the inside. Once settled in the cockpit, I became very aware of the characteristic smell that pervaded all German aircraft; it somehow reminded me of almonds and was strong but not sickly.

The reflector gunsight was very intrusive in that cramped environment and was heavily padded (obviously, for safety). The forward view on the ground was terrible, so on takeoff, I was advised to raise the tail as quickly as possible. This could be done fairly abruptly without fear of the airscrew hitting the airfield surface because the inverted-vee engine's high thrust line gave ample clearance. The airplane had to be flown off, as any attempt to pull it off early resulted in aileron snatching because the wing slats opened unevenly. For this reason, to shorten the takeoff run, 15 degrees of flap were recommended.

Once the Bf was airborne, the main wheels retracted quickly, but the electrically actuated airscrew pitch-changing was slow. The flaps were raised manually

the stall was preceded by elevator stick buffeting and the opening of the slats; this was accompanied by unpleasant aileron snatching as the slats opened unevenly. The stall itself was fairly gentle: the nose fell off, and the left wing dropped about 10 degrees. These characteristics were accentuated in the landing configuration.

The landing approach was quite steep, but elevator felt very positive, which was just as well, for a substantial change of attitude was called for in the flare before touchdown. Even after ground contact, the lift did not spill rapidly, and on rough terrain, ballooning or bouncing were common.

Flying formation was easy with the crisp ailerons, rather heavy elevators and good engine response to throttle movement. Aerobatics, however, were more difficult because of the elevator heaviness and the slat snatching at the top of loops; this was often remarked on by young student pilots captured and questioned at the end of the War, and all were critical of the aircraft's landing idiosyncrasies. It must be remembered, however, that pilot training in Germany during WW II was neglected

to an incredible degree, as the pilot schools were directly subordinate to the air fleet commanders, who regarded the instructors as reserve pilots there to top off frontline units. The effect was that by 1944, Luftwaffe fighter pilots were being sent into combat with only 160 hours flight time whereas their British and American counterparts had 360 and 400 hours, respectively.

I was not overly impressed with the Emil, and yet it has earned a considerable stature in the eyes of many aviation

historians and has charisma in the minds of many Luftwaffe pilots. This reputation rests mostly on its superiority to its mediocre—and often downright inferior—opposition, especially on the Eastern Front, where the German pilots outshone the Russians' tactics—although not their courage—and amassed huge kill scores. I know only too well how easy it is to get emotionally involved with an airplane in which you have fought and survived and to regard it with the same uncritical affection as a mother has for her child. But, when you've flown a wide range of other fighters and become more analytical, your views are soon tempered by reason. Certainly, the Bf 109E was a good workhorse, but it was not a thoroughbred like the Spitfire and Mustang.



The Bf 109F was fitted with a more powerful DB601 engine in a new symmetrical cowl, and modifications were also made to the supercharger and radiator intakes. The 109F was also fitted with a new cantilevered tailplane, rounded wingtips, a smaller rudder and a fully retractable tailwheel (courtesy of Warren M. Bodie).

by means of the outer of two concentrically mounted wheels to the pilot's left; the inner wheel adjusted tailplane incidence. Thus, the wheels could be moved simultaneously to counteract the trim change as the flaps came up. The climb was at a steep angle; stability proved excellent in the longitudinal and lateral planes and was almost neutral directionally. Control harmony was poor because the rudder was light, the ailerons moderately light and the elevators extremely heavy. Control harmony in a fighter should be achieved with light ailerons, slightly heavier elevator, and the rudder heaviest.

An airplane's stalling characteristics tell a lot about its "inner self," and the 109 was no exception. At about 20mph (30km/h) above stall speed and with the aircraft "clean,"



flashes around!

This little fighter is now bucketing along, accelerating rapidly. As the tail lifts, there is a positive tendency to swing left. This can easily be checked; however, if you are really aggressive in lifting the tail, the left swing tendency is difficult to stop and happens very quickly. Now the tail is up, and you can vaguely see where you are going. It's a wild, rough ride on grass, and with all the noise and the smoke from the stacks, it's exciting.

Quick glance at the airspeed indicator (ASI): 160km/h, a light pull-back on the stick, and you're flying!

Hand off the throttle, select FLUG on the undercarriage selector. The mechanical indicators motor up very quickly, and you feel and hear a "clonk, clonk" as the gear comes home. A quick look out at the wings, and you can see that the slats—fully out—are starting to creep in as the airspeed increases and the angle of attack is reduced. With 230km/h and an immediate climbing turn-up, you enter the downwind leg just in case you need to put the airplane down in a hurry. The Old Flying Machine Company's SOP is always to fly an orbit overhead of the field to allow everything to stabilize before venturing off; this has saved at least one of our airplanes.

Start to frantically crank up the flaps and increase the airspeed through 250km/h; power back to 33 inches and 2,300 rpm for the climb. Plenty of airflow

through the narrow radiators now, so close them and remember to keep a watchful eye on the coolant gauge for the next few minutes until the temperature has settled down. With the radiator flaps closed, the aeroplane accelerates positively. As you climb, you're aware of holding in a little right rudder to keep the ball in the middle, but the foot loads are light, and it's no problem. Level off and power back to 30 inches and 2,100 rpm. The speed has picked up to the 109's cruise of about 400km/h, and now the ball is right in the middle, and no rudder input is necessary.

Handling

Once settled down, with your adrenaline level back down to just plain high, you can take stock of the situation. The initial reaction is of delight to be flying a classic airplane, and the next is the realization that this is a real fighter. You feel aggressive flying it. The urge is to go looking for something to bounce and shoot down!

The roll rate is very good and very positive below about 400km/h, and the amount of effort needed to produce the relevant nose movement seems exactly right. As the stall is reached, the leading-edge slats deploy—together, if the ball is in the middle; slightly asymmetrically, if you have any slip on. The aircraft delights in being pulled into hard maneuvering turns at these slower speeds. As the slats

The 109G was basically an F-series airframe that had been fitted with the new D13605A engine that had a maximum output of 1,475 hp that could be boosted to 1,775 by the addition of GM.1 nitrous oxide injection. The most effective version of the Gustav was the G-6 that had a 30 mm engine-mounted cannon and two 20 mm underwing cannon. The cabin pressurization system of the G-5 was removed in the G-6 variant. (courtesy of Warren Bodie)

THE RAF IS GIVEN A GUSTAV—GRATIS

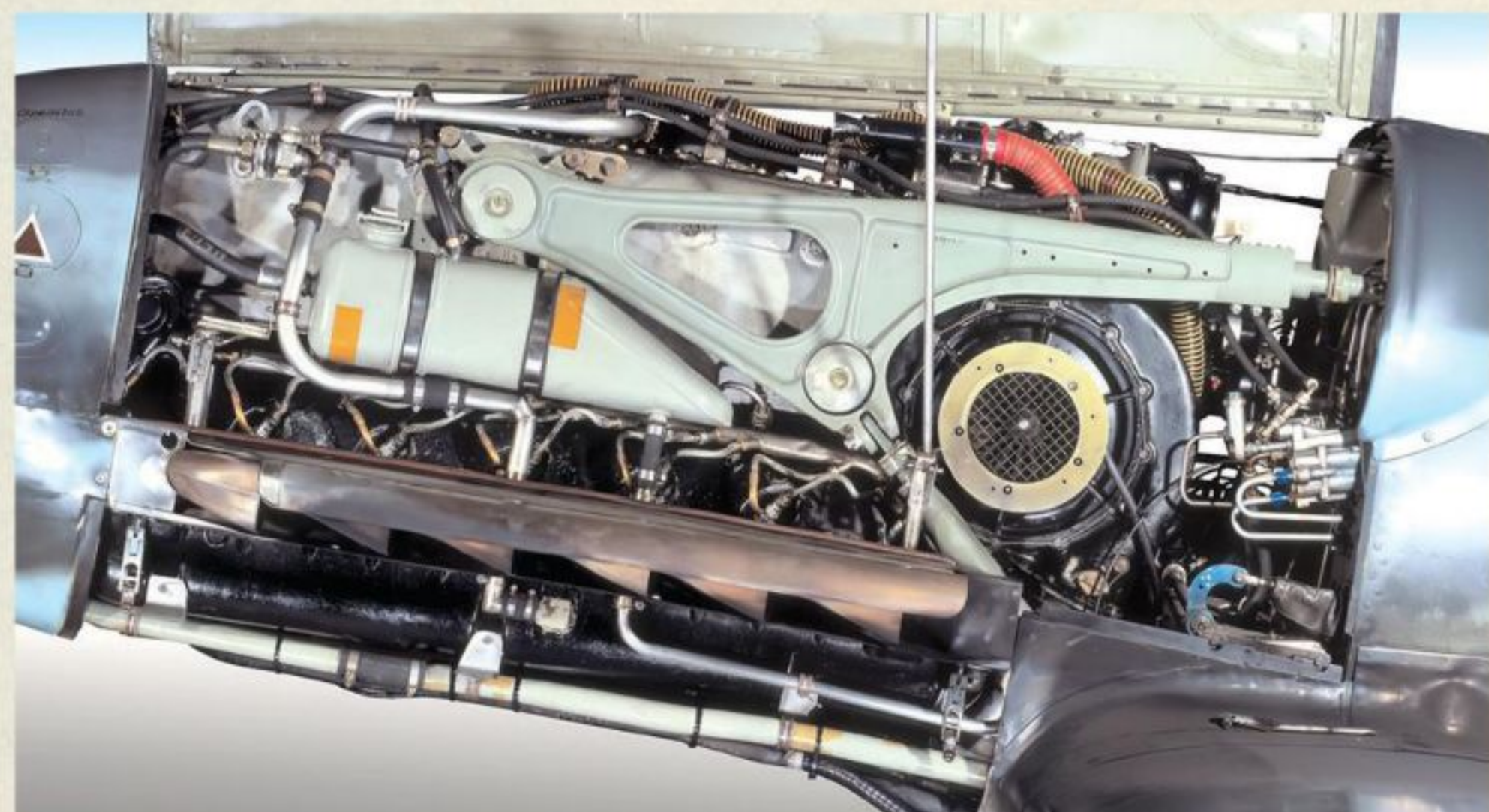
Although the Emil was a very prolific version of the Bf 109 series, the most produced version was the 109G, or “Gustav.” On July 21, 1944, a Bf 109G-6/U2 landed in error at Manston Airfield in the southeast of England and was at once transferred to RAE Farnborough, where the test pilots gave it a thorough flight assessment; it was also assessed from engineering and armament standpoints.

To me, the Bf 109E always looked sinister, but the Gustav seemed less so by virtue of its rounded wingtips, cantilevered tailplane and the Galland clear-vision cockpit canopy that was added to the G-10 and subsequent variations. It was powered by a 1,475 hp DB 605AM and was armed with two .50-caliber (13 mm) fuselage-mounted machine guns (300 rounds per gun) and one 20 mm cannon with 60 rounds firing through the airscrew spinner. Other differences from the Emil were its smaller rudder and retractable tailwheel. These changes increased its loaded weight to 1,422 pounds and increased its wing loading; it was also more than 30mph faster and indeed could enhance its top speed significantly for a short period by using GM-1 nitrous oxide injection. I would like to have seen a more efficient method of operating the flaps, other than by the laborious winding of a large hand wheel, but this didn’t materialize.

At RAE Farnborough, despite our having a considerable supply of spares from the many 109s that crashed in



“Utilitarian” best describes the 109’s cockpit. As the heavily framed enclosure is lowered over your head, the feeling of claustrophobia is apparent. Power and flight controls within easy reach afford the pilot simplicity of form and function. The pilot’s legs straddle the MG 151 20mm cannon breech. photo by Brian Silcox)



Right: The Gustav’s 1,475 hp Daimler-Benz DB 605 engine has been retrofitted to the Spanish-license-built airframe. In 1942, Spain secured the rights to build the Gustav, with cooperation from Germany providing tooling, instruments, drawings and Daimler-Benz engines. Because of the war situation, Germany never delivered, and the Ha 1112 “Buchon” flew with Hispano-Suiza V-12s and, later, Rolls-Royce Merlin engines. (photos by Brian Silcox)



England, we did not find our captured Bf 109G-6 easy to maintain. Part of our problem involved the electric systems used to actuate the ancillary controls; we were used to hydraulic systems. But there was also the poor quality of the rubber tires and the customary ineffective German brakes.

The armament of the 109 was of particular interest to RAE scientists, who agreed that the 20 mm cannon firing through the airscrew spinner—as introduced in the 109D—was a potent weapon, both with regard to destructive power and ease of sighting. This could not be copied in British fighters powered by Merlin engines, as these had a vee layout; the Daimler-Benz engines were inverted vee and so could accommodate the cannon between the cylinder head blocks. The later introduction of the 30 mm cannon in the 109G-6/U4 caused concern because of its formidable destructive power, but tests showed that if fired slowly, it was unreliable and inaccurate at ranges beyond 650 yards (600 meters). The 30 mm cannon was more suited to bomber interception than fighter-versus-fighter combat, so for the latter, it was replaced by the faster firing 20 mm Mauser cannon with 150 rounds.

The Bf 109 was heavily involved in two significant but vastly different operations that produced contrasting results. The first took place in Russia on July 5, 1943, when the Battle of Kursk developed into the largest and fiercest air battle of all time; 432 Soviet airplanes were shot down versus the loss of only 26 Luftwaffe aircraft. The second operation was in Germany on April 7, 1945, when 120 Bf 109Gs, piloted mainly by students, took off to intercept a USAAF raid with instructions to ram the bombers as a last resort. Of that German force, only 15 returned.

SYNOPSIS

The more than 33,000 Bf 109s produced from 1938 to 1945 gave the Luftwaffe an abundance of continuously updated air weapons. They were capable of beating their implacable enemies, even in the terrible conditions of Russia and North Africa. Many Luftwaffe Bf 109 pilots racked up scores in the hundreds that will dazzle the minds of air historians and fighter buffs for years to come.

But the Bf 109's deficiencies almost equal its fabulous assets. The Luftwaffe lost 11,000 of these thoroughbred fighting machines in takeoff and landing accidents, most of them at the end of the War when they needed them most. The inexcusably poor visibility from the cockpit greatly reduced their pilots' ability to fight. The snatching of the automatic wing slats not only caused many of the numerous ground accidents but also contributed to a great many aerial accidents. The slat, canopy, and landing-gear problems all had known, simple production fixes. Perhaps Prof. Willy Messerschmitt and the Luftwaffe generals were too busy patting themselves on their backs and counting Bf 109 victories to find time to listen to the pilots or to digest the significance of the Bf 109's accident rates.

The Bf 109 was, indeed, a prolific, necessary and timely fighter but was not as great as the Spitfire, the Mustang or the Hellcat, which all had many fewer vices for the wartime pilots to overcome.

pop out, you feel a slight “notching” on the stick, and you can pull more until the whole airframe is buffeting quite hard. A little more and you will drop a wing, but you have to be crass to do it unintentionally.

Pitch tends to be heavy above 400km/h, but it is still easy to manage up to 500km/h, and the aircraft is perfectly happy carrying out low-level looping maneuvers from 550km/h and below. Above 550km/h, one peculiarity is a slight nose-down trim change as you accelerate. This means that when you run in for an airshow above 500km/h, the airplane has a slight tucking sensation—a sort of desire to get down to ground level. This is easily held on the stick, or it can be trimmed out, but it is slightly surprising initially.

When you maneuver above 500km/h, two hands are required for a more aggressive performance. Either that or get on the trimmer to help. Despite this heavying up, it is still quite easy to get 5G at these speeds.

The rudder is effective and of medium feel up to 500km/h. It becomes heavier above this speed, but regardless, the lack of rudder trim is not a problem for the type of operations we carry out with this airplane.

Initial acceleration is rapid up to about 560km/h—particularly with nose down. After that, the 109 starts to become a little reluctant, and you have to be fairly determined to get over 600km/h.

Contemporary comparisons

First, let me say that all my comments are based on operations below 10,000 feet and at power settings not exceeding 40 inches and 2,600 rpm. I like the airplane, and with familiarity, I think it will give most of the Allied fighters I have flown a hard time—particularly in a close, hard-turning, low-speed dogfight. It will definitely outmaneuver a P-51 in this type of fight because its roll rate and slow-speed characteristics are much better. The Spitfire, on the other hand, is more of a problem for the 109, and I feel it is a superior close-in fighter. Having said that, the aircraft are so closely matched

that pilot ability would probably be the deciding factor.

At higher speeds, the P-51 is definitely superior, and provided the Mustang kept its energy up and refused to dogfight, it would be relatively safe against the 109.

Other factors affecting the 109 as a combat aircraft include the cramped cockpit. Although the view out (in flight) is better than you might expect, this is quite a tiring working environment. The profusion of canopy struts is not a problem. In addition, the small cockpit makes you feel more a part of the airplane, and the overall smaller dimensions make you more difficult to spot. There's no doubt that when you are flying the 109 and you see the crosses on the wings, you feel aggressive. If you are in an Allied fighter, it is very intimidating to see this dangerous little airplane turning in on you!

Landing

Returning to the circuit, it is almost essential to join for a run and break. Over the field, break from 50 feet, up and over with 4G onto the downwind leg. Speed at 250km/h or less, gear select to DOWN, activate the button and feel the gear come down asymmetrically. Check the mechanical indicators (ignore the electric position indicators), set the pitch to 11:30; fuel, both boost pumps ON. If you have less than half a tank of fuel and the rear pump is not on, the engine may stop in the three-point attitude.

Radiator flaps to full open, and wing flaps to 10 or 15 degrees. As the wing passes the threshold downwind, take all the power off and roll into the final turn, cranking the flap like mad as you go. It is important to set up a high rate of descent and a curved approach.

The aircraft is reluctant to lose speed around finals, so ideally, you should initiate the turn quite slowly at about 190 to 200km/h. Slats normally deploy halfway around the final, but you, the pilot, are not aware that they have come out. The idea is to keep turning with the speed slowly bleeding and roll the wings

level at about 10 feet at the right speed and just starting to transition to the three-point attitude. The last speed I usually see is just about 180; I'm normally too busy after that!

The 109 is one of the most controllable aircraft that I have flown at slow speed around finals, and provided you don't get too slow, it is one of the easiest to three-point. It just feels right. The only problem is getting too slow. If this happens, you very quickly end up with a high sink rate and with absolutely no ability to check or flare to round out. It literally falls out of your hands!

Once down on three points, it tends to stay down, but be careful; the forward view has gone to hell, and you cannot allow any swing to develop. Initial detection is more difficult—the aircraft being completely unpredictable—and can diverge in any direction. Sometimes, the most immaculate three-pointer will turn into a potential disaster halfway through the landing roll. Other times, a ropy landing will roll as straight as an arrow!

When we started flying the 109, both my father and I did a lot of practice circuits on the grass before we tried a paved strip. Operating off grass is preferred. Although it is a much smoother ride on the hard surface—directionally—the aircraft is definitely more sensitive. Without doubt, you cannot afford to relax until you are stationary. You would never make a rolling exit from a runway in the 109.

To summarize, I like the airplane very much, and I can understand why many Luftwaffe aces had such a high regard and preference for it. Hans Dittes has completed a fantastic restoration and should be complimented on returning *Black 2* to the air. ✚

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THE GEICO SKYTYPERS

**The family-run business that changed
the skywriting industry forever!**

BY GERRY YARRISH | PHOTOS COURTESY OF GEICO SKYTYPERS AIR SHOW TEAM



Besides the skytyping dot-matrix system, the aircraft can also produce traditional smoke trails.



A precision flight squadron

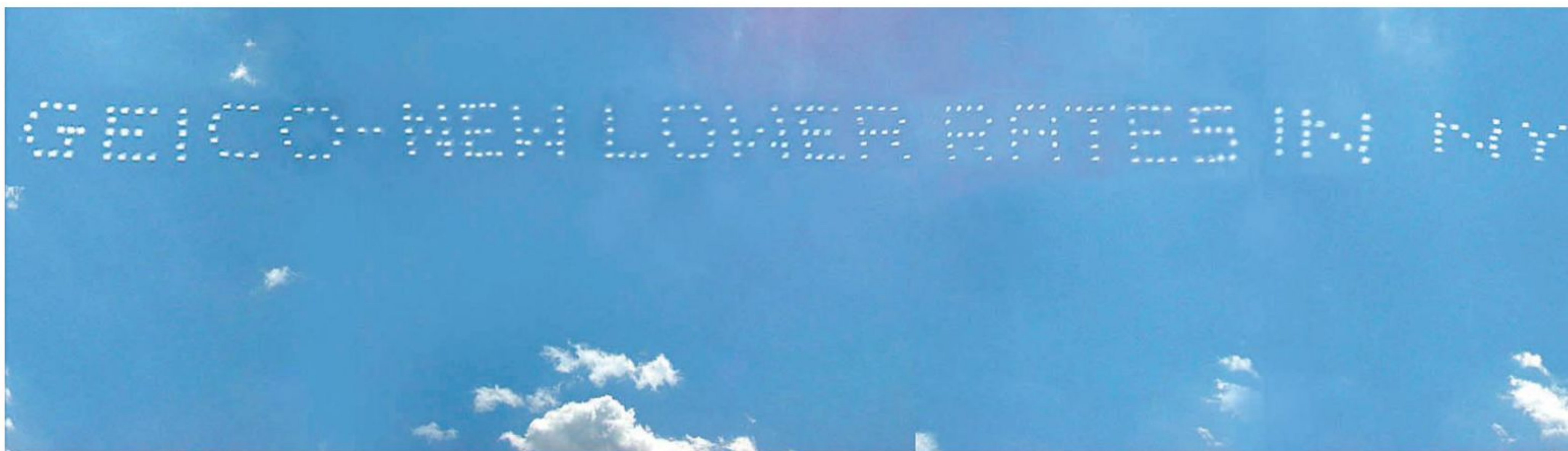
made up of six WW II vintage North American SNJ-2s, the world-famous GEICO Skytypers Air Show Team performs exciting flight maneuvers at many top airshows across the country. One of the most widely recognized airshow teams, the Skytypers have been thrilling crowds for decades, and can often be seen in GEICO commercials with an air-sick GEICO gecko flying backseat!



The History

The Skytypers began operation in 1932, when a little-known beverage company hired Andy Stinis (pictured here) to perform skywriting to promote its product. That company was Pepsi-Cola, and for the next 22 years the company used skywriting as its best mass advertising medium. In 1946, Andy developed what he called "skytyping," a faster, more advanced method of skywriting using multiple aircraft to create more complex displays and messages in the sky. Skytyping produced a high-quality image, with messages that were clearer at long distances and stayed intact much longer. In 1964, Andy was awarded the patent for computer-controlled skytyping between multiple aircraft.

In 1965, Andy's son Greg moved a fleet of six SNJ-2 aircraft out to California, creating a West Coast Skytyping division. For 10 years, Greg Stinis ran both the East and West divisions, but due to business growth and economics, he focused more on the West Coast. Greg then hired Mort Arken to run the East Coast operation. Arken, a retired U.S. Army and U.S. Navy pilot with 30 years of experience, was a natural showman with extensive sales experience. He teamed up with Greg to deliver Skytyping and aerial formation demonstration flights for a host of clients—among them, Anheuser-Busch, Miller Brewing Company,



When doing dot-matrix skytyping, each letter is as tall as the Empire State Building.

Coors, Pepsi-Cola, Universal Pictures, Toyota Motors, Disneyland, Coppertone, Solarcane, Ford, and General Foods, to name just a few.

Arken fell in love with the business, and had such a passion for aviation that in the 1970s he purchased the East Coast division and the six SNJ-2 aircraft from Andy Stinis. In 1979, Greg Stinis formed Skytypers Inc., taking over all patents and rights to continue his father's business legacy.

Between these two divisions, the Skytypers performed at scores of prestigious and historic events: The 1984 Olympic Games in Los Angeles, NFL Superbowls, Macy's Thanksgiving Day Parades, New York City's Fourth of July celebrations, and even skytyping over the White House in the nation's capital.

With the help of Arken's business expertise, they struck an agreement to skytype around the country as the Miller Squadron for the Miller Brewing

Company. In 1989, Greg expanded the West Coast division into Japan, becoming the first U.S. civilian WW II aircraft team to fly and tour that country. Since then, Skytypers has created several joint ventures throughout the world, including South Africa in 1994 and France in 1999.

Subsequently, in 1992, Mort's son, Larry Arken, who had worked and flown for his dad over the years, acquired the business. Father and son worked side by side until 2007, when Mort passed away at the age of 83. Mort Arken was responsible for the company's long relationship with GEICO, and today the East Coast team is also known as the GEICO Skytypers.

In 1996, Greg Stinis's son Stephen (Andy's grandson), having grown up in the Skytypers business, joined the company's operations, thus making Skytypers a three-generation enterprise. In 2004, Stephen and his cousin Curtiss Stinis developed and patented a new skytyping system using multiple computers on a wireless network. The fully digital system can create messages in several languages and produce color graphics and logos. In 2004, Skytypers reincorporated in Las Vegas, Nevada with Stephen as president.

The mission of Skytypers has always been to reach mass markets as a unique, compelling, and cost-effective medium for outdoor communication. A true family-run enterprise, Skytypers is a perfect example of American business ingenuity that has become ingrained in the minds of millions of aviation enthusiasts all over the country and around the world.

Everything about the GEICO Skytypers Air Show Team is precise.



A Conversation with #1 Larry “Boss” Arken

The commanding officer and flight lead for the GEICO Skytypers Air Show Team, Larry Arken is also a captain for a major commercial airline. Growing up, Arken sat in the copilot seat behind his father, Mort, flying over the skies of Long Island and the Northeast Coast. Mort’s passion for flying, business acumen, and showmanship led him to purchase the East Coast division of the Skytypers, but at a young age, Larry saw the potential to build on his father’s foundation to create the world-class organization that it has become today.

Larry’s aviation career developed while flying a variety of warbirds and corporate jets. He first flew Falcon 10s, 20s, and 50s, and he then transitioned to flying DC-8s for UPS. He later secured a position with a major commercial airline and has now been a captain for many years.

When not flying corporate airliners, Larry pilots vintage P-47 Thunderbolts, F4U Corsairs, and P-51 Mustangs for the Airpower Museum in Farmingdale, New York. Larry also holds a North American Trainer Association (NATA) designation, and is a check pilot for formation flying. As an airline transport pilot, Larry has logged more than 25,000 flight hours and holds certification ratings for seven large jets.

Flight Journal caught up with Larry and he was kind enough to chat with us about what it’s like from “a day in the life” point of view as flight lead for the team. Here’s what he had to say.

FJ: Where are the East and West squadrons located and how are they equipped?

LA: Our East Coast team is based out of the Republic Airport in Farmingdale, New York on Long Island and operates North American SNJs. The team does both skytyping and airshows. The West Coast team, based out of Las Vegas, operates Grumman American Tigers and only does skytyping.

FJ: As flight leader, what's "a day in the life" like?

LA: It starts early in the morning when the team gets together and does our briefing, which lasts for an hour. It covers administration, airshow layouts, and items specific to the airshow demonstration box, and then the maneuvers brief. After that we get ready to fly, which sometimes includes skytyping prior to the aerobatic low-level demonstration. When we land, we meet our fans and sign posters for them. Then we have our debrief, where we review the performance and have discussion to make sure we

always continue to be the best we can, and that the visual display to the crowd is correct.

FJ: How many airshows do you attend each year?

LA: We typically perform at 15 airshows a year. Most of our pilots are former military aviators that fly fighter aircraft. Most now fly for the airlines.

FJ: You mentioned splitting up the squadron during the winter and having some go to Florida. What does that entail?

LA: We place three or more aircraft at Lakeland, Florida during the winter months. This is so we can continue our training and maintain proficiency by flying the planes in warmer weather. The other aircraft come back to New York for cyclical winter heavy maintenance.

FJ: For the skytyping gigs, what's involved as far as getting the proper clearance?

LA: Typically, if we work above any restricted airspaces it usually doesn't stop our skytyping, except for Washington, D.C.

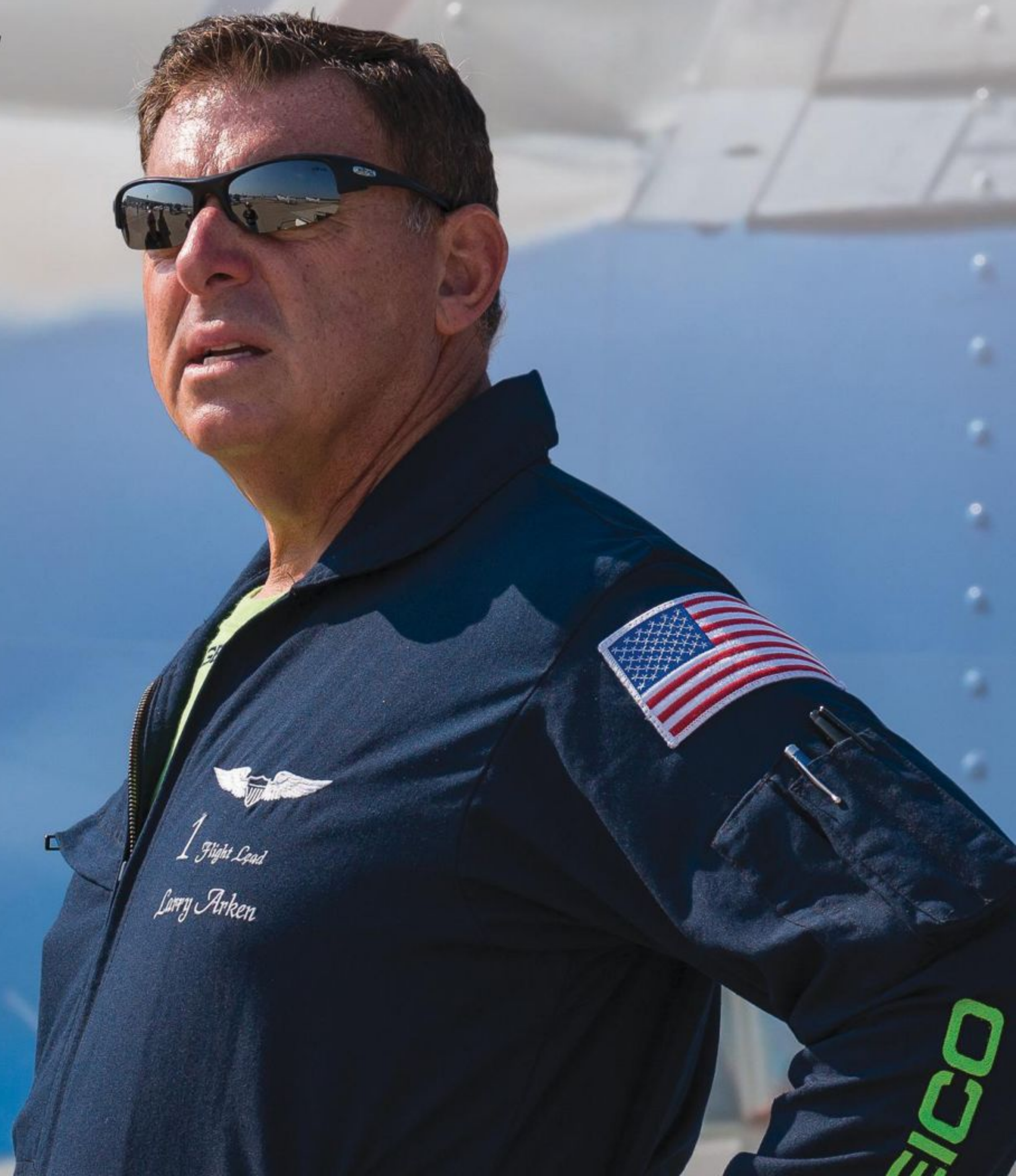
FJ: What's involved with the smoke dot-matrix skywriting system?

LA: Five of the aircraft fly in a line abreast formation. The center aircraft has a computer that tells the other aircraft when to smoke electronically. Each letter is almost as tall as the Empire State Building and each message is about two miles long. We can place 25 letters up in less than two minutes. In the New York City metro area approximately 3.5 million people are in view of each message.

FJ: Can you explain what's involved in earning the credentials for formation flying?

LA: In order to get your formation certificate you must be proficient in formation flying with multiple aircraft, including formation takeoffs, rejoins, position changes, breakouts, station-keeping, and safety as it applies to formation flying. As you can see, it is quite detailed.

Larry Arken is the commanding officer and flight lead for the GEICO Skytypers.





Stacked up nicely, this formation flight shows how close these Skytypers get. (Photo by Chris Parya).

The Aircraft

In 1940 to 1941, North American Aviation designed the SNJ (U.S. Navy designation) as an advanced trainer used between basic trainers and first-line tactical aircraft. Known by many names, these aircraft are often referred to as the T-6 Texan (U.S. Army Air Corp), and the Harvard (RAF), but most pilots refer to it as the “pilot maker.”

The GEICO Skytypers Air Show Team operates the SNJ-2 version of the aircraft. This model has a larger 180-gallon fuel tank, allowing the aircraft to operate for more than four hours. Other unique design features include a decrease of eight inches in the overall fuselage length, a larger rudder, and a free-castering tailwheel. Each plane weighs 5,500 pounds and is powered by a 600 hp Pratt & Whitney R-1340-AN1 nine-cylinder radial engine.

SQUADRON PILOTS

#1....	Larry Arken	Commanding Officer/Flight Lead
#2	Chris Thomas.....	Right Wing
#3	Mike Brockey.....	Left Wing
#4	Chris Orr.....	Slot Pilot
#5	Steve Salmirs	Lead Solo
#6	Tom Daly.....	Lead/Opposing Solo
#7.....	Jim Record	Advance Pilot
#8	Steve Kapur.....	Pilot Marketing Officer
#6	Kevin Sinibaldi.....	Opposing Solo
#3	Mark Gannucci.....	Alternate Left Wing

GEICO SKYTYPERS AIR SHOW 2020

If you would like to see the GEICO Skytypers Air Show Team in action, here's their 2020 airshow schedule.

March 28-29 MacDill AFB AirFest, Tampa, FL

May 2-3 Fort Lauderdale Air Show, Ft. Lauderdale, FL

May 16-17 Power in the Pines, Joint Base McGuire-Dix-Lakehurst, Burlington Cnty, NJ

May 23-24 Bethpage Air Show, Jones Beach, NY

June 13-14 OC Air Show, Ocean City, MD

June 27-28 Rhode Island Open House and Air Show, N. Kingstown, RI

July 20-26 EAA Air Venture, Oshkosh, WI

August 15-16 Chicago Air and Water Show, Chicago, IL

August 22-23 Wilkes-Barre/Scranton Armed Forces Airshow, Wilkes-Barre, PA

August 24-26 Thunder Over the Boardwalk, Atlantic City, NJ

September 12-13 Maryland Fleet Week & Air Show, Baltimore, MD

September 19-20 NAS Oceana Air Show, Norfolk, VA

October 30-November 1 Lockheed Martin Space and Air Show, Orlando, FL

November 7-8 Stuart Air Show, Stuart, FL ✈

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ABOUT THE AUTHOR

Ian Gardner served for five years in support company of the 10th (Sussex) Battalion, the Parachute Regiment as a medic before leaving the U.K. Territorial Army in 1993 due to injury. Always enthusiastic about military history, several years after leaving the Battalion, Ian became interested in World War II American paratroopers. Following a visit to Normandy in 2000, he decided to focus on the 101st Airborne Division, and in particular the 3rd Battalion of the 506th Parachute Infantry Regiment, which led to the critically acclaimed trilogy *Tonight We Die as Men*, *Deliver Us from Darkness*, and *No Victory in Valhalla*. He is also the author of *Airborne: The Combat Biography of Ed Shames of Easy Company*. Currently self-employed, he is married with two grown children and lives near Aldershot in Hampshire, England.

Sent by the Iron Sky

By Ian Gardner

Osprey Publishing, 260 pages

World War II was such a horrific time, punctuated with countless battles fought by millions of soldiers. Looking back, there were many historical events that defined this costly struggle between freedom and fascism. From the turmoil in Europe, and the events that lead to the entry of the United States into the War, the fighting was fierce and unrelenting from the very first foot fall at Normandy on D-Day, June 6, 1944. But hidden behind the bold newspaper headlines of the day, there were always the human stories of courage and sacrifice known only to those who were there.

The power of storytelling lives in the singular voice of the teller, and with his novel, *Sent by the Iron Sky*, author Ian Gardner offers a truly powerful story as he presents, with impressive accuracy, the legacy of an American parachute battalion during World War II. Drawing from his many personal interviews with veteran paratroopers, Gardner tells the unvarnished story of their accomplishments while assigned to the 101st Airborne Division 3rd Battalion, 506th Parachute Infantry Regiment, in World War II.

From their initial formation in 1942 at Camp Toccoa in Georgia, under the command of Lt. Col. Robert Wolverton, the storytelling instantly becomes personal as we learn the

commander's thoughts of his wife Kay and his son Lachlan back home in West Virginia. A man of few words, Wolverton truly believed it was his destiny to lead what he proudly considered one of the finest airborne units that had ever been created. I felt a sense of loss while reading later in the book about Wolverton's death and ultimate replacement by Maj. Oliver Horton.

More than 6,000 volunteers endured the grueling 13-week basic training program designed to eliminate all but the very strongest. Including 20-mile marches, scramble nets as high as 40 feet, and specialized combat training, by the final week some 5,000 recruits had washed out due to physical exhaustion or injury. Those who made the grade went



BEHIND THE LINES

While reviewing *Sent by the Iron Sky*, we reached out to the author and chatted with him about this book and his writing.

FJ: You've invested years of research for this book, and interviewed veterans who were actually there. As the author, what's the most interesting part(s) of the story for you and why?

IG: Being an ex-para, the role of an airborne soldier has always held a special fascination for me, but it was a random purchase back in 1999 that really ignited my imagination for the American sky warriors. *The 101st Airborne at Normandy* by Mark A. Bando, was a compilation of brilliant short stories that gripped and captivated me like no other. I read the book dozens of times until the pages were tattered and worn but, for some reason, kept returning to chapter 22, "The Bridges at Brevands." Although scant, and as I was later to discover, a little inaccurate, the nucleus of information uncovered by Mark on 3rd Battalion's role on D-Day was the bait that set me on a quest to learn more. Over the next six years I managed to track down over 50 veterans of the battalion, who, by good fortune, slowly opened up to reveal their innermost memories, which had been buried for 60 years. This huge undertaking took over my life, and with help from many people including Bando, led to the creation of my first book, *Tonight We Die as Men*, co-authored with Roger Day. I was lucky to stumble across this human story of adversity that resonates down the decades. The modern-day 506 Infantry Regiment based at Fort Campbell in Kentucky recognized this when, in 2016, I accepted their offer, along with Steven Spielberg and Tom Hanks, to become an Honorary Member of the Regiment (HMOR).

FJ: With your own personal experience in the military serving in a parachute regiment, was there anything specific that inspired you to write *Sent by the Iron Sky*? Was there something specific that spoke to you?

IG: For me, the most interesting parts are the stand-alone individual stories (most of whom have since passed away) that appear throughout and the short "eye witness" quotes, which graphically illustrate big milestone events and turning points in each important battle. I have written this book in a warm and engaging style, specifically aimed at a wider audience. Anyone who wants to "go deep" can look towards *Tonight We Die as Men* or the other two books in the trilogy to satisfy whatever further historical curiosity they may have.

FJ: With younger readers moving in to overtake the baby boomer generation, what do you want readers to come away with after reading your book? Do you find that there is more, or less, interest in WW II military history these days?

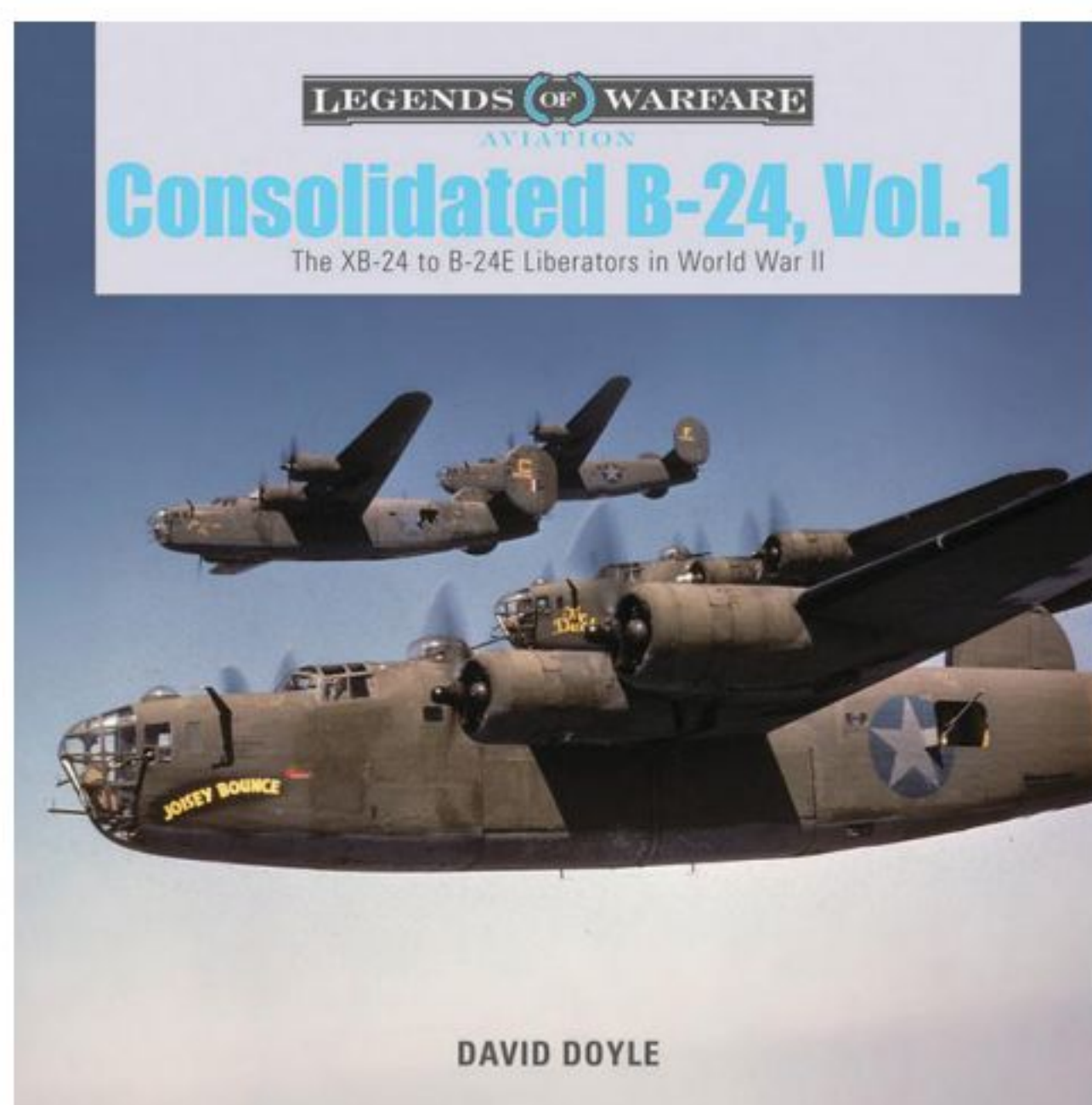
IG: During my many travels across Europe and America, I have met many young people who are passionate about history, particularly WW II, including my own son, David. Some have been inspired by my work, and this is something that I am particularly proud of, but others, like teenager Richie McErlean, have gone way beyond and are now inspiring me. Richie carved out his own destiny and I urge anyone who reads this, young or old, to go look up YouTube and search "Project Vigil: D-Day 2014, the Saluting Boy on Omaha Beach." The latest generations of young men serving with the 506th at Fort Campbell are all encouraged by the "head shed" to read my books. But the release of *Iron Sky* has created a new flame that I believe will burn brighter than ever before. This condensed volume will find its way into the imaginations of a new generation whose surviving great-grandfathers will soon be unable to speak for themselves. †

on to jump school, and the narrative is filled with the details and exploits of the 506th, their attachment to the 101st Airborne Division, and ultimately their overseas deployment from Fort Bragg.

On D-Night (June 5, 1944), the 3rd Battalion paratroopers leapt out of their C-47 cargo planes into the darkness. Several interviewees discuss what that experience was like, describing the horror of parachuting into enemy territory. For months they battled on, and their heroic defense of Bastogne earned the division a Unit Citation (the first in the history of the U.S. Armed Forces). Fighting their way across Europe, the battalion took part in many noteworthy battles—some of the toughest battles of the War, including Operation Market Garden and others, until they finished up the War occupying Hitler's mountain retreat of Berchtesgaden.

Along the way, memorable personalities are highlighted and we meet the likes of Cpl. Don Francis, G Company; Stanley "Doc" Morgan, the 3rd Battalion's surgeon; "Rosie" Rosenfield; Pete Madden; the Brown Brothers, Jim and Jack; and Johnny Gibson to name just a few.

Sent by the Iron Sky is extremely well illustrated. The many authentic vintage images (some 200), help to tell an awe-inspiring story and will encourage readers to continue and discover more about these historic events. I was especially moved by the photographs depicting Allied POWs, captured shortly after D-Day, being marched through the streets of Paris. Ian Gardner's book is compelling and riveting; readers develop a personal connection with the troops and the circumstances described in their stories. Priced at \$30, I found *Iron Sky* thoroughly engrossing, and I highly recommend it to anyone interested in learning more about the brave troops who served as paratroopers in WW II.
—Gerry Yarrish



Consolidated B-24 Vol. 1

By David Doyle

Schiffer Publishing, 112 pages

The B-24 Liberator remains the world's most-produced multi-engine heavy bomber aircraft, as well as the most-produced military aircraft in United States history. Close to 19,000 airframes were manufactured in five aircraft assembly plants.

Beautifully illustrated with rare historical photographs and vivid color photos from the National Archives and Imperial War Museum, this book highlights the design, development, and wartime use of the early model B-24s, following them from the assembly lines to their assignments in various bomber groups. Part of Schiffer Publishing's *Legends of Warfare* series, the *Consolidated B-24 Vol. 1* is a comprehensive accounting of the XB-24 to B-24E Liberators flown during World War II.

I have always been impressed with this brute of an aircraft called the Liberator. Though the more attractive Boeing B-17 Flying Fortress got all the Hollywood glamour, the rugged B-24 never failed to get the job done. David Doyle's book begins with discussions and documentation of the Liberator's prototype, the XB-24, which was developed in 1939.

The Liberator that rolled out of Consolidated's San Diego assembly plant on December 29 was in fact the first heavy bomber to ever use tricycle landing gear. It also featured a "wet" wing, with fuel tanks along practically the entire length of the wing. At the controls for the maiden flight was Consolidated's chief test pilot, Bill Wheatley, who initially found several deficiencies. The most problematic issue was the aircraft's inability to attain the promised top speed of 311 mph. This was addressed with engine changes and the addition of more efficient turbo superchargers. With the replacement of its tail control surfaces and other design changes, the test aircraft was redesignated the XB-24B and was able to attain a more desirable airspeed of 310 mph.

Even before this first flight, seven test aircraft were ordered by the U.S. Army Air Corps and designated YB-24s. Six of

these were diverted for sale to the British (designated LB-30As). The chapters provide excellent black and white photos with descriptions of the various B-24 designations. Of particular note are the exceptional color photographs from the Stan Piet collection. The text goes on to describe the use of the Liberator I by the English and French as an anti-submarine patrol bomber and then covers the Liberator Mk IIs, which enjoyed improved armament, self-sealing fuel tanks and other refinements. Several more chapters go on to describe the C and D models of the B-24 as well as the Navy versions of the B-24D, designated the PB4Y. Many detailed photos show impressive views of the aircraft's engines and various gun turrets, as well as colorful nose art.

There are also amazing photographs showing B-24s flying over Germany, making their way to the famous raid on the refineries at Ploesti in Romania in 1943. The author tells the B-24's story with many carefully researched photos, many of which have never before been published. The large format images, coupled with descriptive and informative captions, are a feast for the eyes for any WW II aviation enthusiast. I was particularly interested in several photos of the *Lady Be Good* B-24 that crash-landed in the Libyan Desert. The remains of the relatively well-preserved wreck (albeit broken in two) were discovered in 1958 along with the remains of eight of its crewmembers. Since then the *Lady Be Good* has been featured in numerous articles and documentaries, and was the subject of a television dramatization.

Other detailed images can also be found of the *Strawberry Bitch* B-24 which is part of the collection at the U.S. Air Force Museum at Wright Patterson AFB in Dayton, Ohio. Color photos show the cockpit interior and controls, the landing gear, machine gun placements and several other details, all in crisp color. Additional chapters offer insights on various models including the Liberator III and G.R.V, the C-87, the XB-41, and the B-24E.

If you like interesting factoids and detailed aircraft photography and have a soft spot for the less famous heavy bomber of WW II, then this book, priced at \$19.95, is a great addition for your aviation library. I highly recommend it. —Gerry Yarrish ✈



ABOUT THE AUTHOR

David Doyle's earliest published works appeared in periodicals aimed at the historic military vehicle restoration hobby. By 1999, this included regular features in leading hobby publications, appearing regularly in US, English and Polish magazines. Since 2003, over 100 of his books have been published. Broadening his horizons from his initial efforts concerning vehicles, he soon added aircraft and warships to his research objectives.



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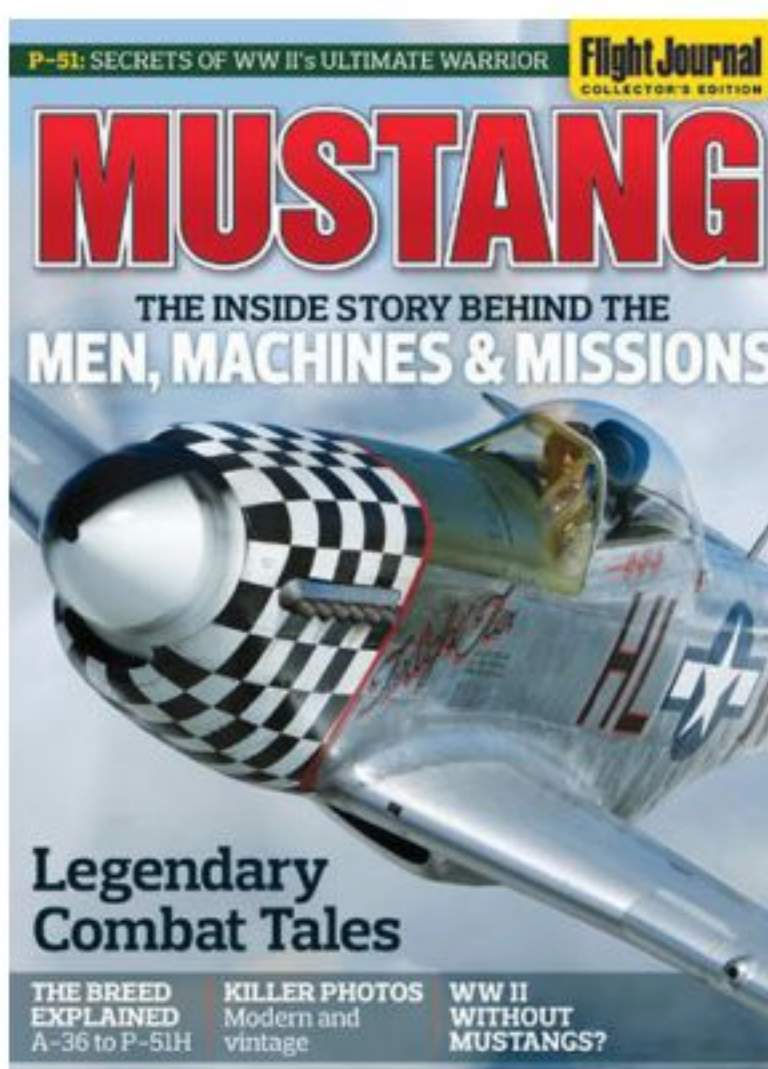
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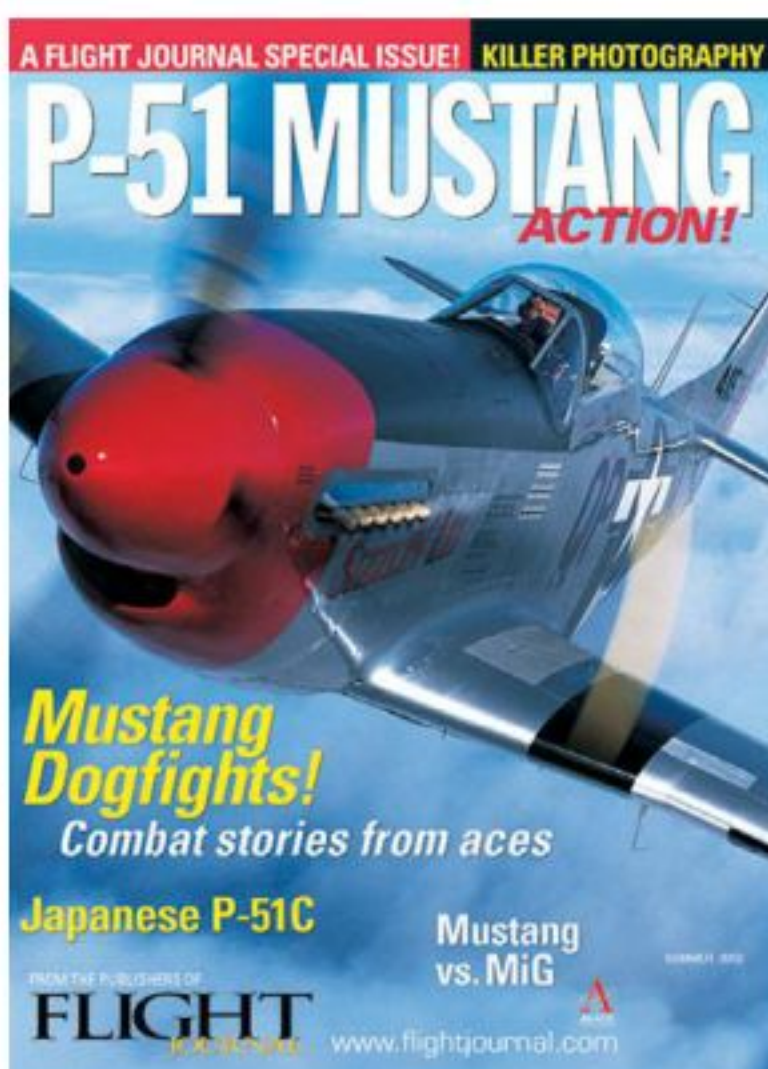
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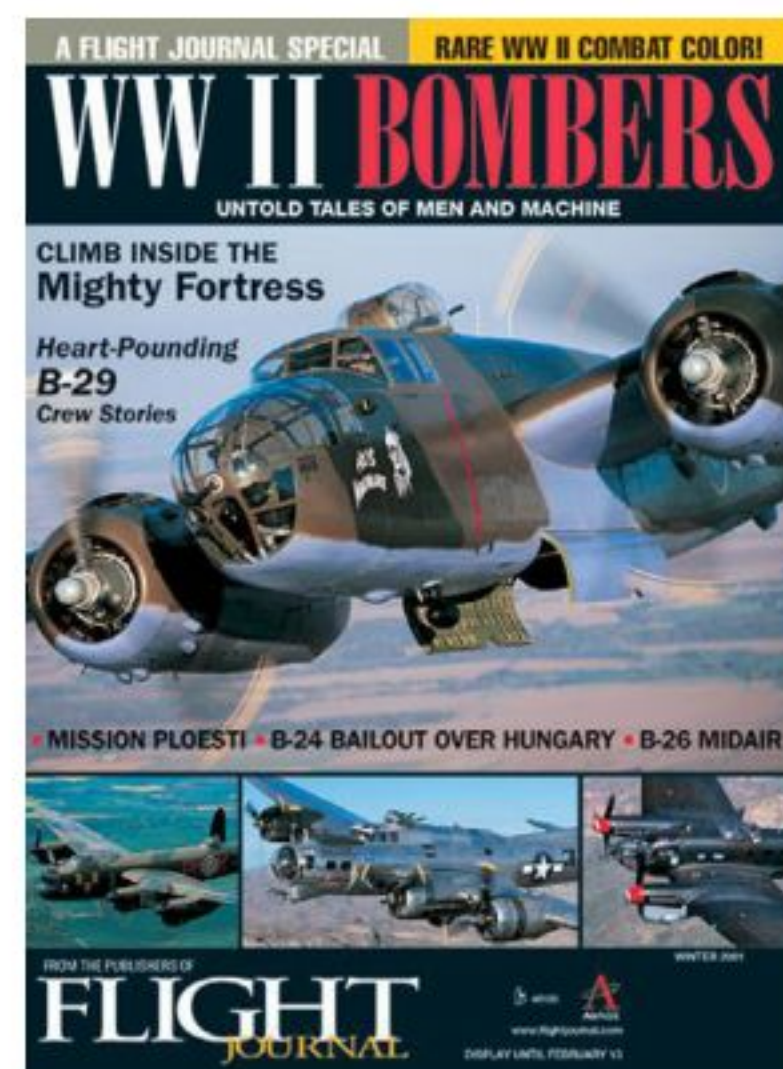
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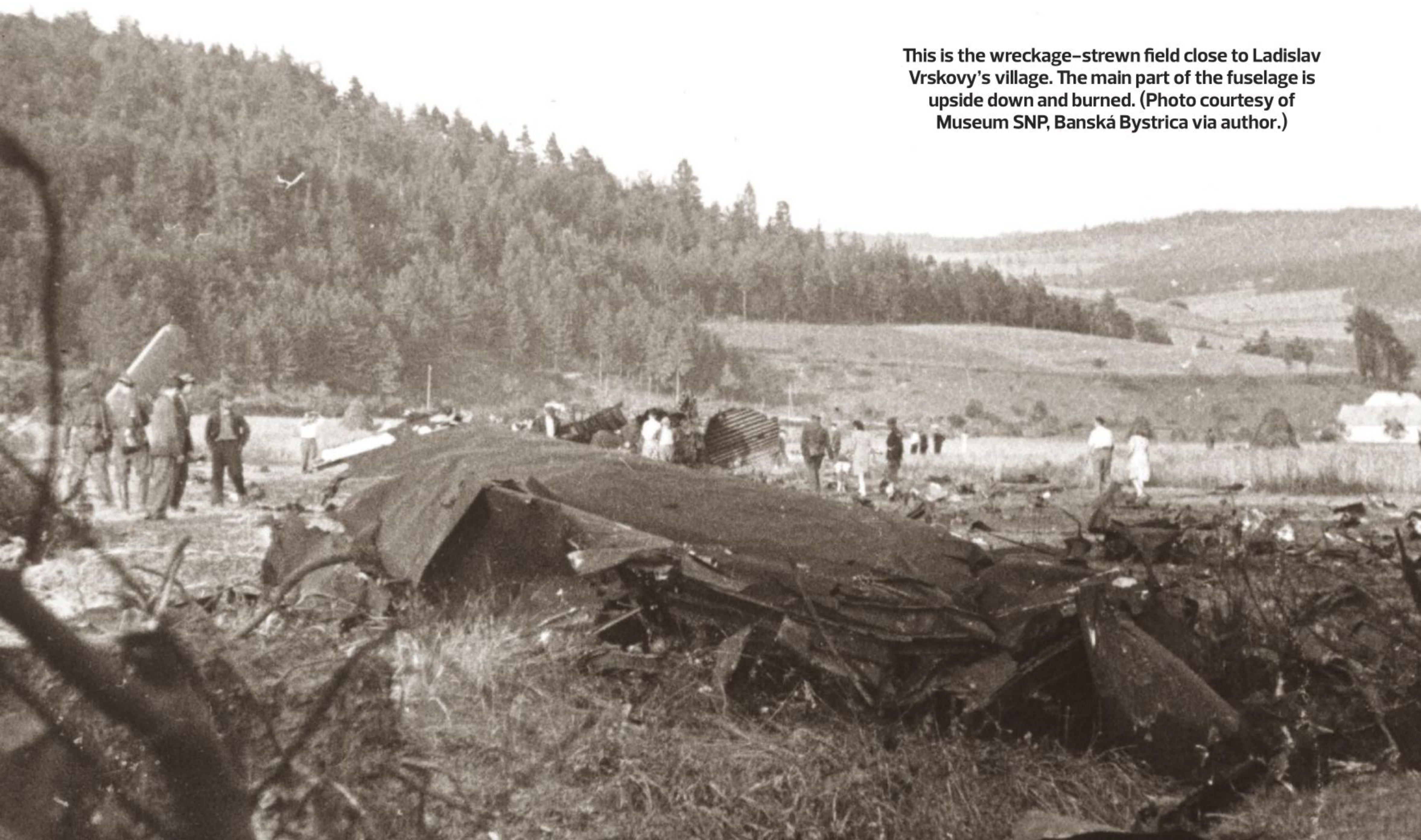
FIRST RAID TO BLECHHAMMER

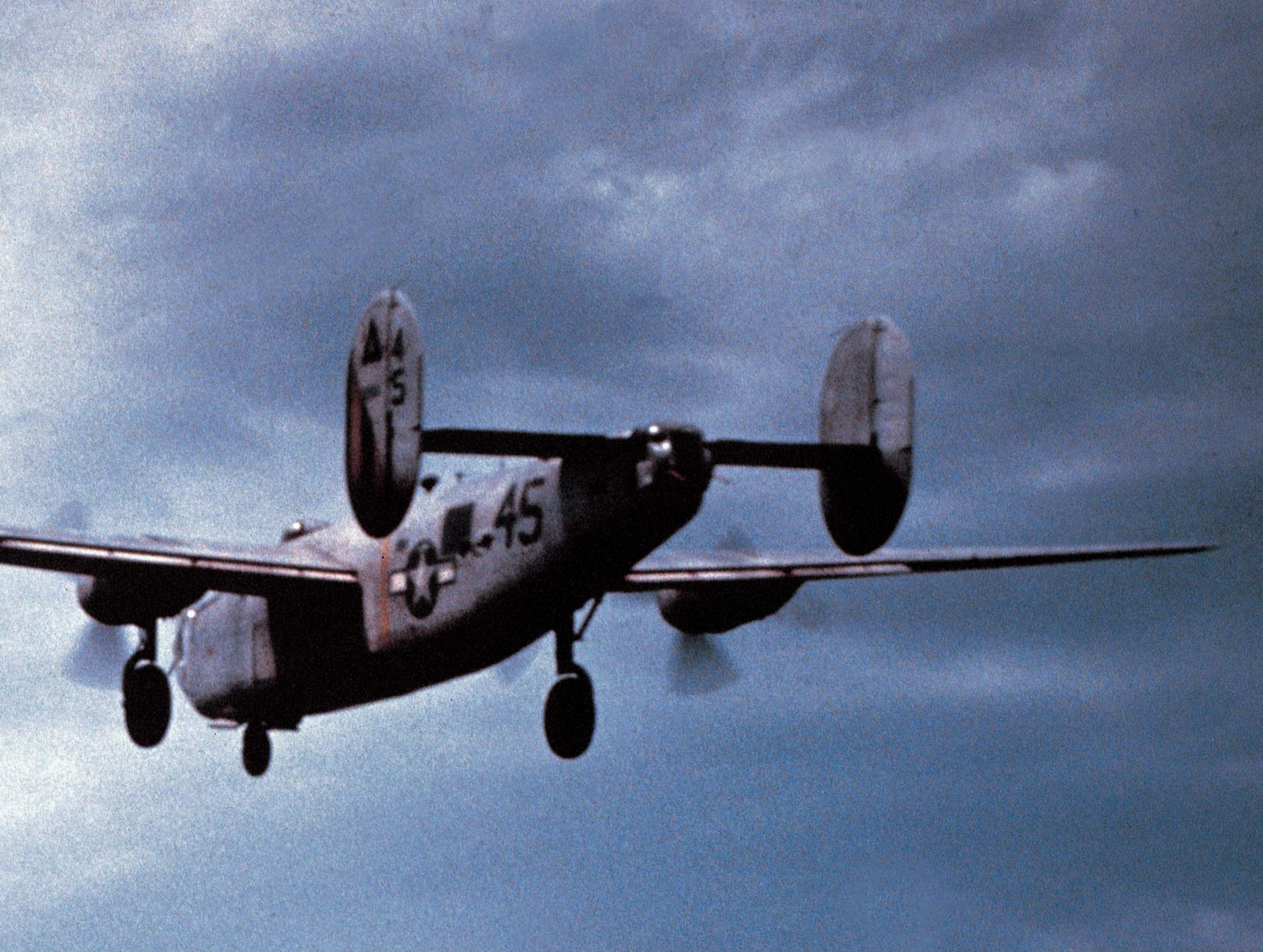
Escaping and Evading in Southwest Slovakia

BY PETER KASSÁK

The 15th U.S. Army Air Force was created on October 30, 1943, to support the Allied Air Forces in their efforts to destroy Axis industries and communications and to break the morale of the German people. Located in Italy, it could easily reach targets in Southern France, the Balkans and Central Europe. Its most known and fearsome targets became the Romanian oil fields at Ploesti and oil refineries and industrial parks around Vienna in Austria. The refineries in Upper Silesia in Northern Europe (now Poland) became the third most visited target and spread fear among the aircrews because of its strong antiaircraft artillery.

This is the wreckage-strewn field close to Ladislav Vrskovy's village. The main part of the fuselage is upside down and burned. (Photo courtesy of Museum SNP, Banská Bystrica via author.)





The first Fifteenth AF raid on those refineries was flown on Friday, July 7, 1944. A stream of 189 5th Bomb Wing (BW) B-17s attacked the refinery IG Farbenindustrie—in American papers known as “Blechhammer-South” (today, Kiedzierzyn, Poland). Another 226 49th and 55th BW B-24s attacked the oil refinery known as “Blechhammer-North” (Blachownia Slaska, Poland), and were supported by 140 304th BW B-24s that dropped their bombs on a refinery in what is today Zdzeszowice, Poland. Fighter cover was provided by 352 Fifteenth AF fighter planes of various types.

The 464th and 465th BGs were stationed at Stornara Airfield and belonged to the 55th BW. On this date, the entire 55th BW, accompanied by Liberators of 49th BW (altogether, seven or eight groups) attacked the oil refinery at Blechhammer-North. For the 464th BG, this was its forty-ninth mission.

In the 778th BS, 464th BG combat formation, B-24H Liberator (S/N 42-52489) was piloted by 2nd Lt. Earcel H. Green along with 2nd Lt. Roy L. Gullledge as copilot. Other crew members were 2nd Lt. George O. Winberg, navigator; 2nd Lt. Neal T. Cobb, bombardier; S/Sgt. Jesse C. Houston, nose turret gunner; T/Sgt. Jack E. Elliot, radio operator and upper turret gunner; S/Sgt. Andrew C. Parker, ball turret gunner; T/Sgt. Claude H. Davis Jr., engineer and left waist gunner; S/Sgt. Gerald E. Howland, right waist gunner; and S/Sgt. John J. Schianca, tail gunner.

The flight path to the target took the formations over several countries in Southeast Europe. German HQ's 8th Jagddivision (8.JD) was responsible for the protection of the southeast part of the Reich. To meet the enemy bombers, 17 twin-engine heavy fighters, Me 410B-2s that belonged to I./ZG 26, took off from Malacky-Novy Dvor airbase in Slovakia.



These were soon supported by 18 Bf 110G-2s—their twin-engine brothers from II./ZG 1—that took off from Wels Air Base and headed northeast to meet American forces. Their duty was to break up the U.S. bombers' tight boxes in one organized attack that would use W.Gr.21 rockets and gunfire. Then they were to clear the area to save their tails from U.S. escort fighters and let the faster single-engine Luftwaffe fighters finish the attack.

For these purposes, 27 Bf 109G-6s from II./JG 27 took off from Fels am Wagram, followed by 25 I./JG 302 Bf-109Gs from Götzendorf. As a subordinate unit to 8.JD, I./JG Ost was airborne from its base at Liegnitz as well, flying 20 Bf 109G-6s and 10 Fw 190A-5s.

to wail, we all abandoned our work and ran to secure ourselves. I went with my friend to a nearby forest, in the direction of our village. We watched the bombers fly from the north back to Italy. One plane was flying lower and behind the others; its altitude was only about 3,000 feet, and dense black smoke formed a long trail behind its engines. It was obvious: this one cannot make it back to Italy.

"I jumped on my bike and went home. I was worried the plane would crash on my village, as it was flying in that direction. When I came closer, I saw a cornfield with remains of the aircraft everywhere; it crashed less than one mile from the village. The remains were still smoking, and ammunition was

exploding. According to those who saw the tragedy, the pilot probably set up for emergency landing. But the propellers hit the waterside of a nearby stream, and [the] plane turned upside down. Wings were ripped off the fuselage and stuck up in the field, resembling gravestones. The engines were thrown ahead and continued for about 300 meters. One of them accidentally flew [in the] direction of a tree, where 53-year-old farmer Ján Bacík

was hiding. The engine cut the tree down one meter above ground, hit the man and stopped approximately 60 meters beyond. Bacík died from his injuries and was buried in the village two days later."

Bailed Out at Only 500 Feet

Bombardier 2nd Lt. Neal T. Cobb remembers the last moments of his bomber's fateful crash and his subsequent "adventure.":

"On July 7, 1944, our target was Blechhammer. This was my twentieth mission. We lost one engine to flak over the target, and when we pulled out of formation, we were attacked by 109 fighters [most probably belonging to Jagdgruppe Ost, which attacked



On October 7, 1944, six 483rd BG B-17 bombers landed at the Tri Duby airport in Slovakia, which was controlled by partisans and Slovak soldiers, and evacuated 29 airmen back to Bari, Italy. (Photo courtesy of Museum SNP, Banská Bystrica via author.)

The bomber formation also flew over Hungarian air space, and to defend their homeland, Hungarian fighters of Vadaszostaly 101 Puma FG supported their German allies by sending 34 Bf 109G-6s from the Veszprém Air Base to face the Americans.

A Witness to War

Many inhabitants of Southwestern Slovakia remember the long bomber streams that flew above their heads and were accompanied by the terrifying sound of thousands of engines. One of them was Ladislav Vrskovy, a resident of Dolny Lieskov village:

"I was 28 years old and working in a nearby town. When air raid sirens started



The onboard guns did not remain mounted on taffetas, as most of the aircraft disintegrated on the field during the crash. (Photo courtesy of author.)



The Liberator's engines were ripped off the wing and propelled forward by momentum. One crashed into a tree behind which a civilian was hiding. He was fatally injured. (Photo courtesy of author.)

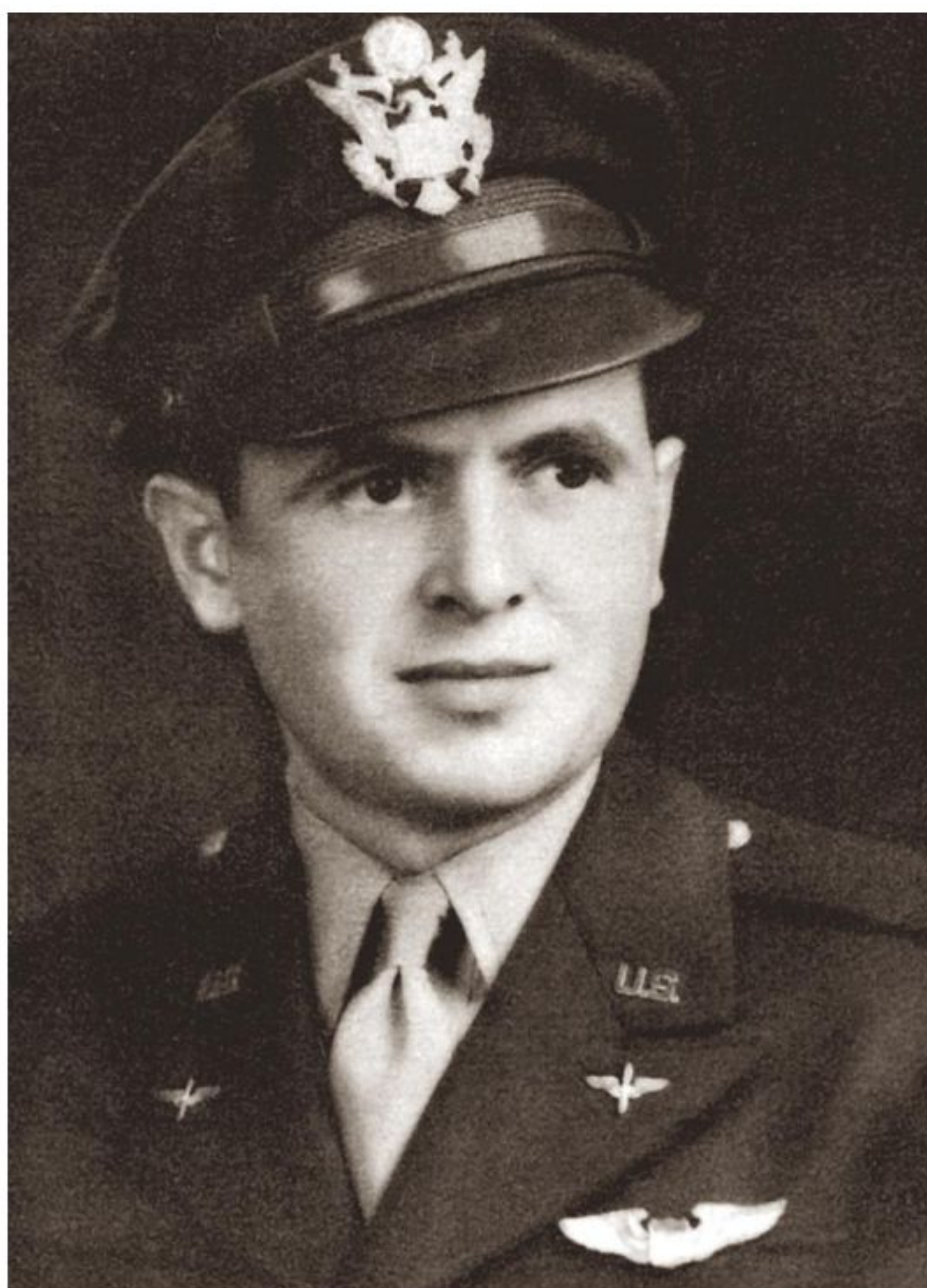
WINGS WERE RIPPED
OFF THE FUSELAGE AND
STUCK UP IN THE FIELD,
RESEMBLING GRAVESTONES

The Liberator's wings broke like matchsticks and wound up stuck in the ground like grave-stones. (Photo courtesy of author.)





The Liberator's bombardier, 2nd Lt. Neal T. Cobb.
(Photo courtesy of author.)



Pilot 2nd Lt. Earcel H. Green was killed in action when his stricken Liberator crashed on the return trip from Blechhammer. (Photo courtesy of author.)



The navigator on Lieutenant Green's B-24 was 2nd Lt. George O. Winberg.
(Photo courtesy of author.)

Americans more to the north]. They knocked out two more engines. All this time we were heading south; finally, the pilot told us to bail out. Six of us were able to do so, but four of the crew went down with the plane. I was the last one to get out, and the people who saw it said that I bailed out at 500 feet.

"Five men from my crew were taken to Trenčín from Dolny Lieskov, and we were interrogated at the Air Force headquarters. The next day, 14 of us were loaded onto a truck and taken to Bratislava. The other nine included George Fernandes and the rest of his crew, who were also shot down on July 7, 1944, [Fernandes' Liberator crashed at Dubodiel, a few kilometers southeast of Trenčín]. We were taken to a military installation in Bratislava and then, in a few weeks, to Grinava POW camp, where we remained until the end of August.

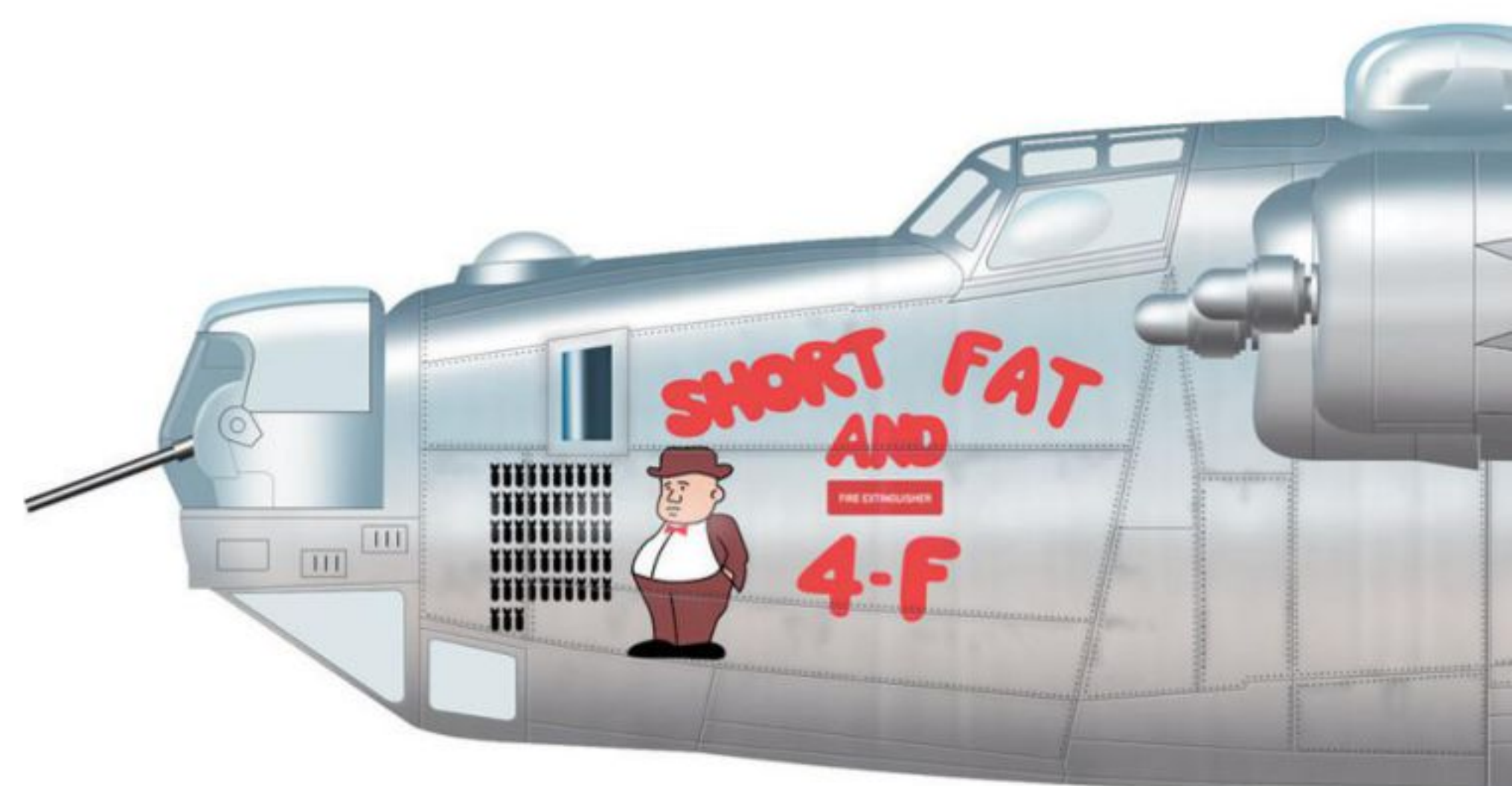
"Our sixth crew member, John Schianca, was taken to the hospital in Trenčín, owing to his left thigh wound caused by flak shrapnel, but he rejoined us a few days later."

Six of the 10-man crew bailed out. Remains of 2nd Lt. Earcel H. Green, 2nd Lt. Roy L. Gullledge, T/Sgt. Jack E.

Elliot and S/Sgt. Andrew C. Parker were recovered from the wreckage and buried at the Dolny Lieskov cemetery the next day. On September 28, 1946, the graves were opened and the bodies were moved to U.S. cemeteries.

Slovakian Protection

During the summer of 1944, when the first U.S. airmen were captured in Slovakia, the Slovak government got an idea (actually born out of necessity) to build its own POW camp. By doing that, they were able to protect the Americans, as they were not sent to Germany but remained in Slovakia as prisoners. Such a camp was established in the village Grinava near Pezinok, in southwestern



Slovakia in July 1944. Cavalry Major Ján Savel was nominated as the camp's commanding officer. The camp consisted of 26 wooden barracks and two latrines. Every captured airman had his own bed, two blankets, a pillow and a table lamp. Airmen reported that the food was very good and consisted of soups, vegetables, meat and coffee. Because of this they really didn't need any Red Cross parcels; however, they each were given 150 cigarettes from these packages, and each airman received 150 Slovakian crowns a month.

On August 29, 1944, the Slovak National Uprising (SNU), with the center in Banská Bystrica, occurred. Slovakian soldiers refused to collaborate with Germans and went to fight for independent Slovakia. In the evening, news about the SNU spread through the POW camp at Grinava. The Americans heard it and began to plan escapes. They formed small groups of three to four men and left camp. Their escape routes led to the Carpathian Mountains, where they planned to contact partisans, and with their help, reach Banská Bystrica. Most of them succeeded.

The Slovakian guards did not make any problems for the Americans during their escape. What's more, the next day, the guards ordered a truck and moved themselves and those Americans who were wounded or in shock after the bailout to the outskirts of Banská Bystrica. From there, they easily made it by foot into town. One was John Schianca, who was still recovering from his leg injury.

The rest of Lieutenant Green's crew

THE BARTENDER TRIED TO TALK US INTO SURRENDERING TO THE GERMANS, BUT FRANK TOLD HIM 'NO,' AND WE HEADED BACK UP INTO THE HILLS ... WE JUST KEPT WALKING AND WALKING.

went into the mountains. Neil Cobb was one of them:

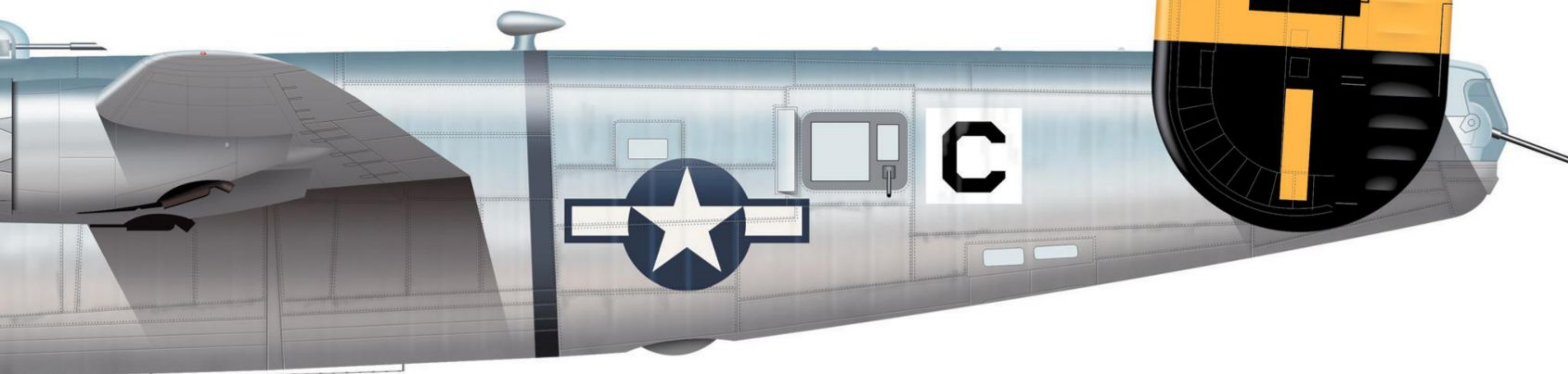
"On the night of August 29, we were told that the Germans would take control of the camp the following morning. I and two others left that night and headed north. The guards all left, and most of the airmen took off in small groups heading for Banská Bystrica.

"Our original plan was to travel at night and sleep during the day. We soon learned that travelling at night was suicide. So from then on, we slept at night and walked during the day.

"We just slept wherever we could find a little shelter with some leaves under us. It was quite cold and when it rained, it was quite miserable. We just kept on walking and getting wetter and wetter. When we found an isolated farmhouse, Frank Soltesz would go in and talk to the inhabitants. [Frank Soltesz, of Slovakian immigrant parents, was a U.S. fighter pilot shot down over Slovakia on July 7, 1944, while escorting the U.S. bombers to Blechhammer. He became victim of a sudden attack of 109s from I./ JG 302. Frank could speak the Slovak language and thus communicate with local people.] Most of them gave us a piece of bread and a glass of milk, but some were afraid and asked us to leave.

"We slept in a haystack one

Short Fat and 4F was a B-24J from the 464th BG and participated in bomb raids that took place in early 1945 (Illustration by Tom Tullis.)





These U.S. airmen were shot down over Slovakia and captured by Slovak soldiers; they escaped from Grinava POW camp into the mountains and wound up in a partisan camp led by Ján Repta (standing in the middle). Left to right: fighter pilots Frank Soltesz, Gordon Follas, George Winberg, Jesse Houston, Neal Cobb, Ján Repta, Claude Davis and John Wilson. (Photo courtesy of author.)

night, and I was bitten by spiders. I scratched the bites, and they became infected, so we walked into a little town and into the local hostinec [pub]. We wanted whiskey to put on my sores. The bartender tried to talk us into surrendering to the Germans, but Frank told him 'No,' and we headed back up into the hills. As we left, we saw a railroad handcar with several German soldiers on it coming into the town. Apparently, the bartender had notified the German authorities.

"We ran into several partisan bands along the way. At one of their camps, we were given civilian clothes and a pass for identification. At another camp run by a Russian major, we were given food and asked to join their band. Frank told the

major that we couldn't do that, and we were given until sundown to get out of town.

"We met some men from the prisoner camp and learned that we might get help at Banská Bystrica. One night, we walked into a little town and were put up in a nice home and even slept in a bed. Before daybreak the next morning, the man of the house awakened us and told us we had to leave before the sun came up. It would not be safe then. He gave us each a sack of food, and his wife had cooked each of us a whole chicken. What a feast we had that day! I have often thought about that couple who helped us and pray they did not suffer for what they gave us.

"We just kept walking and walking. We headed north and northeast and finally

got way north, possibly just into Poland. At that point, we headed south with our goal of getting to Banská Bystrica. Somewhere along there, we ran into Roy Madsen and his group. We eventually made it to Banská Bystrica, going the last 30 miles in the boxcar of a train.

"We arrived at about 11 o'clock at night. This was either on the 26th or 27th of September. We figure that we had walked somewhere between 300 and 400 miles; our bodies felt like it was 400.

"The next morning, I was sitting on my cot when Lt. Holt Green, USN, came walking down the aisle. He introduced himself and said that he would help us. That is the first time we heard about the OSS [Office of Strategic Services].

"I found out that the OSS had flown in on September 17 and that John Schianca had flown out on that day. What good news that was! [Two B-17s of 483rd BG landed in Slovakia on September 17, 1944, and brought some support materiel for partisans and evacuated 14 airmen.]

"We were given new uniforms by the OSS and some local currency. We were all put up in barracks and pretty much left on our own. We found a pastry shop, and we'd sit at a table in the back where they brought out the pastries. As the girl came by with a tray full of pastries, we'd buy the whole tray. We had to quit doing that because there weren't any pastries for anyone else. At night, we went to the hotel and smoked cigarettes and drank beer. Dark curtains covered all the windows because the town was blacked out. The Germans would fly over at night and drop a few bombs just to irritate us.

"Each day, more American fliers came into Banská Bystrica; there were finally 28 or 30 of us. The Germans were trying to put down the uprising and recapture the town. The commandant of the uprising told Lt. Green that the Tri Duby airport could not be held very long. Lt. Green talked to Bari, Italy, by wireless, and OSS headquarters told him to have all of us at the airfield the following morning, October 7, 1944.

"We were loaded on trucks and driven

to Tri Duby airport—just one building and only a grass runway. The six B-17s arrived at last, escorted by 32 P-51s. The planes brought in 12 other OSS men and an AP correspondent named Joseph Morton. We helped unload the planes, and then we boarded and took off for Italy, where we landed just after sunset. We were checked over by medical personnel and given a nice meal, a shower and clean clothes. It was good to be back!

"I was processed and given orders for transport back to the U.S. I arrived in New York harbor on November 7, 1944. What a wonderful day that was!"

Protected by the Resistance

With Neil Cobb, three others from his crew boarded the B-17 bombers: 2nd Lt. George O. Winberg, T/Sgt. Claude H. Davis Jr. and S/Sgt. Jesse C. Houston.

The sixth crew survivor, S/Sgt. Gerald E. Howland, did not make it home until the end of hostilities. Howland left Grinava POW camp in a group of four airmen. They went by a similar way as Neil Cobb and his friends, but in the mountains, they did not meet the partisans; instead, they were contacted by local people—members of the resistance. They hid the five airmen in the woods and supported them with food until November. In mid-November, after two and a half months in the hideout, some information about American fliers in the mountains reached the Germans, who organized search patrols. To protect the locals who had helped them, the Americans decided to move. They started their journey on November 13, 1944. Unfortunately, within two days, they were all recaptured, this time, by German soldiers, and they were sent to POW camps in the Reich. Luckily, Howland survived the captivity and returned home to the States after the end of WW II.

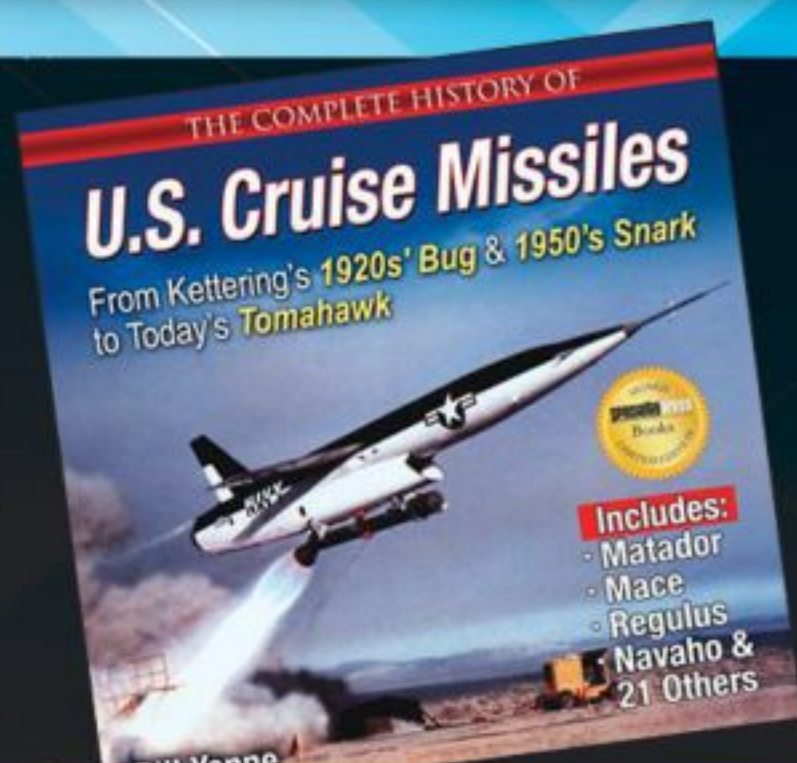
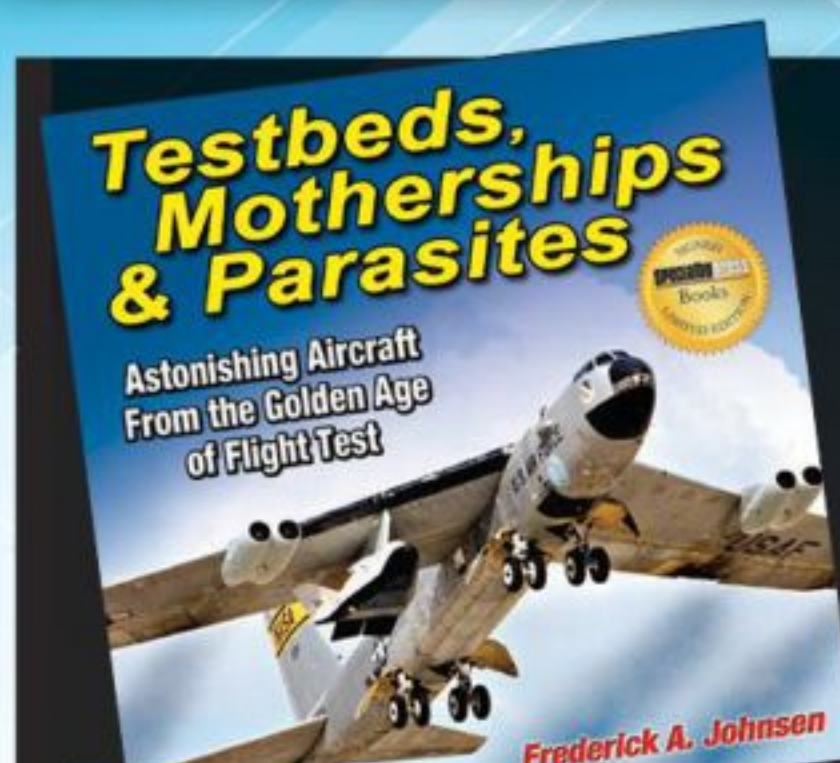
As for the four crew members who were killed in action, let this previously untold story serve as their memorial and an appreciation of my country's deep thanks!

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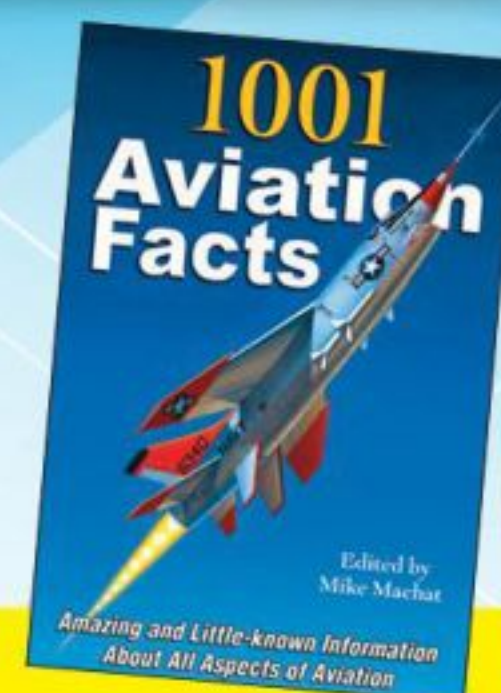
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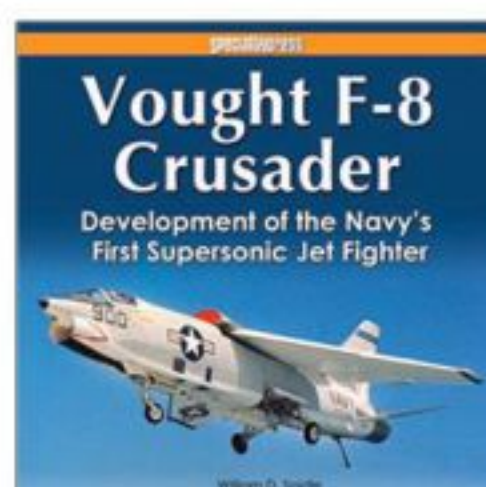
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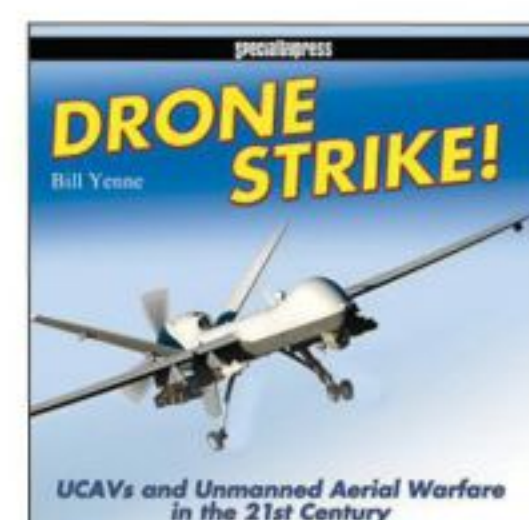
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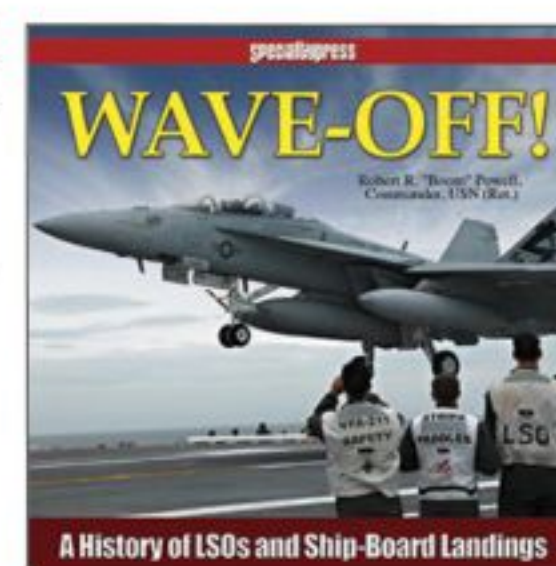
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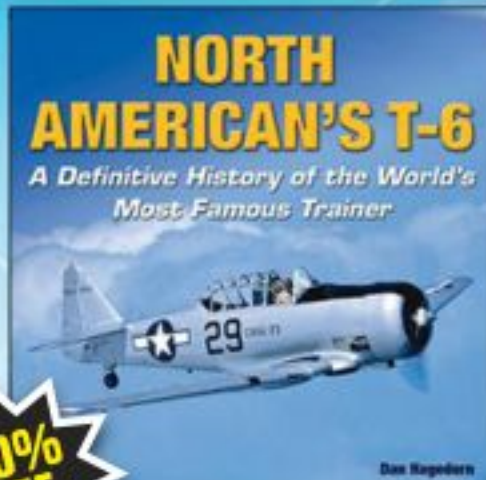
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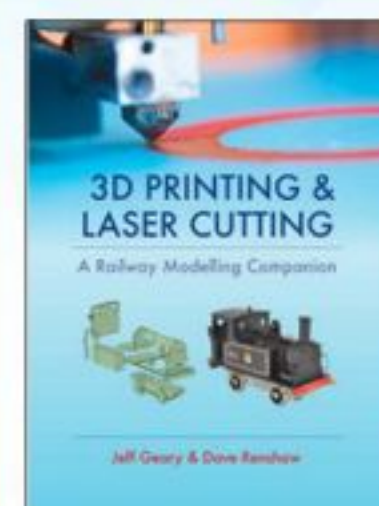
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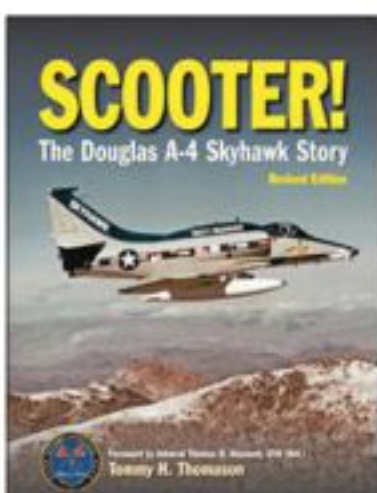
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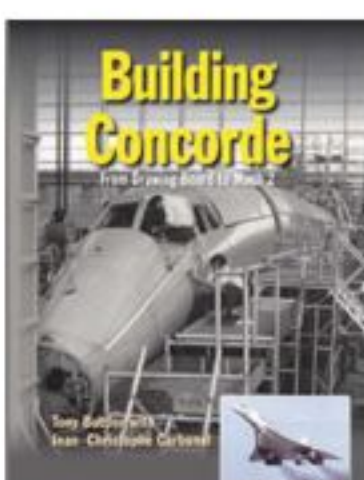
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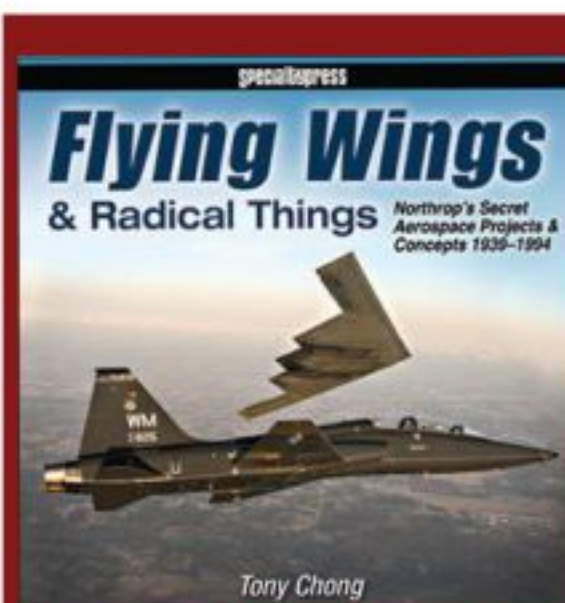
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Flying Backseat in a Texan

BY THE *FLIGHT JOURNAL* CREW

Recently, senior editor Gerry Yarrish had an experience of a lifetime when he was able to fly backseat with Nick Ziroli Jr. in his beautiful AT-6 Texan. It was during formation flight training, and being based out of the American Airpower Museum at the Republic Airport in Farmingdale, Long Island, the flight took place mainly over Long Island Sound. Nick flew his training flight along with his wingman Craig Sampson and their half-hour flight included station-keeping, close-in tight formations and maneuvers like 360-degree and 180-degree turns, tight 45-degree banking turns, as well as lazy eights and hard breakaways. After their series of training flights were successfully completed and logged in, Nick and Craig received their certifications (and their Texan

Formation Patches) from commanding officer and flight leader of the GEICO Skytypers Air Show Team, Larry Arken.

Gerry commented that even though it was a glorious day with blue skies and not a cloud in sight, at the end of the flight he was “Well wrung out!” While not being overly aggressive, the maneuvers did produce some higher than normal Gs, and when the flight was complete, Gerry was ready to land and start bragging about his experience.

Nick’s Texan is beautifully maintained and he flies it and other museum warbirds regularly, helping the museum give rides as part of their “Legends of Airpower” and the Jones Beach Air Show. ✈



Above: In the Museum’s hangar, Nick (right) and Craig Sampson pose in front of Nick’s 1942 AT-6 Texan. Left: Not many can wear this patch on their flight suit. Both Nick and Craig are justly proud of their accomplishment. Below: Gerry flying backseat with Nick during a training flight. Craig’s Texan can be seen in the background.



During formation flight training, Nick Ziroli Jr. flew in close with wingman Craig Sampson over Long Island Sound.

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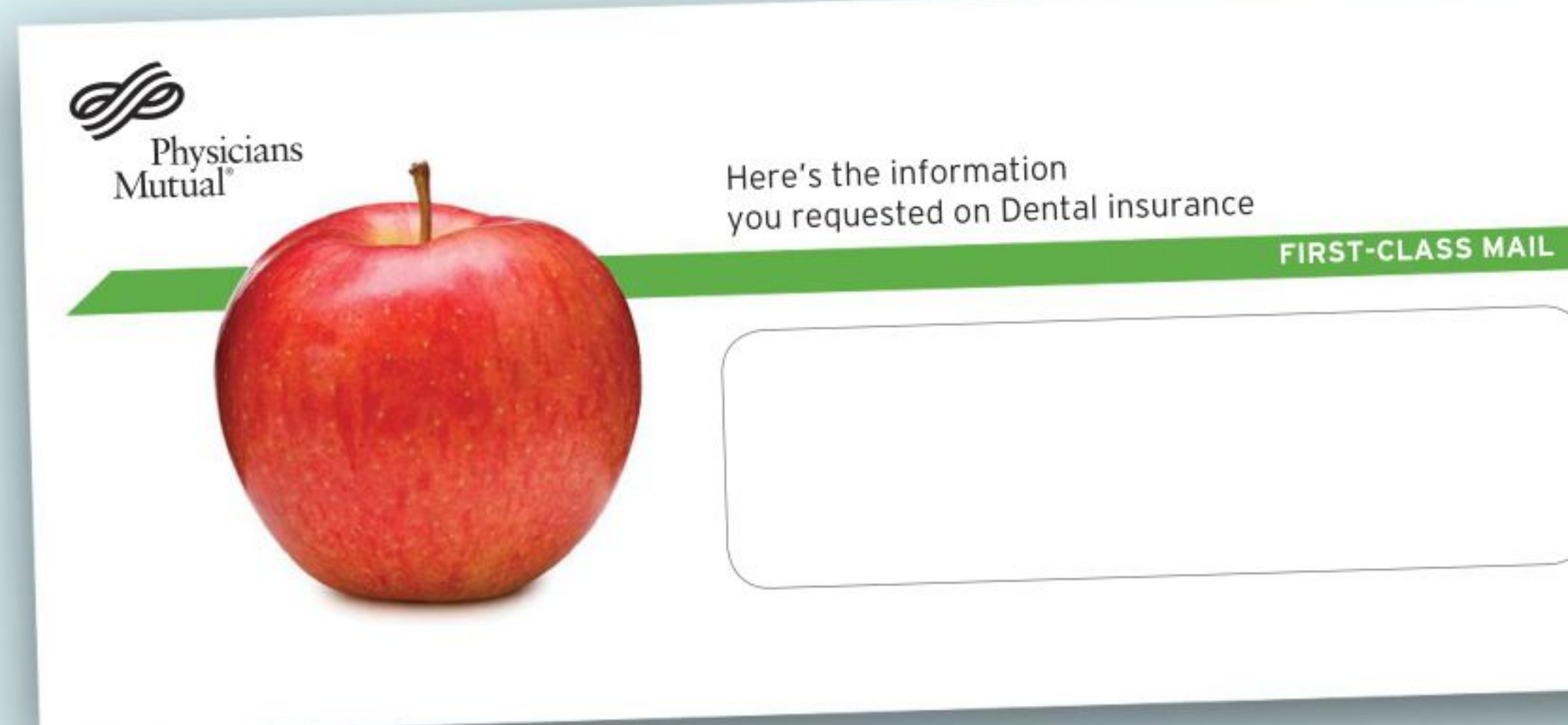
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