EAA
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Vol.72 No.9 | September 2023

+ **Difficult or Just Different?**
The myth of hard-to-fly airplanes

A Landmark Homebuilt
Wimpy and the Beaverton Outlaws

The Arctic Tern
A look back at a backcountry classic

OSHKOSH
AirVenture 2023 in photos

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Looking Back at EAA's 70th

AirVenture Oshkosh 2023 delivered

BY JACK J. PELTON

IN JULY, WE CELEBRATED EAA's 70th anniversary during AirVenture. The celebration actually started early, with a gift in the form of the FAA's release of the notice of proposed rulemaking for MOSAIC that will redefine the light-sport aircraft (LSA) category and sport pilot privileges, among many other positive changes. The most significant being that LSA will no longer be limited to a specific weight. The limitations will be based on stall speed in a clean configuration and a speed limit of 250 knots. The proposed rule also allows for complex aircraft equipped with retractable gear and a constant-speed prop. It was great to start the celebration with a gift like that.

During the week of the event, we continued to deliver something for everyone with significant participation by the USAF Air Education and Training Command, which filled Boeing Plaza every day with trainers, fighters, and transports. We had a remarkable gathering of Corsairs and welcomed significant new restorations, like an award-winning P-47 Thunderbolt and, of course, *Bataan*, Gen. Douglas MacArthur's Lockheed Constellation VIP transport.

For me, one of the greatest rewards of the week was seeing the large numbers of families with young children on the grounds, thanks to our free youth admission policy, which is supported in part by Boeing. This program is in its third year and is certainly delivering on our mutual goal of getting more young people to AirVenture. While they were here, young AirVenture attendees could check in at our new Youth Welcome Center to find information about activities at KidVenture, the AeroEducate Center, our Learn to Fly Center, as well as numerous colleges and universities. There were resources available for youths interested in just about any pathway to a career in aviation; from pilots, to mechanics, to engineers, it was all here.

This was a record year in so many ways, with more airplanes and movements, more campers, more cars, and international visitors from a number of countries that tied the previous record. But those metrics aren't the ones that define success. The real metrics are the smiles that you see on people's faces as they get to experience all aspects of aviation. From pristine restorations of vintage aircraft and warbirds, shiny new homebuilts and aerobatic aircraft, and a wide array of ultralights, to the Iron Man-style Gravity jet suits and Wisk's first public demo of a fully autonomous aircraft. Twilight Flight Fest continued with STOL demos and breathtaking RC model flying, and our air shows — both day and night — delivered world-class entertainment as always. More than a thousand workshops and forums helped teach and inform, and nearly that many exhibitors filled the grounds to show off their new aviation offerings.

Of course, without our dedicated and passionate volunteer corps, there would be no AirVenture. We're all incredibly thankful for the work that they do, and it's always heartwarming to hear their stories. It's not uncommon to find third-generation volunteers on the convention grounds, and the pride they have in their work, the connections that they make, and the relationships that they establish are what makes AirVenture a true family reunion. Speaking of heartwarming, it was powerful to be there on the flightline to welcome the returning veterans on the Yellow Ribbon Honor Flight, against the backdrop of our commemoration of 50 years since the end of direct hostilities in Vietnam. It was great to see some EAA members among them, a couple of whom even called me by name when I had the honor of shaking their hands as they got off the airplane.

It's not uncommon to find third-generation volunteers on the convention grounds, and the pride they have in their work, the connections that they make, and the relationships that they establish are what makes AirVenture a true family reunion.

Looking back, I deeply appreciate how the Oshkosh family came together as it always does, enjoying the camaraderie that comes from our shared passion for aviation, looking out for one another through weather challenges and supporting those who were affected by the loss of loved ones during the week. Through it all, we were reminded that our Oshkosh family is stronger than ever.

Now, in our staff-wide state of happy, excited exhaustion, the planning for next year begins in earnest, and I can't wait. July 2024 can't come soon enough. Thanks to everyone who joined us, and we'll see you next year. EAA

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Photo of LuLu from the JPI website gallery

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70th EAA ANNIVERSARY

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EAA SportAviation

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FEATURES

ON THE COVER:
This year's winner of the Bill Barber Award for Showmanship, Nate Hammond, EAA Lifetime 1193485, flying *GhostWriter*, his modified Super Chipmunk, over the grounds of AirVenture Oshkosh 2023. Photo by Connor Madison

ON THIS PAGE:
NASA's massive Super Guppy glows against the backdrop of fireworks at the end of one of the night air shows during AirVenture Oshkosh 2023.

For more on many of the topics in this issue, visit EAA.org/SportAviation.
To view and submit aviation events, visit EAA.org/Calendar.

PHOTOGRAPHY BY **ANDREW ZABACK**

DEPARTMENTS

COMMENTARY

NEWS & INFO

EXPERIMENTER

MEMBER CENTRAL

EXTRAS IN THIS ISSUE EAA.ORG/EXTRAS

SPORT AVIATION EAA.org/SportAviation

CELEBRATING 70 YEARS OF DREAMERS AND DOERS

EAA AirVenture Oshkosh 2023, our annual fly-in and membership convention, was one for the record books. More than 677,000 people came through the gates to experience their own "only in Oshkosh" moments, surrounded by family, friends, and, of course, more than 10,000 aircraft.

TIMELESS VOICES EAA.org/Videos

BURT RUTAN

Burt Rutan is an aerospace engineer who has designed everything from homebuilt aircraft, such as the Long-EZ; to Voyager, the first aircraft to fly around the world without stopping or refueling; to SpaceShipOne, the first privately funded spacecraft to enter the realm of space.

WEBINARS EAA.org/Webinars

HOW TO GROUND AN AIRPLANE

Nobody wants to fly an unsafe airplane. Fortunately, we pilots have numerous opportunities to uncover conditions that might compromise safety, including prebuy examinations, preflight inspections, thorough run-ups, in-flight vigilance, post-flight inspections, and post-maintenance checks. This webinar will prepare you to ground the aircraft before it grounds you!

HINTS FOR HOMEBUILDERS EAA.org/Hints

MAKING A CONE-SHAPED DEBURRING TOOL

EAA Homebuilt Aircraft Council member and RV-8 builder Mike Dooley demonstrates how to make a small cone-shaped 3M deburring pad that can be used with a Dremel tool.

THE GREEN DOT

OV-10 BRONCO PILOT JOHN VAN ETTEN

This time on *The Green Dot*, hosts Tom and Chris are joined by John Van Etten, who was an OV-10 Bronco pilot and on-scene commander during the famed rescue mission of Bat 21 during the Vietnam War.

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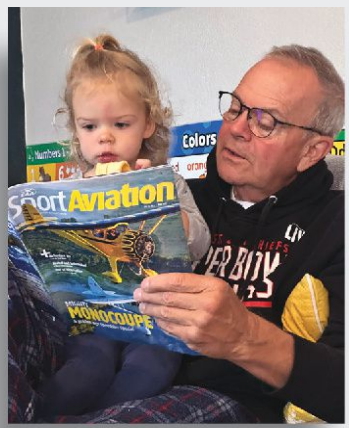
REACHING A YOUNGER DEMOGRAPHIC

WHEN MY SON NOAH was 5 years old, he developed a huge love for aviation. His passion started with World War II aircraft. He would ask us to get him books that had anything to do with the aircraft that were used in WWII. Throughout the day, he would sit and study his aircraft books so much that he could tell you just about anything you wanted to know about the aircraft in it. From the size of the airplane, the speed of the airplane, how many bombs it carried, and when it was used in battle. Four years later, he is now 9 years old, and his aircraft passion has grown deeper.

When he was 5 years old, he flew in a Vietnam War-era Huey helicopter, when he was 7 years old, he flew in the B-25 *Berlin Express*, and he has participated in EAA Young Eagles flights for two years. As soon as we receive the latest *EAA Sport Aviation* magazine, he's the first one to grab it and read through it. He lives and breathes anything and everything that has to do with aviation!

Tricia Meerstein, EAA 1430312
Sheboygan Falls, Wisconsin



AS WE FLIPPED THROUGH the pages, my granddaughter's eyes sparkled with excitement looking at the vibrant photographs of airplanes and the beautiful settings. Each page revealed new airplanes of various colors. What made this experience truly magical was the power of imagination.

Beyond the educational aspect, this simple activity allowed us to connect on a deeper level. As we paged through the magazine, she nestled in my lap, snacking on her banana, pointing excitedly at the pictures and telling me what she saw. Granted her vocabulary is still developing, but she spoke with such enthusiasm that I could not help but acknowledge whatever she was telling me. It was a precious, albeit infrequent, bonding moment.

In this digital age, it is refreshing to step away from the television, put down the smartphone, and spend quality time with those you love. So, whether it's an airplane magazine, picture book, or other reading material, embark on these adventures together as these fleeting moments will leave a lifetime of memories.

Bud Keil, EAA 619179
Shell Knob, Missouri


STEVE KROG

Why So Many Failures?

With the demand for new pilots comes the need for certificated flight instructors. And this need has not and cannot yet keep up with the demand for increased pilot training. Ultimately, this leads to less than properly trained new young pilots.

My Kind of CFI

STEVE KROG'S BACK-TO-BASICS TRAINING and of course his J-3 always bring back "when pilots were pilots and their planes were glad" (once heard that from a crop duster pilot standing next to a Stearman biplane)!

As an expired CFI with more than 20,000 hours of flight time specializing in aerobatics, tailwheel, and basic skills, perhaps the best flight training I received was not from a CFI but a strawberry farmer on his grass strip in his own yellow J-3 Cub.

Instruction like landing in his friend's field to "get tomatoes for your mom" — a lesson that proves you can make a safe landing off of an airport.

"Have you ever flown a glider?" as mag switches were turned off, and being talked through a power-off landing!

Even the first flight lesson when my question "What do I need to do?" was answered by, "Just give it what it needs."

Those lessons and others led to me teaching every student a one-turn spin and then hearing their explanation while demonstrating their own precision spin so they could have the spin endorsement for CFI — with only their student pilot certificate.

To an outdated old guy like me, Steve Krog's articles and knowledge are greatly appreciated! Keep up the great work!

Rob Mixon, EAA 110647
Jupiter, Florida

SUBMISSIONS

Letters intended for publication should be emailed to editorial@eaa.org or addressed to EAA/Letter to the Editor, P.O. Box 3086, Oshkosh, WI 54903. Please include your EAA number, city, and state. All letters are subject to editing. Unpublished letters will not be returned.

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MOSAIC IS HERE!

BY SEAN ELLIOTT, EAA VICE PRESIDENT OF ADVOCACY AND SAFETY

ON JULY 24, the opening day of EAA AirVenture Oshkosh 2023, the FAA officially published its proposed MOSAIC (Modernization of Special Airworthiness Certificates) rule for the expansion of light-sport aircraft (LSA) in the *Federal Register*. This proposed rule has been in the works for more than 10 years, with EAA playing a major part in its development. The MOSAIC notice of proposed rulemaking (NPRM) is 90 pages long, and while we are still reading through the details, it appears to be a major step forward for GA and recreational aviation. The proposals put forward by the FAA should enable significant safety enhancements and increase the viability of this category of aircraft.

So what's in it? First, it is truly a focused expansion of light-sport aircraft. No more 1,320-pound weight limit for LSA. The measures in the proposal are performance-based and would no longer be an arbitrary weight. It appears that the key limiter in the proposal is V_{S1}, or clean stall speed at the maximum certificated takeoff weight. As proposed, it is 54 knots calibrated airspeed. There is also a limitation of four seats. A sport pilot, or someone with a higher certificate exercising the privileges of a sport pilot, will continue to be limited to one passenger. While there are a few other definitions, it appears that the clean stall speed and seat number are the top drivers of what is in and what is out.

Expanding light-sport aircraft means that sport pilots will be able to fly more capable aircraft that meet this new definition. Many aircraft such as C-182s, C-172s, Luscombes, C-140/120s, and even a few retractable, high-performance aircraft, such as the single-engine 180-hp Piper Comanche, would be eligible to be flown by sport pilots. The elegance of this is that there will now be training and flight instructor endorsements to ensure that the budding new sport pilot who wants to move up to something more complex will still be trained and demonstrate the ability to safely operate those aircraft under the watchful eye of a flight instructor. These combinations of more significant aircraft and proper training with CFIs for interested sport pilots have the makings of being a game changer for recreational aviation in the United States.

Having just completed AirVenture, the EAA team is still carefully reviewing the details of this proposed rule. I'm sure many of you are doing the same thing. EAA has set up a dedicated email at MOSAIC@eaa.org to hear your feedback and any concerns as we develop our response to the NPRM. At first reading, this NPRM appears to be a 90 percent well-done proposal. The FAA is counting on all of us to provide feedback that helps tweak certain areas and really hit the bullseye with the final rule.

The comment period will close on October 23, and the final rule should take around 16-24 months to be completed.

EAA would like to thank the FAA team members who have worked on the MOSAIC NPRM and look forward to providing our comments and working toward a final rule that will benefit the general aviation community.

SWEPT UP IN THE ILLEGAL CHARTER NET

BY RONNIE R. GIPSON JR., CHAIR, EAA LEGAL ADVISORY COUNCIL; PROFESSOR OF LAW – UNIVERSITY OF MEMPHIS

LATELY, THERE HAS BEEN a lot of attention and emphasis from the FAA geared toward stopping illegal charters. Pilots have asked whether either the use of general aviation aircraft to transport someone for medical procedures or sharing expenses with someone on a flight violates the Federal Aviation Regulations (FARs) prohibition against compensated flights without a commercial certificate — an illegal charter. The worry from the pilots is that either operation, if in violation of the FARs, could lead to an enforcement action by the FAA. If the FAA were to initiate an enforcement action against a pilot for conducting a commercial flight without a commercial certificate under Part 61.113, then the pilot potentially could face certificate revocation, certificate suspension, and/or a civil penalty.

First, let's deal with the scenario of transporting someone for medical treatment. For many years, pilots have used their own aircraft to fly cancer patients seeking treatment from one state to another for free. Consistent with FAR Part 61.113, transporting cancer patients without charging those patients for the flights (known as public benefit flights) does not violate the FARs as long as neither the pilot nor the organization arranging the flight receives any type of compensation for the endeavor. The term "compensation" with respect to application of the FARs is a term of art with specific meaning. The FAA defines compensation broadly to include any reimbursement of expenses and the building up of flight time … if the pilot does not have to pay the costs of operating the aircraft. When a pilot performs a public benefit flight and, in that operation, the pilot covers the cost of operating the flight such as expenses for fuel, maintenance, landing fees, etc., then the pilot is not being compensated for the flight. However, when a pilot provides a public benefit flight and, in that operation, the pilot

receives remuneration to cover operating expenses such as fuel, maintenance, landing fees, etc., then the situation is one where compensation exists. Once compensation is present, the regulatory requirements in multiple areas change such as the maintenance requirements for the aircraft, the medical certificate needed by the pilot, as well as the need for a commercial certificate per Part 61.113. If an organization arranged the free flight but received remuneration for the associated expenses, then the organization must comply with FAR Part 119.

The issue of compensation and illegal charter in aviation law is one that has been the basis of enforcement actions for years. As a result, to assist with application of the FARs, there exists a body of interpretive letters, petitions for exemption, advisory circulars, and an understanding among aviation industry and legal professionals about what type of flight operations require the heightened care of a commercial certificate and authority to conduct operations under FAR Part 119. Nonetheless, despite the guidance there continues to be disagreement about the application of the FARs to public benefit flying, and even experienced operators run afoul of the commercial operations regulations.

Individuals or organizations who are unfamiliar with the complexity of the compensation issue thrust themselves into a thorny area of aviation law by soliciting pilots to volunteer to make public benefit flights without understanding the ramifications of getting the nuances in the law wrong. In 2005, the FAA in an advisory letter lauded the selfless efforts of the pilots who engage in public benefit flying. Yet, in the same publication, the FAA emphasized that the philanthropic nature of the operation does not result in a free pass exception from the commercial operation regulations. The message to pilots engaging in public benefit flying is to proceed carefully and ensure that all aspects of the flight and operation comply with the FARs.

The second area of concern — sharing expenses on a flight seems straightforward, but it too holds traps for those who fail to proceed carefully. FAR Part 61.113(c) allows a pilot exercising private pilot privileges to share expenses of a flight with passengers. The only expenses that can be shared with passengers are fuel, oil, airport fees, and aircraft rental fees. However, the pilot cannot conduct any commercial activities on the flight such as banner towing, crop dusting, ferrying, or training. On this point, as part of the inquiry, the FAA will look for a common purpose between the pilot and the passenger for traveling to the destination. If the passenger chooses the destination, and the private pilot does not have his own reason to be in the city at the same time, then the requirements of the common purpose test have not been met.

Next, the FAA looks to see if a private pilot can be classified as "holding out" to a segment of the public as willing to furnish transport to any person who wants it. As explained in FAA Advisory Circular AC 61-142, "Common carriage is defined as a holding out of a willingness to transport persons or property from place to place for compensation or hire." When a private pilot attempts to share expenses on a flight, the only missing piece to fulfill the requirement for common carriage is the "holding out" component. In the past, the FAA has determined that website posts, internet postings, along with newspaper inserts and magazine ads were all forms of holding out. EAA is not immune from making missteps in this complicated area of regulatory aviation law. Previously, EAA maintained an online bulletin board, accessible only to paid members on its website through the use of a username and password, that allowed pilots to offer open seats on their aircraft to prospective passengers seeking to hitch rides to AirVenture. The passengers were expected to share expenses with the pilots who made the posts under Part 61.113(c). Consistent with FAA Advisory Circular 61-142, the online bulletin board failed to raise any regulatory concerns. Historically, the number of EAA members who used the electronic bulletin board was very low, less than 20 a year. However, very recently, the FAA took the position that the electronic bulletin board was a direct form of holding out because EAA's membership of more than 200,000 was too big. In essence, the posting of the notice of an open seat on the EAA electronic bulletin board communicated to the public that a transportation service was indiscriminately available, which constituted "holding out" by the pilots to a segment of the public and violated the regulation.

Knowledge is power, and it affords pilots who are interested in public benefit flying with the opportunity to prepare themselves in the best way possible to avoid any negative legal consequences. If you have further questions on this topic, reach out to EAA and let it connect you to one of the members of EAA's Legal Advisory Council. Forewarned is forearmed because, unfortunately, getting swept up in the FAA's illegal charter net could turn out to be expensive and costly in so many ways. EAA

TOP STORY

EAA AIRVENTURE OSHKOSH 2023

Facts and figures

THIS YEAR'S ANNUAL CONVENTION turned out to be another record-setting year.

"There was so much going on during the week that encompassed the entire world of flight, from the presence of the U.S. Air Force Training Command and NASA, to magnificent aircraft restorations and exciting new flying technology," said EAA Chairman and CEO Jack J. Pelton. "Oshkosh was again the place that brought the aviation world together."

This year's attendance was approximately 677,000, up from the previous record of 650,000 last year. But attendance numbers weren't the only record.

"We had record-setting totals of campers, exhibitors, volunteers, and more," Jack said. "It was also a challenging year at times with weather, logistics, and other factors, which makes me even more proud of the efforts by our volunteers and staff to organize an outstanding event."

Here are some additional details from this year's fly-in:

Total aircraft: More than 10,000 aircraft arrived at Wittman Regional Airport in Oshkosh and other airports in east-central Wisconsin. At Wittman alone, there were 21,883 aircraft operations in the 11-day period from July 20-30, which is an average of approximately 148 takeoffs/landings per hour when the airport is open.

Total showplanes: 3,365, including a record 1,497 registered in vintage aircraft parking, plus 1,067 homebuilt aircraft, 380 warbirds (up 3 percent from '22), 194 ultralights, 134 seaplanes and amphibians, 52 aerobatic aircraft, and 41 rotorcraft.

Camping: More than 13,000 sites in aircraft and drive-in camping accounted for an estimated 40,000 visitors.

Volunteers: More than 5,500 contributing in excess of 250,000 hours.

Commercial exhibitors: 848 (another record number).

Forums, Workshops, and Presentations: More than 1,400 sessions hosted throughout the week.

Social media, internet, and mobile: More than 18.3 million people were reached by EAA's social media channels during AirVenture (up 78 percent over 2022), with engagement of 1.9 million. More than 189,000 hours of viewing EAA video clips online also occurred during the event (more than double the 2022 total).

International guests: International visitors returned in a big way in 2023, with 2,372 attendees registering at the International Visitors Tent from a record-tying 93 countries outside the United States. Adding a significant number of international visitors who do not register at the tent when they arrive, the actual total is much higher.

The Gathering: The EAA Aviation Foundation's annual event to support its aviation education programs attracted more than 1,000 people and raised more than $2 million dollars that will be focused on EAA's mission of growing participation in aviation.

Media: 863 media representatives onsite, from six continents.

Estimated economic impact*: $170 million for the five counties in the Oshkosh region (Winnebago, Outagamie, Fond du Lac, Calumet, and Brown).

By the time you read this, planning for EAA AirVenture Oshkosh 2024 has begun in earnest.

"We are already looking at a number of big activities, including the 100th anniversary of the Royal Canadian Air Force," Jack said. "Plenty of ideas have also been forwarded to us from EAA members and others that will be part of the planning for 2024."

**Based on a 2017 University of Wisconsin Oshkosh economic impact study.*

COVINGTON AIRCRAFT DONATES PRATT & WHITNEY R-985 ENGINES FOR EAA'S FORD TRI-MOTOR

BY ROBBIE CULVER

COVINGTON AIRCRAFT OF OKMULGEE, Oklahoma, just celebrated 50 years in business overhauling Pratt & Whitney R-985s, R-1340s, and PT6As. Covington has a message for the aviation community: "While the rest of the world seems intent on growth through mergers, Covington Aircraft Engines remains true to the power of one: you. We are one family. Servicing engines from one manufacturer. With one guiding commitment. And by providing uncompromising service with core values first established by the Abbott family, we've built Covington Aircraft Engines over the last 50 years, one customer — and one engine — at a time."

Covington has donated three new R-985 Wasp Junior nine-cylinder 450-hp supercharged air-cooled engines for EAA's Ford Tri-Motor 4-AT-E. The first engine arrived in mid-July, with the remaining engines to arrive at the end of the year and in early spring 2024.

At an unveiling event held at EAA's Kermit Weeks Hangar on Wednesday, July 26, Covington Aircraft's President Aaron Abbott said, "We love our partnership with EAA." Abbott added, "We love EAA and AirVenture. We love coming up here — my wife and kids come up here, my parents are up here. It's just a great time to come see friends — it's like a family reunion every summer." Abbott's father, Paul, who founded Covington, joined his wife, Betty; Aaron's wife, Michelle; and their daughters, Emma and Audrey, and their son, Oaks, at the Weeks Hangar to celebrate the occasion.

John Hopkins, manager of aircraft maintenance for EAA, said, "We're just so excited to be part of the Covington family, and putting their engines on our airplane will give us many years of reliable service."

Andrew Ramsey, business development manager at EAA, added, "Our relationship with Covington Aircraft is amazing! They sponsor our Wednesday night air show and are also the main sponsor of our Runway 5K. They support EAA in a lot of different ways and are great partners and really good people!"

NOMINATIONS FOR EAA DIRECTORS

PURSUANT TO THE RESTATED articles of incorporation and seventh restated bylaws of the Experimental Aircraft Association Inc., nominations are hereby solicited for Class I director positions to be filled at the 2024 EAA annual member meeting. Nominations for these positions shall be made on official nominating petition forms that may be obtained by mail (addressed to Judy Reader, Experimental Aircraft Association Inc., P.O. Box 3086, Oshkosh, WI 54903-3086) or by e-mail (jreader@eaa.org).

The nominating petition shall include a recent 3-by-5 photo or high-resolution (300 dpi) digital image of the candidate and contain a brief résumé and 200 word bio of his or her background and experience. Candidates must be current EAA members. Each petition shall require the signatures of at least ten (10) EAA voting members, along with such members' EAA numbers and membership expiration dates. Nomination petitions shall be submitted to Judy Reader, Experimental Aircraft Association Inc., P.O. Box 3086, Oshkosh, WI 54903-3086, no later than January 1, 2024. The EAA board governance committee shall acknowledge the filing of such petition and shall verify the validity of the signatures included on each such petition.

The EAA annual member meeting will be held during EAA AirVenture Oshkosh 2024, which is scheduled for July 22 through July 28. The annual meeting will be held at the Theater in the Woods, on the EAA grounds at Wittman Regional Airport, Oshkosh, Wisconsin, at 8:30 a.m. CDT on Wednesday, July 24, 2024. EAA

YOUTHS SOAR WITH AEROEDUCATE AT AIRVENTURE 2023

New offerings for youths and families

BY DANIELLE SCHMICK, AEROEDUCATE PROGRAM MANAGER

EAA CONTINUALLY FINDS AND develops new pathways to help students and youths get excited about science, technology, engineering, and math. EAA's AeroEducate program will enhance and cultivate students' passion for careers in aviation and STEM. The AeroEducate program is full of FREE, fun, K-12 aviation-themed activities to use at home, in school, or in EAA chapters.

Developed by EAA to encourage curiosity and invite youths to explore pathways to careers in aviation, you can create a new spark for your students by using the fascination of flight as a framework and a source of inspiration. EAA AirVenture Oshkosh 2023 provided the opportunity for youths to soar with AeroEducate.

AeroEducate, EAA's newest youth education online resource, supported two brand new offerings for families and youths during AirVenture 2023: the Youth Welcome Center located at the Four Corners, and the AeroEducate Center located in Aviation Gateway Park.

Each space brought new resources and activities for AirVenture attendees, and it sure delivered!

The Youth Welcome Center sought to support the tens of thousands of youths who entered the grounds with their free admission, supported in part by The Boeing Co. The ultimate vision for this space was to welcome and support families and youths, whether they were returning AirVenture attendees or first-timers, to maximize their experience on the grounds, as well as provide resources for youths to continue their aviation exploration post-AirVenture.

Youths of all ages were invited to engage in fun aviation activities in the center, and families were provided with a printed map that outlined all youth activities occurring on the grounds, including KidVenture, Boeing's youth activities, Warbirds area flight simulators, Vintage area kids' tent, AOPA's virtual reality flight simulators, NASA STEM Zone, NEXTGEN Aviators, and more! To support their aviation journey after the air show week, youths could also register on-site for their free AeroEducate account and a free Young Eagles flight in their area.

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High school-aged youths who entered the Youth Welcome Center were guided to visit Aviation Gateway Park, which includes the AeroEducate Center, EAA's Career Center, EAA's Education and Career Center, WomenVenture, and a wide variety of aviation college and university exhibit spaces, all providing resources and networking opportunities for future aviation professionals.

AirVenture, although an incredible, exciting, and often life-altering experience, can be a bit overwhelming, especially for first-timers. We hope that the Youth Welcome Center's efforts to make our family and youth attendees feel welcome and supported on the grounds not only enhanced their overall AirVenture experience, hopefully resulting in a return visit, but also inspired more youths to explore aviation as a hobby or future career, supporting EAA's mission to grow participation in aviation by promoting The Spirit of Aviation.

The AeroEducate Center was another new offering for AirVenture 2023 that provided resources for all visitors to learn more about the AeroEducate program. The center held a half-day experience for educators and youth leaders, and conducted daily forums and hands-on activities geared toward middle and high school-aged youths. Highlights from AirVenture week included:

- About 40 educators from across the country attended EAA's first Educator Day for educators and other youth leaders, which shared a variety of aviation resources from groups including AOPA, Tango Flight, NASA, Safe Launch, We Build It Better, Academy of Model Aeronautics, and Choose Aerospace. Educator Day attendees also had the opportunity to observe NEXTGEN Aviators' "Introduction to Aviation and Trades Skills" hands-on experience in action for youths in grades 6-12.
- Mack and Zara Rutherford, powered by SHARK.AERO, shared their world record flight experiences as the youngest pilot and youngest female, respectively, to fly solo around the world.
- Additional forums were given by representatives from NASA, Siemens Technology, Airbus, United Aviate Academy, Naval Academy, Sierra Space, Carroll University, and AeroEducate, all seeking to inspire youths to pursue aviation careers in engineering, piloting, manufacturing, aerospace, drones, and more!
- Crack the Code: Aviation Challenge invited youths to dive into the lifecycle of a commercial airplane: engineering, manufacturing, flying, and maintenance. This escape room-like activity was supported by Siemens Technology, Airbus, United Aviate Academy, and United Calibrate.
- Additional hands-on activities supported by United Technical Operations, NASA, and AeroEducate gave youths the opportunity to explore aviation through building, innovating, and experimenting.

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AeroEducate's First Year by the Numbers

EAA's AeroEducate program was fully launched online in July 2022, and after one year of implementation it has seen incredible growth and engagement. As of July 2023, AeroEducate had a little more than 17,000 registered users:

- More than 15,000 student accounts
- More than 1,000 teacher accounts
- More than 1,000 parent accounts
- More than 300 EAA chapter accounts

Learn more about AeroEducate at AeroEducate.org, and create your free account today!

If you have any questions, feel free to contact the EAA AeroEducate team at 920-426-6864 or aeroeducate@eaa.org.

The Blue Barn, home of EAA Chapters and Young Eagles programs at AirVenture, also provided an opportunity for EAA chapter leaders and members to fully learn about AeroEducate and how their chapter can use AeroEducate to keep the kids coming back to the chapter, and back to the airport after a traditional, fun Young Eagles rally. Chapter leaders walked away with an *EAA AeroEducate for Your Chapter* handbook, and spoke with AeroEducate volunteers to prepare them to use this helpful program at their home chapter.

We are hopeful to be able to provide similar resources and activities for youths and families during next year's air show — stay tuned for AirVenture 2024!

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FLYBY WORTHY?

Calling all photographers: Do you have a photo that you think should be showcased in *EAA Sport Aviation*? We want to see it! Share your photo with us using the form at EAA.org/Submissions.

WHAT
Eric Hansen, EAA 1173357, flying his Glasair III.

WHERE
Bridgeport, Texas

PHOTOGRAPHER
Russell Sherwood, EAA 88888

STEVE KROG
COMMENTARY / THE CLASSIC INSTRUCTOR

Incursions and Deviations

On the ground, in the air, they're everywhere

BY STEVE KROG

AN ACQUAINTANCE FROM HARTFORD stopped at the hangar recently. Perplexed with blood pressure rising, he confided that while heading back to Hartford Municipal Airport (HXF) from central Illinois, he observed an airplane several miles to the left off his wing flying at approximately the same altitude.

It appeared to be on a potential collision course. Seeing that it was a modern production aircraft most likely equipped with a full glass panel including ADS-B, he closely observed it to see what, if any, action the pilot might take to prevent a potential collision.

Seconds ticked by while he kept eyeing the approaching aircraft. It didn't appear the pilot was aware of my friend's airplane even though it had ADS-B Out. When it seemed the airplane was about to overtake my friend, he took evasive action to establish safe separation.

While doing so, he was able to catch a glimpse of the cockpit occupants. Neither of them looked up, and it appeared they were completely oblivious of my friend and his airplane.

Several days later, I had the opportunity to meet with our FAA safety inspector and asked if he was experiencing situations such as this. He rolled his eyes and said the FAA was getting reports of this nature, including numerous ones of incursions both on the ground and in and around the airspace.

In Wisconsin alone, we had two or three reported incursions last fiscal year to date. This year for the same period, we've had more than 50 reported incursions requiring investigation.

WHY IS THIS HAPPENING?

Some of the reported incidents include runway incursions, landing on the wrong runway, taking off on the wrong runway, landing at the wrong airport, and flying through Class C and D airspace without talking to anyone. Each of these situations could lead to a serious outcome.

The bottom-line cause for all these incursions is the all-inclusive "pilot error" excuse. But upon further investigation, there is more to each situation.

One pilot even admitted he had no sectional or airport charts in the airplane, nor did he have a GPS. His flight was from one nontowered airport to another. Deciding he didn't need charts, he departed for his destination. But directly along his route of flight was a busy Class C airport. Oblivious to his surroundings, he continued through the airspace at 1,500 feet AGL and never bothered using the handheld radio.

The tower operators attempted to contact him but to no avail. Low enough and slow enough, the tower folks were able to easily read his N-number. While all of this was happening, several commercial flights had to be held on the ground, and another was required to hold until this individual was well clear of the Class C airspace. Sadly, this story repeats itself with some frequency.

Another Class C incursion incident was shared with me a while back. An individual who owned a Cessna 150 and kept it on a private airstrip decided to do some practice takeoffs and landings on a nearby hard surface airport.

Thinking the tower didn't open until 0700, he proceeded to do about 10 takeoffs and landings before stopping for breakfast. When a couple of people from the FAA met him at his airplane, he couldn't imagine what they wanted. He was reminded that the tower opened at 0600, and he had been tying up Class C airspace for nearly an hour. Never once did he bother to turn on his radio nor glance at the tower.

Pleading ignorance didn't help this individual. In fact, it caused one of the FAA inspectors to carefully look over the airplane. Before the inspection was completed, several discrepancies had been noted, grounding the aircraft on the spot.

In both examples, the pilots demonstrated poor or no preflight planning. Had the first pilot bothered to look at a chart, he would have seen that his route of flight took him directly through Class C

PHOTOGRAPHY BY **CONNOR MADISON**

airspace. The price paid for this mistake, I'm sure, was far more costly than the time it would have taken to glance at a chart. The second pilot needed to take a one-minute look at the FAA's *Chart Supplement* to confirm the tower opening time. His mistake was considerably more costly than losing a minute's time.

Runway incursions are happening nearly every day, especially in this age of electronics and the tools available to every pilot. Every towered airport requires a read-back before you begin to taxi. A simple airport diagram, either printed or on your iPad, would prevent many of these incursions.

However, many of the pilots experiencing an incursion read back the taxi instructions without thinking about what they are saying, and then begin taxiing and not complying with the instructions. Perhaps it's a guy thing. Many guys never bother with an instruction manual for anything so why bother listening to instructions from ground control?

My wife and I were once on a flight out of JFK Airport in New York. It was in the evening, and we were on a 747. Just as the pilot began to rotate, the nose came down hard on the runway, the engines were in full reverse mode, and the brakes were applied. We came to a stop, but not before overhead luggage bins had sprung open and luggage was flying everywhere.

We began a slow taxi back to the gate. While doing so we saw what caused the aborted takeoff. Another

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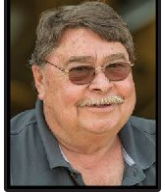


aircraft had taxied partway onto the runway we were using and would have taken most of our left wing off had the captain not quickly reacted to a serious runway incursion.

Runway layouts can be confusing, especially at airports where the runway ends meet. You may have been cleared to Runway 27, but being in a hurry to get going, you lined up on Runway 24. The airspace you were about to enter was cleared for Runway 27. Now the controller is upset because the airspace off Runway 24 was not clear of other airborne traffic. Not only that, but 24 is considerably shorter than 27. Whose fault would it have been had you mistakenly used 24 and parked your airplane in the trees on the departure end?

Similarly, landing on the wrong runway can cause serious problems. A situation occurred a while back where a Bonanza had been cleared to line up and wait for an aircraft landing on another runway. While positioning the aircraft, the pilot happened to look up and saw the landing gear of another aircraft landing on the wrong runway. It cleared his airplane by feet and touched down shortly beyond his runway position. Later, the landing pilot commented he was confused about the runway and never saw the airplane holding on the runway.

Both incidents can be attributed to poor or no situational awareness and also to never looking outside and scanning the immediate area.

How can one possibly land at the wrong airport? It seems impossible, yet it happens. When it does, especially when it happens commercially, it becomes headline news. Years ago, I had the opportunity to do some charter flying. One of my frequent destinations was Rapid City, South Dakota.

If you are familiar with the area, there is a large U.S. Air Force base about 20 miles away. Both airports had similar runway layouts. My first flight there was an eye-opener and a lesson well learned. This was before GPS units existed, so I was tracking inbound on the VOR.

When I thought I had the airport in sight, I called approach control and advised them of my intentions of landing at Rapid City Regional Airport and stated I had the runway in sight. A minute or two later the controller came on the radio and said, "N4094W, I believe you have the wrong airport in sight. Look over your nose about 15 more miles and you'll see us."

I broke off my approach while trying to stay out of the Air Force base traffic area. Once on the ground, I called the tower to thank them for preventing me from making a big mistake. The controller was quite nice about it and said it happens almost daily, so they always keep a close eye on traffic approaching from the east and southeast.

WHAT CAN YOU DO?

The answer is quite simple; use your head and the many tools available to you:

1. Most of us flying general aviation pleasure flights have radios in our airplanes, either handheld or panel mounted. Don't be afraid to communicate.

2. Today we all have iPads loaded with several different flight planning applications. Some are free, while some require an annual subscription. If you have an iPad, use it every time you leave your home airport traffic area. Just because you have an iPad with GPS capabilities doesn't mean you should never bother with a paper map, or at least some sort of backup for navigation should your iPad fail.

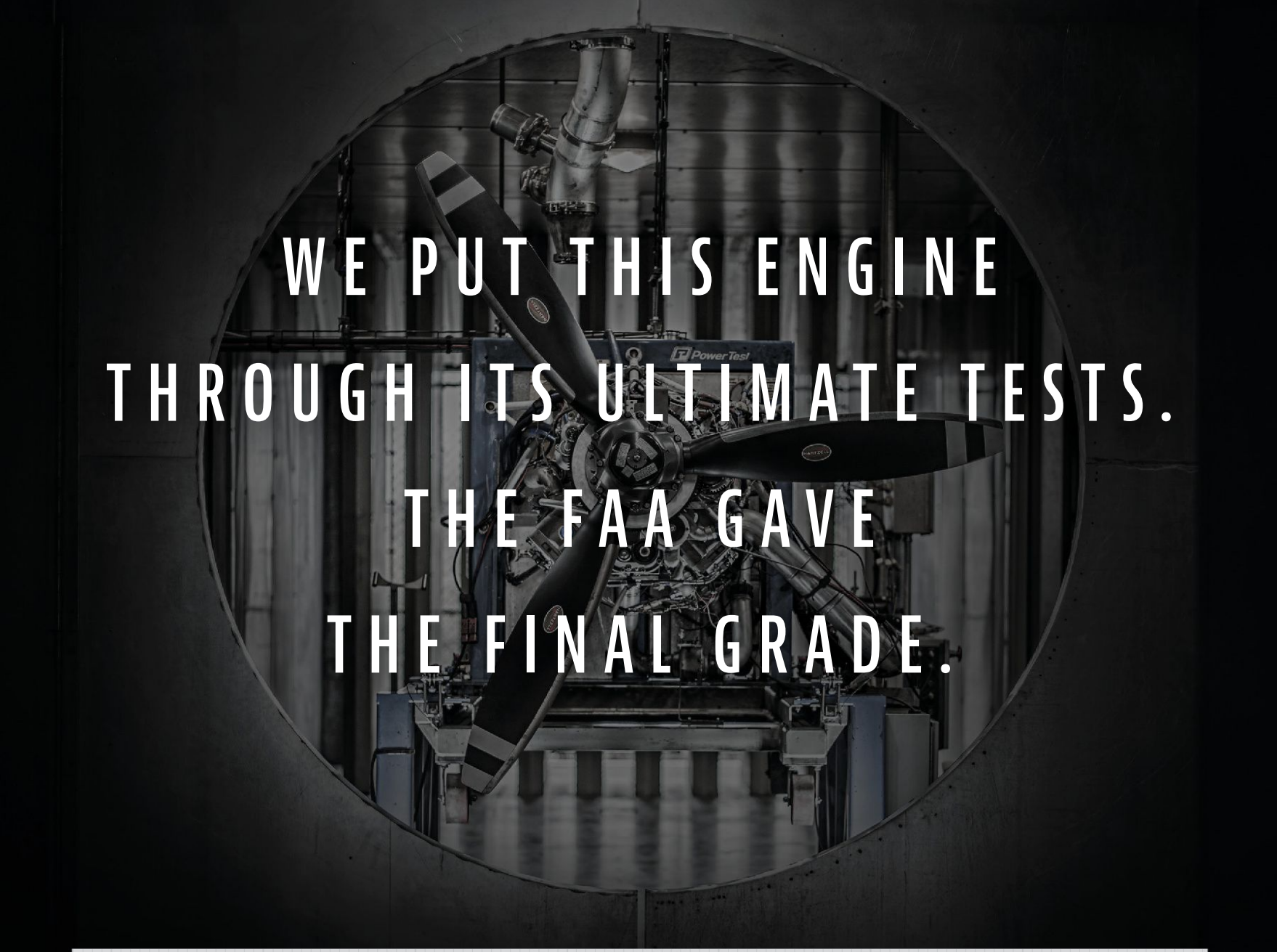
3. Most every electronic flight application contains detailed information about the airport you are intending to fly to. Take several minutes and study that information. It may prevent you from creating a potentially serious problem at your destination.

4. Probably more important, though, is getting your head out of the cockpit and making visual scans. All the new fad electronics designed for improving safety have caused many pilots to fully depend on them and never look out the window. When doing this, situational awareness goes out the window.

Join me and all the other GA pleasure pilots and use your head and your eyeballs. Let's help make it safe for everyone to enjoy. Keep flying safely. *EAA*

Probably more important, though, is getting your head out of the cockpit and making visual scans. All the new fad electronics designed for improving safety have caused many pilots to fully depend on them and never look out the window. When doing this, situational awareness goes out the window.

Steve Krog, EAA 173799, has been flying for more than four decades and giving tailwheel instruction for nearly as long. In 2006 he launched Cub Air Flight, a flight training school using tailwheel aircraft for all primary training.



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Kick the Tires

Tips and Myths

BY LISA TURNER

THE INVENTION OF THE wheel was certainly revolutionary. But our designs for what to wrap around that piece of stone confounded us for years. Constant tradeoffs between wear versus handling, cost versus efficiency, etc., over decades refined the invention to where you can now buy specific solutions for your mission. Backcountry? There's a tire for that. Jet aircraft? There's a tire for that. Small aircraft? There's a tire for that.

Tires are so ubiquitous we totally forget about them. And, we don't like being reminded about tires.

"Did you check the tire pressures?"

"Oh, gosh. I forgot that. They should be fine. I checked them last month."

You may have noticed that this is the usual reaction whether you're leaving in the car or the airplane for vacation. Thank heavens our cars no longer have fender skirts (wheel well covers); the tires would be checked even less often. The 1952 Nash Rambler had non-detachable fender covers. It must have been fun to inspect and fill those tires. Similarly, if an airplane has wheelpants, the tires will get about the same amount of attention — very little.

Why do we care about the tires? A flat on the road is one thing. We can stop and change the tire. When we land an airplane, a tire takes on the force of a wheel accelerating from zero to 60 mph or more as we touch down. Aircraft tires are subjected to high directional forces on landing, especially if we're dealing with a crosswind we have not corrected for.

Here are tips for keeping your tires airworthy, with some fun in a myths quiz at the end.

TIP 1 — INSPECTION

You already know to check tires on your preflights. This includes taking more than two seconds to actually look at the tires. You may need to move the airplane from its position to see all of the tire. We don't typically remove wheelpants on a preflight, but if you haven't inspected and aired the tires in the last few months, it's worth taking a little extra time to do a full inspection. Use your judgement on this. If you've inspected them recently and were flying yesterday, you can be more cursory.

Consider doing a post flight inspection when you return from flying. It's not overly time consuming and may reveal an assortment of issues you won't see on a preflight. Tire wear patterns come to mind. Tires can be damaged by debris on taxi, takeoff, and landing. Look for cuts, cracks, worn spots, bulges, foreign objects embedded in the tread, and general tread wear. If you see damage or wear that bothers you, have your mechanic render an opinion.

Check the bead — where the tire meets the wheel rim. This is an overlooked area that can reveal cracks or breaks. Damage to the bead can cause the tire to loosen on the rim, leading to movement and folding or pinching of the tube with sudden failure — especially on landing — that can cause you to lose control.

TIP 2 — HANDLING

Over time, you'll get a feel for the ground handling in your airplane, and how it feels when you take off and land. This experiential blueprint will help you notice when something is going wrong. An example is a flat spot that your tires can acquire in an emergency braking situation. Once the animals on the runway have disappeared into the trees, you forget about them but now you feel a difference in the ride. Check the tires out after events like these and when you get a sixth sense that something is wrong.

Because side loads on tires produce heat and accelerated wear from flexing, straighten the airplane out just before touchdown. As students, we kept crabbing into the wind because we were learning how to use the controls. Continuing to do this later can destroy a set of tires in no time. Be disciplined using controls, especially rudder, to land without high side loads.

Tailwheel aircraft are unforgiving in these same drifting situations. Instead of saying "Oops," as we might in our Cessna 152, we will find ourselves in a ground loop in a Cub. Save yourself and your tires by practicing good landing technique for the aircraft you're flying. Then stay attentive after landing.

Think ahead on braking and pivoting the aircraft. Riding the brakes will accelerate tire wear in addition to brake wear. Stomping the brakes can cause

Because side loads on tires produce heat and accelerated wear from flexing, straighten the airplane out just before touchdown.

LISA TURNER
COMMENTARY / AIRWORTHY

QUIZ — True or False?

1. You should never consider tire retreads for your airplane if you want to stay safe.
2. Save yourself money by reusing the tubes when you replace the tires.
3. Tire blowouts cause the majority of accidents related to landing gear and tires.
4. The FAA mandates the use of nitrogen to fill small aircraft tires.
5. You can use wheels designed for tubes with tubeless tires.

ANSWERS:

1. False. Tire retreads can be a great way to get strength and durability at a lower cost. Do your research to make sure you're ordering from a reputable and well-known company. If you're thinking of purchasing tire retreads for a retractable gear aircraft, buy them contingent on doing a test for clearance going into the wheel wells. It's not a fun day when your new tires get stuck in the well. Tires expand slightly over time, so if it's tight now, it will only get tighter later.
2. False. You may save yourself money, but you may also end up with a failure sooner than you thought you would. It's like changing the oil filter but not the oil. Tubes stretch over time, making them more susceptible to pinching and folding cuts.
3. False. Sudden tire blowouts are rare. Most tire failures provide warning that can be caught on thorough inspections. Flats on landings are often caused by underinflation that causes the tube to get pinched and cut. If you continue to "fly the airplane" after landing, you'll be on guard for any strange behavior and may be able to avert running into the weeds with a flat.
4. False. There is no reason to not fill your tires with nitrogen, but it's not necessary, and we have enough other things to do than worry about it. Commercial aircraft do use nitrogen. (FAR 25.733 requires that all tires on braked wheels on airplanes heavier than 75,000 pounds be filled with dry nitrogen.) Nitrogen reduces the loss of tire pressure due to permeation through rubber over time by about a third, reduces moisture, and does not support combustion. Some car dealers are selling new cars with nitrogen filled tires; while they do hold pressures longer than regular air, my opinion is that it's a minimal gain for the extra effort.
5. False. You can use tubes with wheels designed for tubeless tires, but not the other way around, since the likelihood of leaks is high due to the wheel design.

the wheels to lock or skid, leading to loss of control. Gentle and thoughtful control input will reduce wear on all your aircraft systems.

TIP 3 — EXPERIMENTAL AIRCRAFT

Our homebuilt test phase is often combined with pilot inexperience. As we taxi about the airport and ease into our first flights, the last thing we're thinking about are the tires and brakes. Fast landings, poor crosswind control, and heavy braking may characterize those early hours when we're thinking only about getting safely on the ground amid the heart pounding.

The first 50 hours should include thorough inspections across the board. Don't forget the tires. Leave the wheelpants off to make inspections easier.

TIP 4 — MAKING CHANGES

If you own an experimental aircraft, then you have great latitude to try different tire configurations. If you decide on different tire, wheel, and brake combinations, remember that they may alter weight and center of gravity. Check with the manufacturer and with the builders' group on experience with different combinations. Recalculate your weight and balance once you've settled on your choices.

In certified aircraft, you are confined to FAA-approved parts, and this includes tires. Check your pilot's operating handbook (POH). It will include both a size, such as 6.00-6, and a ply rating, and sometimes a brand and model recommendation. Aircraft tires are approved under the FAA's technical standard order system.

Want to do your own work installing new tires and tubes? The FAA includes these tasks on the list of approved owner maintenance items.

TIP 5 — INFLATION

After inspection, the inflation pressure is critical to the handling and longevity of the tires. You already know this from your experience with your car or truck tires. For some reason, we hate checking tire pressures. This can be because we have to get on our hands and knees, a gauge that's difficult to read or use, or we forgot what the pressure is supposed to be. To get around this, make the chore easier. I bought a compact and lightweight battery-operated air compressor I keep in the car. I wrote the pressures for the airplane on some masking tape and put that next to the specs for the car. When I fly, the portable goes in

my bag, and there is simply no excuse anymore to not check pressures. I use a calibrated gauge to cross-check the compressor gauge.

While tire underinflation and overinflation in your car or truck means accelerated wear and poor handling, in your airplane it can cause problems serious enough to send you into the runway lights or off into the weeds. Use the setting your POH or maintenance manual advises, or the manufacturer's advice if you have an experimental. The recommended setting can be different from what is on the sidewall of the tire. And don't misread "MAX pressure" on the sidewall for filling pressure. Finally, consider getting 90-degree valve stem tubes if you have trouble reaching the valve.

Tire and tube care can be made simpler if we heed the advice and recommendations given to us by the manufacturer for the aircraft we're flying. Follow these tips and remember that you're taking off and landing on these tiny patches of rubber. Give them a thorough inspection every time you fly.

Find more information about tires in the Checkpoints column in the January and February 2021 issues, and also via the links at EAA.org/Extras. EAA

Lisa Turner, EAA Lifetime 509911, is a manufacturing engineer, A&P mechanic, EAA technical counselor and flight advisor, and former designated airworthiness representative. She built and flew a Pulsar XP and Kolb Mark III, and is researching her next home-built project. Lisa's third book, *Dream Take Flight*, details her Pulsar flying adventures and life lessons. Write Lisa at Lisa@DreamTakeFlight.com and learn more at DreamTakeFlight.com.

LACEY PITTMAN
COMMENTARY / FLIGHT TEST

Safety Across the Industry

Learning from one another

BY LACEY PITTMAN

I'M THRILLED TO INTRODUCE *Lacey Pittman as a contributor to our Flight Test column. Lacey recently joined our EAA board of directors and brings a wealth of experience to our safety initiatives.*

She is currently the vice president of global aerospace safety initiatives at The Boeing Co. She previously ran air safety and operations at Amazon Air and implemented the safety management system at Horizon Air.

Lacey began her aviation career as a pilot for AirServ International, working with the United Nations High Commissioner for Refugees to provide aid and relief to developing countries throughout West Africa.

I think you'll enjoy her contributions to our column. — Charlie Precourt

Whether you design, build, train in, maintain, or operate an aircraft, we are all united in a desire to make this industry even safer. There is no doubt that the aviation safety ecosystem has seen improvements over the last two decades, as reflected in the reduction in fatal airline and general aviation accidents. However, as I look back at my career involving training, humanitarian aviation, airlines, cargo, manufacturing, and a return to general aviation, I realize there are different hazards — but a common desire to continue to make flying safer.

Beginning in training, we have all experienced that lack of experience but desire to gain the technical ability required to safely operate our aircraft. We had to study and learn so that we could be tested on specific maneuvers required to gain that next certificate, rating, or endorsement.

Then follows the evolution of going beyond the technical and gaining the competencies that will allow for safer responses to multiple failures, complex threats, or errors that may never be specifically trained. These competencies include leadership, communication, workload management, and problem solving.

As I look back at my career involving training, humanitarian aviation, airlines, cargo, manufacturing, and a return to general aviation, I realize there are different hazards — but a common desire to continue to make flying safer.

Lacey Pittman with her daughters Sahara, Keira, and Amelia capturing The Spirit of Aviation.

The skills and competencies strengthen who we are as pilots — and who we are as individuals. For me, applying my aviation skills to serve people has been a goal throughout my career. This desire to serve people led to my involvement in humanitarian aviation.

Humanitarian aviation has its own unique challenges that go beyond the flight deck. Although a humanitarian pilot does not have the same level of safety oversight as found in regulated airlines, I might go so far as to say that the humanitarian pilot faces an increased level of risk due to politically unstable and hostile environments.

Sometimes a humanitarian pilot receives unreliable information — or maybe even little or none at all. This information gap means organizations are vulnerable to an expansive range of safety risks that include points like "Will the weather be good for flying?" and "What are the runway conditions at my arriving airport?" and "How is the fuel quality?"

For example, Jet A was an easy replacement for kerosene in night lanterns, so an aircraft sitting overnight was a rich target. On some of my humanitarian flights, we hired guards to watch the aircraft overnight and tested the fuel for contamination each day. Some of the issues would be contamination from the barrels it was stored in, missing fuel out of the airplane tanks, or, worse yet, the fuel in the aircraft tanks being replaced with water.

There are also issues such as "Are operators really turning off their transponders in flight?" and "Are there really surface-to-air arms in use where I'm flying?" In fact, some pilots live in areas where security is the

most relevant threat to human life either at home or at the airport. For example, I once received a radio call to medically evacuate a refugee woman who had lived her entire life in a village in the rainforest. Her hand and half her other arm had been cut off by rebel soldiers. There were tourniquets on both her arms, and she was heavily bandaged. I was called to life-flight her to the hospital at the capital. Although there was not an immediate threat at the airport where I had landed, the knowledge that this activity was occurring just outside the airport perimeter made me consider the logistics if I were to encounter an aircraft mechanical on the ground.

On another occasion, I flew into Abidjan, Ivory Coast, in 2002. Abidjan Tower cleared us to land. After we landed, the tower failed to hand us off to ground control. When we called ground control, there was no answer. When we taxied off the runway and onto the military ramp, there was not a soul to greet us.

Upon opening up the aircraft door and hearing the all-too-familiar sound of guns being fired, we confirmed that the airport had been taken over by rebel soldiers.

As pilots, our job is to ensure that our passengers and employees arrive home safely. When I joined an airline, I realized that there was a different type of threat on a pilot's list of hazards. It's the pressure to stay on time that masks itself in the subconscious, the drive for excellence, and requires the conscious thought to first stop: Ensure we are all safe, and only then do we go.

In this environment, a pilot must go back to the basics and ensure there is the proper paperwork aboard, briefings have taken place to ensure the safety of all crew and passengers, the correct logbooks are back on the airplane, weather minimums and alternate requirements are met, standard operating procedures are followed, and so on. These things cannot have the pressure of time.

There are many types of cargo operations, each with its own specific hazards. Recalling my personal experience, it was complex. Maintaining a single level of safety across multiple operators and ground crews, while driving for consistency, provided an atmosphere where even a slight deviance would be noticeable and create an opportunity for mitigation. The importance of providing a mechanism for safety reporting was integral to the foundation of the system.

Moving to the manufacturer's side showed me an entirely new facet of the industry. The manufacturers are now working through applying the same guiding principles and pillars of a safety management system to an original equipment manufacturer context.

With this similar process for hazard identification and mitigation comes an opportunity to partner with operators on joint safety risk analyses, to arrive at holistic solutions. This is a new opportunity, and we are just at the beginning stages of understanding and applying this value.

And finally, it has been the biggest joy to return to general aviation this past year. My desire to share The Spirit of Aviation was renewed upon taking my family to EAA AirVenture Oshkosh 2022. My three daughters were enraptured by the night air show, participating in WomenVenture and trying out all the activities at KidVenture. Upon returning home, I realized how much fun it was to reenter general aviation after decades of 121 experience.

However, it should not be a surprise that the general aviation operating environment has become more crowded and has more distractions than it had in the early 1990s when I learned to fly. Although many tools in today's flight deck are helpful for safety in aircraft detection, navigation, and communication, these same tools can also become a hazard through distraction. These are all hazards that we must acknowledge, choose to mitigate, and learn from one another.

It is this last point, learning, where we can unite. We can each have our call to action and personal accountability, to educate ourselves through training courses available on the EAA website under Pilot Resources, simulator experiences such as those available at the EAA Pilot Proficiency Center, and participation in conversations when it comes to safety, such as those available at EAA AirVenture or local EAA chapters.

I look forward to continuing to raise the bar on safety across the industry, both professionally and personally. EAA

Lacey Pittman, EAA 1426484, is Boeing vice president of global aerospace safety, an active pilot, and former humanitarian pilot, airline captain, and air cargo executive. She is board chair at The Boeing Center for Aviation and Aerospace Safety at ERAU, board vice chair at Mission Aviation Fellowship, and board member at EAA.

KRIS CALDWELL
COMMENTARY / PLANE IMPRESSIONS

Helio H-295 Super Courier

Old-school STOL

BY KRIS CALDWELL

FIRST IMPRESSIONS

BACKCOUNTRY PILOTS EVERYWHERE HAVE heard of this almost-mythological bushplane with the exotic name. Its performance seems to defy the laws of physics, even fully loaded. The Helio Courier can do things no other fixed-wing aircraft can and has been doing so for almost 70 years in some of the most remote places on Earth.

It is operated by groups like JAARS, which has more Helio Courier pilot and maintainer experience than all other operators put together (see "Spreading the Word: JAARS and its 75-year aviation missionary work across the globe," June).

DESIGN FEATURES

The Super Courier is a six-seat, all-metal (except the ailerons) taildragger with cantilever high wings. The cantilever wing obtains its strength from a carry-through steel truss spar. Distinguishing features of the Helio Courier include the forward-positioned main landing gear legs that somewhat resemble a stiff-legged stubborn dog.

The H-295 is easily distinguishable from the earlier H-395 and H-391 by the trapezoidal rear windows that replaced the round porthole windows.

When the slats are deployed and the ailerons travel past approximately 10 degrees up, two sets of "interceptor" blades will deploy up on the respective wing, immediately behind the slat opening. This spoils the lift flowing over the wings, thereby causing a rolling moment on that side, even at low airspeeds.

Interceptors function similarly to spoilerons but differ by operating in conjunction with actual ailerons. The interceptors work with mechanical connection to the ailerons. All four slats will deploy and retract independently based solely on the airflow and angle of attack (AOA). When deployed, the airflow is redirected, maintaining boundary layer control and contributing to the allowable high angles of attack.

The Frise-style ailerons are the only fabric-covered surface and have a deep chord in order to maintain a lot of flight control area while not robbing flap real estate. The Fowler flaps span 66 percent of the wingspan and extend to 40 degrees. The stabilator is 14 feet long — longer than a Piper Cherokee wing! It is all-moving and trims with an overhead knob that controls a jack screw in the tail.

The airplane does need a lot of small trim inputs, but a little movement of the crank goes a long way. One of the Courier's safety features is how difficult it is to stall. The stabilator is purposely travel-limited. Stalling the airplane will not result in a break unless the pilot is deliberately attempting to stall and using considerable power to do so. The critical angle of attack is an incredible 30 degrees.

POWERPLANT

The H-295 Super Courier uses a 295-hp GO-480 to power a Hartzell 96-inch, three-bladed, constant-speed propeller. The gearbox produces a 77-to-120 reduction ratio, enabling the 8-foot, three-bladed prop to deliver more torque at lower rpm. Each wing has a 30-gallon bladder tank, and the fuel system is gravity-fed. Some H-295s are equipped with auxiliary fuel tanks, adding an additional 30 gallons per wing for a total of 120 gallons.

A pressure carburetor with automatic mixture control lightens the workload to fly the Courier, which is a good thing. Interestingly, the prop clearance for the initial H-391B (102-inch prop) from the ground was an initial concern for the Civil Aeronautics Administration, but after four test pilots tried (repeatedly) to get the prop to hit the ground, the CAA was appeased and issued the type certificate.

One of the Courier's safety features is how difficult it is to stall. The stabilator is purposely travel-limited. Stalling the airplane will not result in a break unless the pilot is deliberately attempting to stall and using considerable power to do so.

PHOTOGRAPHY COURTESY OF **KRIS CALDWELL**

The combination of the forward-positioned main landing gear, the heavy tail, limited stabilator travel, and the landing gear "tuck" keeps those blade tips out of the dirt.

PREFLIGHT

One unique preflight check of a geared engine is to check for "play" in the gearbox. This is done by slightly moving the prop in either direction to ensure there is no more than a half-inch of movement.

You check the fuel by stepping on a main wheel and then two handy fuselage steps. During preflight, the slats will be fully deployed, providing a great opportunity to check all the "tomahawks" (slat support tubes) and rollers. After all, when in flight with the slats fully extended, 64 percent of the aircraft's weight is carried by the slats and associated tomahawks.

Take time to move each slat and check for smoothness of operation. An interesting detail you may notice during preflight inspection is a small ridgeline bump that runs along the upper trailing edge of the ailerons.

During the certification process, the CAA test pilot declared that the roll control was too light. Rather than going back to the drawing board and redesigning an engineering solution, the designer had someone glue a piece of cord to the trailing edge of the ailerons. The CAA was satisfied with the resulting heavier feel. Since then, a segment of cord is laid onto the wing and doped in during the covering process.

TAKEOFF

A STOL takeoff requires 15 turns of the overhead flap crank to reach 30 degrees. After pre-takeoff checks are completed, line up on the runway and wiggle your feet. Smoothly add full power, which will give you about 3400 rpm at the crankshaft and 2182 rpm at the prop.

The main landing gear legs are splayed out with a stance of approximately 9 feet with weight on the wheels. With

KRIS CALDWELL
COMMENTARY / PLANE IMPRESSIONS

weight off the wheels, the stance is only about 5 feet. This means that during takeoff, as the wings develop lift, the wheels begin to tuck in. This makes the nose rise, almost like a floatplane getting on step.

This rise indicates that the stabilator is developing lift and it is time to lift the tail. Once the tail is up and the aircraft is accelerating, the nose will want to pitch down. Back-pressure is now required to hold the tail wheel just clear of the ground.

The Helio will lift off and fly away in this attitude. Also, full throws of the rudder pedals may be required to track straight. If the takeoff sounds like a lot of work, it's because it is. At a typical training weight, the Super Courier will be off the ground in 450 feet and clear of a 50-foot obstacle in only 700 feet.

Every aircraft design is a series of compromises, and the Helio Courier is no different. The same STOL characteristics that make it an incredible bushplane are what cause it to be somewhat of a handful, notably on the ground. The landing gear of a Cessna 185 is positioned 21 inches forward of the aft-most CG. On a Helio, the gear is a full *50 inches forward of the aft-most CG.*

When you factor in landing gear that tucks in, you have an airplane that would like to swap ends, particularly if you have a CG approaching aft limits.

FLIGHT CHARACTERISTICS

The Helio's performance airborne is just as impressive as the takeoff and landing. It is, however, a hands-on airplane in all phases of flight.

JAARS does not have autopilots in its Helio Couriers, mostly to save weight. In the pre-mission brief, JAARS Chief Pilot Steve Bevelhymer stated that we would be doing steep turns (45 degrees) with 40 degrees of flaps at only 50 knots, while maintaining altitude.

I had a hard time believing that, but he proved it. It does not have much adverse yaw, but there are some over-banking tendencies and lots of torque, so it's important not to spend too much time heads-down in the cockpit.

LANDING

The pilots at JAARS have perfected Helio STOL operations over the past 67 years, and there is no tolerance for "cowboy" techniques or attitudes. Every landing strip is carefully evaluated and performance is methodically calculated. Margins of safety are built in, and pilots must fly their approaches precisely.

Many of JAARS' landing strips are one-way in and one-way out with a landing commit point early in the approach, so JAARS teaches a precise pattern with a completely stabilized approach using angle of attack (gauged from slat position) and power for glide slope.

On downwind, slow to 60 knots and crank in 30 degrees of flaps. After the base turn, slow to 55 knots and crank in 40 degrees of flaps. Approaching the final turn, you'll need to slow and stabilize at the on-speed AOA. As you slow, the inboard slats will extend first. I'm not sure how long it takes to get used to the slats slamming down, but it's more than just one flight!

Every time they moved up or down, I'd see the movement with my peripheral vision and flinch, thinking it was traffic or a bird. The outboard slats should be about 1-1/2 inches short of fully extended.

Once this AOA is attained, a quick glance at the airspeed indicator will show approach speed for the current weight. Landing speeds can indicate as low as 28 (not a typo) knots. The STOL approach is steep (5.5 to 6 degrees) and will usually result in a 450 to 500 fpm rate of descent.

JAARS does not teach a flare as such. It is simply a transition to landing attitude. At about one wingspan's distance from the runway, the pilot will close the throttle and pull the yoke back, setting a three-point attitude. There is no float whatsoever because the pilot has managed energy to the minimum.

The Helio simply plants and sticks to *terra firma*. Air-oil shocks on all three landing gear do much to absorb the landing. Heavy braking can be used after touchdown, with no chance of nosing over due to the unique forward position of the main landing gear legs and heavy tail.

Using this technique, the H-295 can be stopped within 200 feet.

WRAP-UP

The Helio Courier is truly a remarkable airplane and deserves the reverence it receives in the bush pilot world.

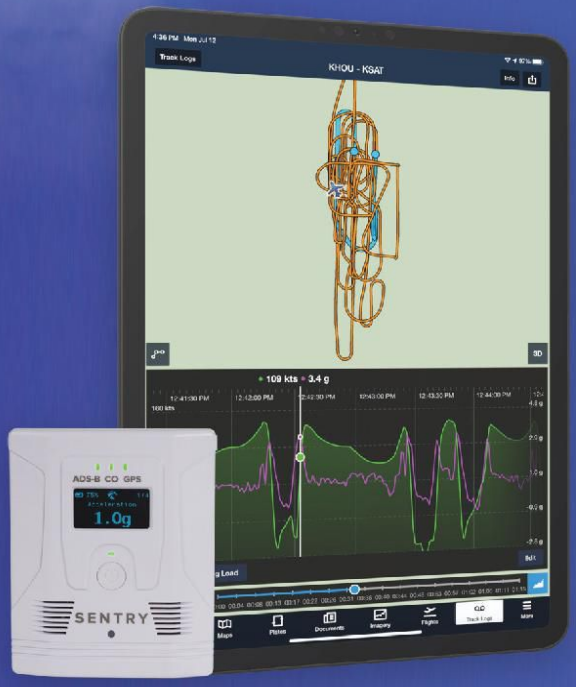
In the words of JAARS President Steve Russell, EAA 1203140, "The Helio Courier is to JAARS what the Spitfire is to the Royal Air Force, or what the P-51 is to the U.S. Army Air Corps."

For almost 70 years, Helio Couriers have flown in and out of the most hostile environments in the most isolated corners of our planet. EAA

Kris Caldwell, EAA 1239655, has loved airplanes since he was 5 years old and has flown everything from gliders to fighters. He is passionate about everything aviation but especially warbirds, vintage aircraft, and backcountry flying. He and his family are always on a search for a new flying or camping adventure. He can be found at PlaneImpressions.com.

Every aircraft design is a series of compromises, and the Helio Courier is no different. The same STOL characteristics that make it an incredible bushplane are what cause it to be somewhat of a handful, notably on the ground.

Safety with Attitude



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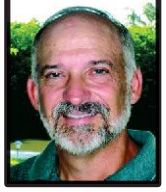

ROBERT N. ROSSIER
COMMENTARY / STICK AND RUDDER

Bumps in the Blue

Tips for avoiding turbulence

BY ROBERT N. ROSSIER

NONE OF US LIKE a rough ride in an airplane, but it seems that the skies are perhaps becoming more turbulent than in the past. Lately we've been hearing more from meteorology and climatology experts about how our global environment is changing.

Regardless of the cause, evidence suggests that our planet is warming. With that comes changes to the flight environment: stronger storm systems and extreme weather conditions that last for extended periods.

No matter where or what we fly, we can expect to encounter a few bumps in the blue that might remind us to slow to maneuvering speed. Some conditions are rife for a rough ride, and these deserve additional precautions.

JOCKEYING THE JET STREAM

One likely place to encounter tooth-rattling turbulence is near the edges of the jet stream. The jet stream, as we know, is a fast-moving current of air high in the troposphere that circles the mid-latitudes in both the northern and southern hemispheres. It meanders north and south as it flows and brings with it a steady stream of weather systems.

As small airplane pilots, we don't have to worry too much about jet stream turbulence, but that doesn't mean we won't be affected by changes in the jet stream. Studies now indicate a possible northward shift of the jet stream, which results in a more rapid warming of surface temperatures in North America, resulting in more severe extreme weather events. With that comes more turbulence.

THUNDERSTORMS

While most of us don't have to worry as much about tangling with the jet stream, we do need to step carefully when dancing about in thunderstorm territory. Thunderstorms inherently produce highly turbulent conditions that can cause aircraft structural damage or failure.

Pilots should stay at least 20 miles away from severe thunderstorms and their overhanging anvils. In addition to the wind shear, thunderstorms can spawn tornadoes and can produce extremely dangerous hail — even throwing it out into clear air ahead of the cell.

Regardless of size or appearance, never attempt to fly beneath a thunderstorm. Turbulence and wind shear beneath the storm can be a killer. Likewise, we should never venture beneath a thunderstorm's anvil, as it often contains extreme clear air turbulence.

Never attempt to take off or land in the face of a hurricane. The updrafts, downdrafts, gusts, and turbulence can easily result in a loss of control. Likewise, avoid flying into an area where embedded thunderstorms may be present. Never assume ATC can provide vectors around embedded thunderstorms. They typically cannot.

The data-linked weather radar we use while flying is often 15 to 20 minutes old or more, so while it might warn us of approaching storms, it is extremely misleading when attempting to navigate around cells. We should completely avoid areas where thunderstorm coverage is six-tenths or more.

Regardless of size or appearance, never attempt to fly beneath a thunderstorm. Turbulence and wind shear beneath the storm can be a killer. Likewise, we should never venture beneath a thunderstorm's anvil, as it often contains extreme clear air turbulence.

WAKE TURBULENCE

Another form of turbulence to avoid is wake turbulence — the horizontal tornadoes formed as higher-pressure air beneath a wing slips around the wingtip to the lower-pressure area above the wing. Not only is the resulting turbulence a problem, but the rotational effect can far exceed our aileron control.

Remember that these wakes are more pronounced when an aircraft is heavy, slow, and dirty (flaps and gear down), and the wakes slowly drift below and outward from the flight path of the aircraft.

The Pilot's Handbook of Aeronautical Knowledge provides several tips to minimize the chances of flying through an aircraft's wake turbulence.

On departure, we should rotate prior to the point at which a preceding aircraft rotated. If a large aircraft departs ahead of us, we should wait three minutes before our own departure. Remember that a gentle crosswind can cause the vortex to remain on the runway for longer periods. In flight, we should avoid flying through another aircraft's flight path, and avoid following another aircraft at an altitude within 1,000 feet below that aircraft.

When landing, we should approach the runway above a preceding aircraft's path and touch down after the point at which the other aircraft's wheels contacted the runway.

While we typically think of wake turbulence in regard to large commercial airliners, even smaller aircraft can produce dangerous wake turbulence. Helicopters also produce vortices when airborne, as well as dangerous turbulence from their downwash when hovering. The rule is to avoid hovering helicopters by a distance of at least three rotor lengths.

MOUNTAIN WAVE TURBULENCE

A common phenomenon in mountainous terrain is what is referred to as mountain wave turbulence. It typically occurs when

mountaintop winds exceed 25 to 30 knots, the wind is nearly perpendicular to the mountain range, and unstable air at the surface is capped by a layer of stable air above.

Such a condition can set up an oscillating flow of air — waves that can extend a hundred miles or more downwind from the mountain range. While sometimes rotating "rotor clouds" may be visible beneath the wave crests, the dangerous turbulence is often invisible.

To avoid the turbulence, avoid areas where mountain wave activity may exist. When flying parallel to a mountain range, adjusting our distance from the range by a few miles or more might put us in smoother conditions. Extreme caution is needed when traversing high terrain since severe downdrafts and turbulence are often encountered on the downwind side of mountain ridges.

Remember, you don't need "mountains" to create mountain waves and turbulence. Any terrain features that protrude into a current of wind can cause turbulence, updrafts, and downdrafts. Cities with tall buildings create hazardous wave activity. Even a structure near a runway or uneven or sloping terrain can cause troublesome turbulence when the wind is blowing.

HURRICANES ON THE HORIZON

One factor we may not have considered is how changes in weather patterns can alter our expectations for hurricane season. Experts tell us that years in which *La Niña* conditions persist, we typically experience more and perhaps more powerful hurricanes in the Atlantic Ocean than those years in which *El Niño* conditions persist.

El Niño refers to a condition of above-average temperature ocean surface waters in the central and eastern tropical Pacific Ocean. This condition alternates with *La Niña* — a cooler-than-average ocean surface temperature in the same region. These conditions have a strong influence on the global climate, including changes in rainfall and low-level trade wind patterns, which in turn influence hurricane development in the Atlantic. *El Niños* occur at irregular intervals of two to seven years and typically last from nine months to two years.

We don't need reminders to avoid hurricanes, but turbulence isn't our only concern. In the wake of a hurricane, expect flooding and damage to infrastructure that can undermine our plans. Runways, lighting systems, automated weather systems, fueling facilities, and maintenance facilities can all be out of service for an extended time following severe storms and hurricanes. We need to perform our due diligence to ensure the required infrastructure is intact. Beyond what is included in NOTAMs, consider what might not be available, including ground transportation, services, hotels, even food and water.

We all want to avoid those uncomfortable bumps in the blue. By taking the right precautions, we can minimize the rough ride created by turbulence. EAA

Robert N. Rossier, EAA 472091, has been flying for more than 40 years and has worked as a flight instructor, commercial pilot, chief pilot, and FAA flight check airman.


N72AK

ONE GOOD TERN

The roots of an uncommon bushplane

BY HAL BRYAN

THIS IS ONE OF those airplanes that might be a this, could be a that, but it's not quite any of them. It's an attractive, well-proportioned, capable high-wing taildragger whose identity gets stuck on the tip of your tongue until you remember the name "Interstate." You're just about to proudly peg it as an Interstate Cadet, but you're still not there. No, N72AK is actually a close descendant of the Cadet called the Arctic Tern. It was built in the '70s and '80s by designer Bill Diehl and his company, Arctic Aircraft.

PHOTOGRAPHY BY **BRANDON YULE**

COURTESY OF **EAA ARCHIVES**

A Tern Off the Interstate

In our corner of the aviation world, we're lucky — blessed, even — to have easy access to the communities that spring up based on a shared love for a particular aircraft type.

Many of those communities have unofficial leaders — the one person that everyone steers you toward when you have questions. You know how it goes. "Oh, you want to get a Tubman 601? Go talk to Ned Nederlander. He's the Tubman guy." An offhand referral like that can make all the difference.

In this case, the "Interstate guy" is Tim Talen, EAA 8615. At the time Tim was inducted into the EAA Vintage Aircraft Association Hall of Fame in 2014, he'd restored seven of them, not to mention a dozen other vintage types, including a Cessna 120, a couple of Cubs, and a Fairchild 22. His bio notes Tim "has an uncanny ability to look at any antique aircraft part and name the aircraft it came from." *(For more from Tim, see his feature story on page 70. - Ed.)*

But for Tim, there's just something special about Interstate's Cadet, which first flew in 1940.

"The Cadet is such a superior airplane," he said.

A friend of his — a longtime air show pilot and fellow Interstate fan — paid the airplane a compliment that always stuck with Tim.

"He said [it was] the only light airplane that he ever flew ... that would fly exactly like Wolfgang Langewiesche in *Stick and Rudder* said an airplane should fly," Tim said. "The Interstate is the only airplane that responds correctly to all of the correct things aerodynamically that an airplane should do. That's kind of a remarkable thing, but nobody says that. Nobody talks about that."

Based in El Segundo, California, Interstate started out as Interstate Engineering and then became the Interstate Aircraft and Engineering Corp. in 1937. Don Smith took over as president from Harry Reynolds about a year later.

"They were doing supply parts for all the other industries there in southern California, Douglas and Northrop and ...Vultee was there, a bunch of them," Tim said.

As the clouds of war began looming on the horizon, Interstate began looking at building an entire airplane, and not just parts. There was a lot of interest from the Army Air Corps in trainer airplanes, and given the types flying cadets would eventually advance to, the push was for tandem seating.

"So, they hired Ted Woolsey ... who was running a school and was teaching ... engineering and draftsmanship, etc.," Tim said. "It was already 1938-39 ... about that time period, my goodness, everybody else had already gotten a two-place tandem trainer going."

While competitors like Piper, Aeronca, and Taylorcraft entered the field with designs that evolved from previously established types, Interstate was new to the "whole airplane" business. Tim praised this "blank sheet of paper" approach as a virtue, not a disadvantage.

"The Pipers were really Taylors, and they weren't really ever clean sheeted," he said. "They were just added onto, and Aeronca kind of did the same thing. And, so, [Woolsey] had a clean start on this thing and came up with a really brilliant design and an incredible airplane."

Tim attributed a lot of the design success to the choice of airfoil.

"[Interstate] used the 23012, which was kind of a new airfoil," he said. "I don't think it had really been thoroughly tried on light airplanes. DC-3 had a 23012, but nothing in that light category was there. ... The 23012 was new, but they made it work and came up with an incredible design. So, they got [the S-1

Bill made a number of refinements based on his experience, including squaring the wingtips and designing a beefed-up, easier-to-build landing gear. He installed a 150-hp Lycoming O-320, eventually designating the airplane S1B2, and naming it the Arctic Tern.

Cadet] into production, and they built about 320 of them, of which eight went to Bolivia."

The fabric-covered Cadet was built with a welded chromoly steel tube fuselage with wood fairings. The wings were built with solid spruce spars and duralumin ribs, and they are attached to the fuselage by V-struts braced by jury struts.

It came equipped with Shinn wheels and hydraulic brakes on gear that incorporated a single oleo-spring shock absorber. As a trainer, the Cadet also featured wingtips that could easily be removed and replaced as needed after a ground loop.

The first version, the S-1, was powered by a 50-hp engine, either a Franklin or a Continental A50. The S-1A introduced a 65-hp Continental, followed again by an equivalent Franklin option. Interstate iterated the design through the S-1B, ultimately offering 85-hp and 90-hp variants.

A Time of War

The Cadet went out of production in 1942 so that the company could concentrate on developing the military version, the XO-63, later designated the L-6. The L-6 added flaps, a larger cabin, and the signature greenhouse cockpit glass required for the liaison mission. It also added weight, which led to the next challenge.

"The biggest problem was the engine," Tim said. "I can see a guy with a slide rule running back and forth with the numbers going, 'It weighs what? And you got how much wing area? And we got to do what with what?' And a 50-foot obstacle, sliding back and forth, and they came up with an improbable number of 113 hp that would do the job. And so now they had to figure out a way to get a Franklin engine with 113 hp, and they mistakenly thought that by turning it up a whole lot faster and putting a reduction unit on it that would make everything work well. Well, it didn't."

The engines were prone to overheating, and the reduction units weren't very reliable. The United States Army Air Forces eventually took delivery of 250 L-6s, the fewest of any World War II L-birds, and kept them all stateside, presumably at least in part due to the maintenance and reliability problems.

PHOTOGRAPHY BY **BRANDON YULE**

A Time of Peace

"Of course, the war ends, everything's folded up and Interstate goes on to building vacuum cleaners for housewives postwar," Tim said. "I think there was some legal issues, and somehow to settle everything, Max Harlow ended up with the type certificate for the A and the B. And, of course, he immediately then turned around and sold all of this to the Call brothers in Afton, Wyoming."

The Calls picked up the remaining parts inventory, jigs, partially assembled wings and fuselages — everything they could get their hands on.

"[They] bought most of this inventory out just for the inventory," Tim said. "They didn't really think much about producing the Interstate. It was more about producing their low-wing CallAirs. And so there's tubing, there's wheels, there's brakes, there's everything, all of the stuff that comes with that they got."

But they didn't ignore the Interstate design entirely.

"They actually built two postwar Cadets, and they added the C90 to the type certificate," Tim said. "So, it's a paperwork change to go from a 65 Cadet to a 90 Cadet — that's a nice thing to have for us mechanics trying to get stuff signed off."

They also took an L-6 and civilianized it, and put a 125-hp Lycoming O-290B on it.

"They had a pretty decent little airplane," he said. "The L-6 with that conversion performed extremely well, and they actually marketed that thing as a Super Cadet."

A man named Bill Diehl, a draftsman and postwar veteran who managed a flight simulator business in Anchorage, Alaska, bought a converted L-6 in 1964. He used it as bush pilots do, rebuilt and refined the airplane several times, and then made a much bigger commitment to the type.

"He bought out all of everything, hauled it all off to Alaska, and in Anchorage, he started producing basically a civilianized L-6, which he named the Arctic Tern," Tim said.

After buying, as Tim said, everything from the Calls, Bill formed the Arctic Aircraft Co. in 1968 and spent the next several years working with the FAA until the Tern was granted a production type certificate in 1975.

"He submitted enough drawings and so forth to satisfy the FAA up in Anchorage, which probably wouldn't have been too difficult knowing the time," Tim said.

Bill made a number of refinements based on his experience, including squaring the wingtips and designing a beefed-up, easier-to-build landing gear. He installed a 150-hp Lycoming O-320, eventually designating the airplane S1B2, and naming it the Arctic Tern.

An Arctic Aircraft marketing brochure from the period touts the airplane's climb performance, slower approach and stall speeds, semi-Fowler slotted flaps, and STOL capability.

"The Arctic Tern will fly in and out of any area that it is possible for a fixed-wing aircraft to operate in with a safety margin not afforded in any other aircraft in its class," the brochure states.

The brochure places a lot of emphasis on the Tern's versatility.

"One day a work horse, the next a quiet, reserved, respectable flight trainer with a lot of built-in safety for the fledgling airman," it states. "The next time it may be seen doing loops, snap rolls, spins, and all the other fun maneuvers that an experienced pilot could want."

Being a bushplane, skis and floats were unsurprising options. It was also available with an optional fiberglass rear compartment that meant "no mess from fresh fish or game … Just open the drain plug and hose it out. … It's fresh and clean in seconds … and it's big enough to sleep in!"

According to a 2014 interview Bill did with the *Anchorage Daily News*, 29 Arctic Terns were built, along with several experimental variants, including a four-seater called the Privateer. Bill sold the rights to the airplane after his wife, who also ran the business side of things, died in 2001. The rights have changed hands at least once more since then, but the airplane hasn't gone back into production.

Now It's Dean's Tern

The Tern's owner, Dean Carrell, EAA 1265467, doesn't have a typical aviation background. It's fitting since the Tern isn't exactly a typical airplane.

"I moved to Worland, Wyoming, here where I live now, back in the early '70s, and started teaching," Dean said. "I went out and learned to fly — and I can't remember why I did because I didn't have anybody in my family that flew. I wasn't one of these kids that had model airplanes and dreamt about flying all my life."

He rented 172s, 182s, and Cherokees, and got a little Super Cub time. Then he owned an Aeronca Chief for a while, along with a couple of family members. Then he owned a 140 and a 172. They'd own the airplanes for a year or so and then sell them, rent for a while, then get excited to buy again.

"Let me back up and say that I never owned a plane," Dean said. "The bank always owned them."

This went on for two or three decades, and then life and other distractions pulled Dean in different directions. He wandered away from flying.

"I kept taking the flying magazines and was always interested in it," he said. "And 18 years went by. Toward the end of those 18 years, I was thinking about possibly flying again, wondering if I could."

He started thinking about buying a Taylorcraft or a Champ or something along those lines.

Sky Aviation, the FBO at Worland, had acquired several Terns years earlier when it was owned by a man named Claude Tyrrel, who did a lot of contract flying for government agencies in Wyoming. As it happens, Claude was also Dean's first flight instructor. Later, the FBO changed hands, and the new owner shifted the focus to helicopters and firefighting. The fixed-wing assets were

gradually sold off. Most of the airplanes were gone by the time Dean walked in about five years ago.

"At the age of 70, I went out to the airport and was talking to Tom Woodward, the owner of the FBO, Sky Aviation," Dean said. "He was just giving me some proper advice on being careful about buying a plane. ... [His] secretary popped up — I'll never forget, kind of in the back room there — and she said, 'We have a plane for sale.' I can remember Tom turning and looking at her, and I said, 'You do?' And he said, 'Yeah, I guess.' He hadn't advertised it or anything."

That airplane was, of course, the Tern, N72AK, built in 1982.

"It was always used for government work, contract work," Dean said. "Mostly did a lot of game and fish tracking, animal tracking, grizzly bear recovery. And then when the wolves came in, doing that."

The airplane had been damaged about 15 years ago in a nose-over during a landing on what looked like a dry lake bed but wasn't.

PHOTOGRAPHY BY **BRANDON YULE**

"They took it back and took it down to the tubing and made sure that everything was straight and proper, and then checked everything out and repainted it," Dean said. "That's why it looks so nice and new. It's still been 15 years, but the plane's always been hangared."

Dean bought the airplane as soon as Tom — who, in another unusual twist, was a former student of Dean's during his time as an elementary school principal — named his price. At the same time, Tom also wanted to clear out two or three hangars full of parts. Interstate guy Tim was happy to step in.

"It was wall-to-wall, parts and pieces and wing panels and fuselages and extra stuff, and this [fuselage] jig," Tim said. "I ended up buying all that inventory out. ... So, in that regard, we can still and are still supplying parts and pieces and help for Cadets and L-6 and Arctic Tern people. ... I'm sure I have the world's largest inventory of Interstate stuff known to man right here in Springfield, Oregon, or my place over in Montana between the two, and I have about 10 basket cases."

Dean got checked out in the airplane and started blowing the rust off after his 18-year hiatus.

"I was safe, but I sure wasn't very good," he said. "But I started flying, and I been flying ever since. I think I've got 500 hours now in that plane. I fly it often, and I just absolutely love it."

While the brochure listed a maximum cruise speed of 117 mph, Dean goes easier on his airplane and plans for 90 mph, burning 7-7.5 gph. With two 20-gallon tanks, that gives him more than four-and-a-half hours' endurance, or a 435-mile range, with VFR reserve.

"Just as anybody gets something you want to mess with it, make it better. Some kid gets a pickup or something, he's got to do all this junk to it," he said."I added ADS-B In and Out. Had an AV-30 [glass attitude indicator] put in there, changed all the lights in the entire plane to LEDs. Went through the process of getting an autogas STC. We run three-quarter autogas and one-quarter avgas in that plane. And I'll put an engine heater on it, which I've never used because we're in a heated hangar. But if I ever go somewhere in cooler weather, I've got it. And a bunch of other little things. That's been a lot of fun."

Dean plans on installing a Stinger tail wheel from Acme Aero. He also put big bush tires on the airplane.

"These big old soft bush tires just kind of plop you [in] ... so all of a sudden I became a really good pilot," he said. "We do land out on little roads and fields, [but] we don't try to be crazy. Some of that YouTube stuff you see ... we're not going to take those kinds of chances. But we love the tires even though they slow you down a little more."

Yes, the Tern isn't all that fast. Dean remembers one trip where, thanks to a healthy headwind, his groundspeed was 50 mph. He watched cars passing him on the freeway below. But the slower speed doesn't stop him from exploring the country.

"I did take the plane back to Illinois to watch Wyoming in a football game, and then I flew on down through to Arkansas ... and went across the Ozarks and stopped in Harrison, where I have a cousin," Dean said.

He's flown into Montana and over and around Yellowstone several times. When his son drew a tag to hunt Elk in New Mexico, they traveled by Tern, and took the (stunningly) scenic route.

"I flew down through Utah, stayed at Moab, flew right down through the Grand Canyon, crossed the Grand Canyon, and went on down to New Mexico there," he said.

For Dean, even when he's trying to get somewhere, it's all about going low and slow, crossing the fields, and looking down at the farms.

"Even though the plane's slow, it just gives me more time to fly," he said. "... I just absolutely love that kind of flying. There's a quote that I've always remembered ... Amelia Earhart's quote that 'You haven't seen a tree unless you've seen its shadow from the sky.' Well, I've seen many, many trees."

For someone with no original background in aviation, there's a whiff of destiny in the air when it comes to Dean and his Tern. With Claude having been his first instructor, and Tom having been one of his elementary school students, it does seem like the Tern somehow belongs with Dean. He has a contact category in his phone called "Arctic Tern," and there are 116 names in it. They're all friends woven together by their common interests. That's a far cry from the young man in the 1970s who had no aviation connections at all, or the older man who stepped away from flying for 18 years.

PHOTOGRAPHY BY **BRANDON YULE**

"The whole aviation world, whenever I go anywhere [and] visit with people, it's just been a wonderful, wonderful part of my life these last few years here," he said.

And the Tern has integrated itself into Dean's family. Dean's son, Daylen, who is also part owner of the airplane, is a pilot. Daylen has logged 240 hours in the Tern.

At the time of this writing, Dean's grandson, Canyon, was just finishing his tailwheel endorsement, also in the Tern.

To Everything There Is a Season

Dean's 75 now and eagerly contemplating his next adventure with the airplane.

"I keep toying with the idea of flying to Alaska again," Dean said. "I've got friends up there. There's some folks up there with Tern, but it's quite a challenge," Dean said. "I don't know what I'll do, but I will do something. I'm not going to sit on a porch and get old that way. I'm going to always have something, and this plane has really been a wonderful plane for me for the last few years."

Dean estimates that there are 10-12 Terns flying right now, and a few more that are on the registry and in restoration. Rare and unusual airplanes like the Tern, not to mention vintage types like the Interstates that came before it, survive because of the dedication of people like Dean and Tim. I think they'd both agree that the reverse is also true. EAA

Hal Bryan, EAA Lifetime 638979, is managing editor for EAA print and digital content and publications, co-author of multiple books, and a lifelong pilot and aviation geek. Find him on Facebook, Twitter, and Instagram @halbryan or email him at hbryan@eaa.org.

SPECIFICATIONS

AIRCRAFT MAKE & MODEL: Arctic Aircraft Arctic Tern
CERTIFICATION: Standard

LENGTH: 23 feet
WINGSPAN: 36 feet, 8 inches
HEIGHT: 7 feet

MAXIMUM GROSS WEIGHT: 1,650 pounds (1,900 Alaska commercial)
EMPTY WEIGHT: 1,073 pounds
FUEL CAPACITY: 40 gallons
SEATS: 2

POWERPLANT MAKE & MODEL: Lycoming O-320
HORSEPOWER: 160
PROPELLER: 82-inch McCauley Borer
CRUISE SPEED/FUEL CONSUMPTION: 90 mph/7-7.5 gph
POWER LOADING: 10.3 pounds/hp
WING LOADING: 8.9 pounds/square foot

VNE: 142 mph
VSO: 38 mph

PHOTOGRAPHY BY **BRANDON YULE**

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CELEBRATING 70 YEARS OF DREAMERS AND DOERS

A look back at this year's convention

EAA AIRVENTURE OSHKOSH 2023, our annual fly-in and membership convention, was one for the record books. More than 677,000 people came through the gates to experience their own "only in Oshkosh" moments, surrounded by family, friends, and, of course, more than 10,000 aircraft. The following is a fraction of our favorite photos from one truly amazing week.

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NASA SUPER GUPPY. *PHOTOGRAPHY BY* **CONNOR MADISON**

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USAF HERITAGE FLIGHT- P-51 AND F-22.
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POLARIS PROGRAM - MIG-29, ALPHA JETS , AND L-39S.
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AEROSHELL AEROBATIC TEAM - T-6S.
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NEWLY UNVEILED STATUE OF TOM POBEREZNY.
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BOEING PLAZA.
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C-5M GALAXY.
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SKIP STEWART – PROMETHEUS (MODIFIED PITTS S-2S).
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FAIRCHILD REPUBLIC A-10 THUNDERBOLT II AND REPUBLIC P-47 THUNDERBOLT.
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WITTMAN TAILWIND.
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LOCKHEED VC-121A CONSTELLATION AND CORSAIRS.
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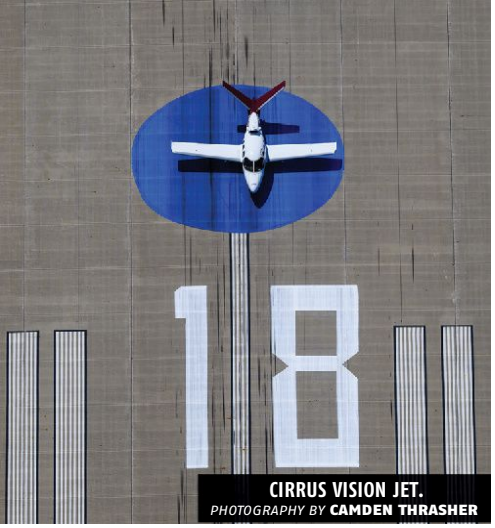

CIRRUS VISION JET.
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PIPER PA-18.
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BOEING PLAZA.
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VAN'S RVS.
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JUST AIRCRAFT HIGHLANDER XL.
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FUN FLY ZONE BALLOON LAUNCH.
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VIETNAM PANEL – THEATER IN THE WOODS.
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ANNUAL WOMENVENTURE PHOTO.
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NASA PANEL – THEATER IN THE WOODS.
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PIPER J-3 CUB.
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CESSNA 170S.
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VAN'S RVS.
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EXTRA 300.
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AEROLITE 103.
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SKYREACH BUSHCAT AND BELLANCA SCOUT.
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AVIAT HUSKY.
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FORUMS AND PRESENTATIONS.

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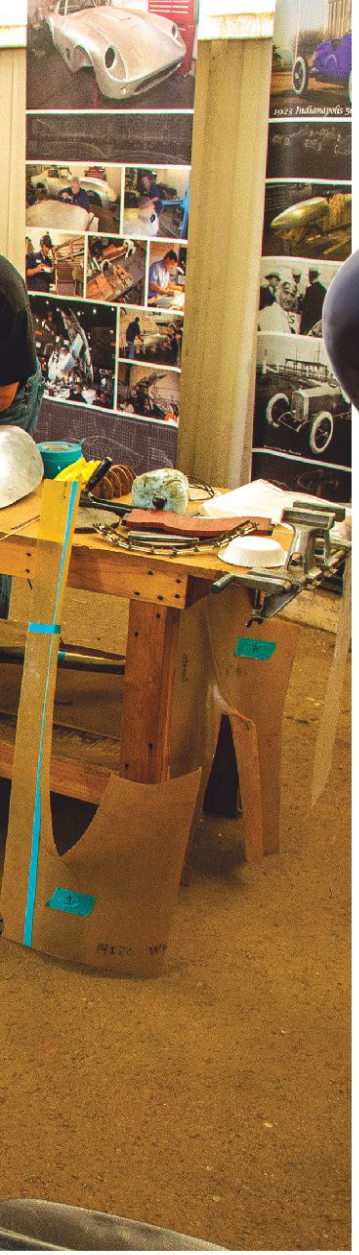

BOEING KC-135 STRATOTANKER.
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VISITORS AND VOLUNTEERS.

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DOUBLEENDER ASCENDER.
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RUNWAY 5K.
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INTERNATIONAL VISITORS PARADE.
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REPUBLIC P-47 THUNDERBOLT.
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KC-135 AND C-17..
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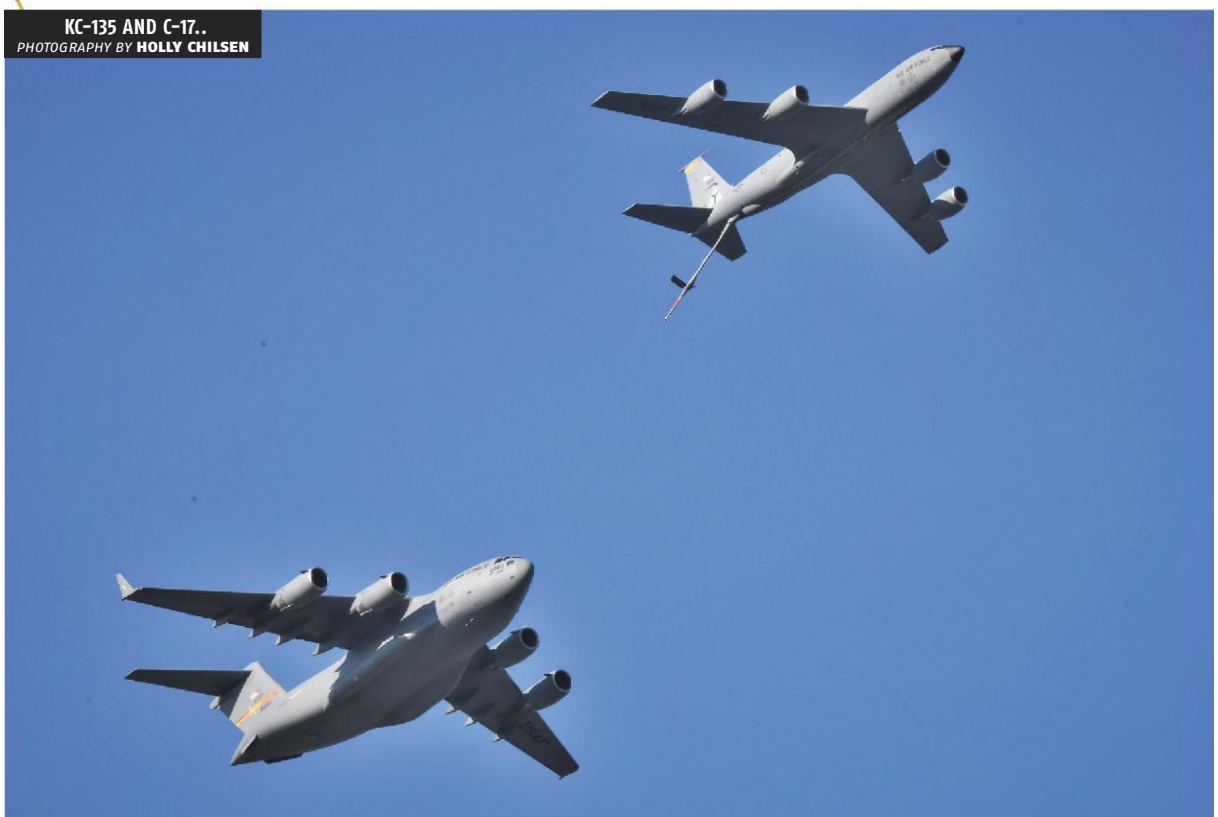

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Wimpy

The little airplane that could — and did

BY TIM TALEN

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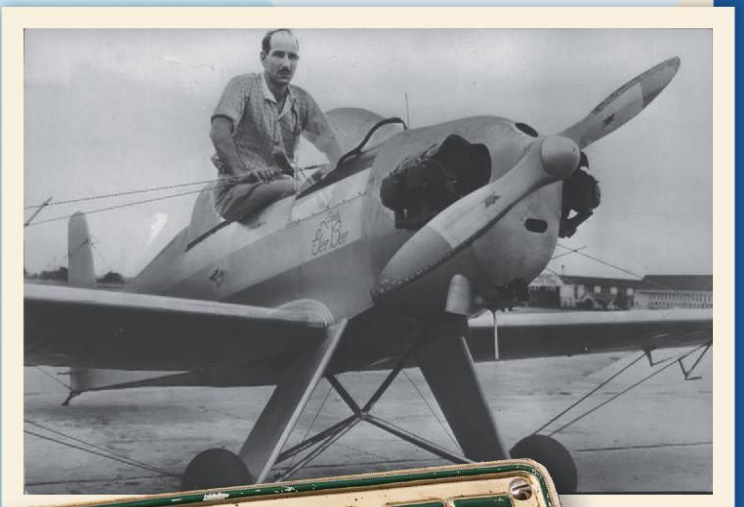

WHEN DOES A SEEMINGLY insignificant vintage Oregon homebuilt — named *Wimpy*, no less — become much larger than one could imagine? Not only did this simple design become a much-copied airplane, but its progeny would become famous. The first iteration of *Wimpy* became the airplane that helped change homebuilt regulations, and that was followed by another award-winning design familiar to EAA members everywhere. So how did all this come to pass? Let's back up a bit and fill in the backstory.

It starts in 1921, a pivotal year in Oregon's aviation history. State legislators authorized the establishment of the first state-level Department of Aviation in the nation. This was five years before the federal government created the Aeronautics Branch within the Department of Commerce.

Oregon immediately developed requirements for pilots and aircraft and most importantly gave the homebuilt aircraft legitimate status under state law. Soon amateur builders got busy. In Oregon, they could build and fly their own creations.

During this pioneer era, Oregon's most prolific designer and builder was Les Long of Cornelius, Oregon. Les was truly a renaissance man, as he also invented and marketed a radio, designed and built at least three successful aircraft, carved and sold wooden propellers, and even designed and produced an aircraft engine, the Long Harlequin.

Les was also a gifted writer. His articles in the early 1930s *Flying* and *Glider Manuals* and *Popular Aviation* chronicled his aircraft designs with plans and instructions. Of Les' designs, the low-wing Longster was the most sophisticated design. In retrospect, it was also his most important.

Les built the prototype low-wing Longster at his farm in Cornelius in 1933. Powered by an Aeronca E-107 engine, it was an immediate success and caught the eye of a couple of young area pilots — Ed Ball and Swede Ralston. With Les' assistance, another Longster was built and flown.

Licensed with a state-issued airworthiness certificate, a state-issued license plate, and federal identification number, N15516, the slick low-winger soon became a regular at the nearby Bernard Field in Beaverton, Oregon. While Bernard Field would gain much notoriety as the home of

PHOTOGRAPHY COURTESY OF **RICK BROWN**

Not only did this simple design become a much-copied airplane, but its progeny would become famous. The first iteration of *Wimpy* became the airplane that helped change homebuilt regulations, and that was followed by another award-winning design familiar to EAA members everywhere.

the "Beaverton Outlaws," there was nothing illegal about their flying activities, as long as they stayed within Oregon airspace.

Enter the next player in the Longster story — Myron "Buz" Buswell. A newly minted Oregon licensed pilot, Buz took an immediate liking to the Longster, and a sale was soon consummated. As the story goes, Buz and the Longster would circle the field and the tiny hamburger stand at the end of the runway, throttle back the two-cylinder engine, and yell down for a hamburger so it was ready when he landed.

Someone commented that was like the cartoon character J. Wellington Wimpy from the Popeye comic strip and cartoons, always looking for his hamburger. Well, the story stuck, and Buz happily added a hand-painted *Wimpy* to the cowl.

Wimpy was flown about 100 hours by many different pilots. By 1940, the aircraft was showing signs of wear. Buz had some ideas about improving the overall performance and look of the Longster. With Les' approval, a yearlong refurbishment brought about a more stylized fin-rudder shape and a higher turtledeck to match the new sliding canopy. By 1941 *Wimpy* was back in the air, and Buz was building much needed flight time.

During this period another young air-minded fellow was watching closely all the activity at Bernard Field. Tom Story was from Portland, and he had enrolled in Lee Eyerly's aviation school in nearby Salem where he learned the basics of aircraft construction. He too thought that Buz's *Wimpy* had real potential and would make a fine project while at the Eyerly school.

Tom's copy of *Wimpy* was powered by a Continental A40 engine using a simply adapted Piper J-2 cowl and, again, a slight change to the fin-rudder shape. It flew briefly in the fall of 1941, but on December 7 everything changed.

With the United States entering World War II, homebuilders pulled propellers, folded wings, and stored their handmade craft for the duration. With a war to be fought, Buz stored *Wimpy* and joined the Army Air Corps, flying B-24s in the Pacific theater. Many of Buz's friends at Bernard Field followed suit, serving in the military as pilots and mechanics. Tom Story put his ship into storage and, as an excellent welder, went to work in the shipyards at Portland.

Another Portland area fellow who was deeply involved in this early homebuilding era was George Bogardus. George had taken his mechanic skills to California and worked with Ryan Aeronautical Co. during the early war years. By 1944, he was back in Oregon. Sensing that the war would soon be over, and wondering how Oregon's homebuilders would get back into the air after the war, George set about effecting a change.

The first step was acquiring Tom Story's low-wing Longster and making a few more improvements including

The Fly Baby Story

An excerpt from Peter M. Bowers' feature story in our December 1962 issue.

The wood construction [for the predecessor to the Fly Baby] was retained for simplicity and low cost and the aerodynamic layout was based on the two Story Specials then operating in Seattle in order to match their flying qualities, which were very definitely superior to others in the area.

The Storys were thoroughly conservative and conventional airplanes with a distinguished pedigree. Their immediate predecessor was George Beaugardus' [sic] *Little Gee Bee*, which Tom Story of Portland, Oregon, had built just before World War II as a development of Les Long's famous Longster *Wimpy*. That Story, originally to have been called *Super Wimpy*, was used by George for a round trip transcontinental flight from Portland to Washington, D.C., in August/October 1947, to petition FAA for a degree of tolerance for amateur-built aircraft that did not then exist. The flight achieved its purpose.

The *Wimpy*, *Little Gee Bee*, and the Storys all got their good performance on low power mainly from a feature well known to the pre-war homebuilders but largely overlooked by the majority of post-war builders who saw the new crop of amateur designs grow out of the Goodyear racers of 1947 and on — low span loading. *Wimpy* did real well with a 30 hp Aeronca E-107 but had 30-foot span or more while the Story designs went to 28 feet for their 65 hp. History and the aerodynamics books bear this out. The early Heath parasols with 25 hp Hendersons were pretty marginal flying machines with 25-foot wings but became ATC'd when the span was increased to 30 while power remained the same. It's not a given area and wing loading that does the job, it's the SPAN that the area is distributed over. The more the merrier.

SPECIFICATIONS

AIRCRAFT MAKE & MODEL: Long Longster — *Wimpy*

LENGTH: 19 feet
WINGSPAN: 31 feet, 6 inches

MAXIMUM GROSS WEIGHT: 585 pounds
EMPTY WEIGHT: 365 pounds
SEATS: 1

POWERPLANT MAKE & MODEL: Aeronca E-107
HORSEPOWER: 30
PROPELLER: Wood, two blades, fixed pitch
CRUISE SPEED: 70 mph
POWER LOADING: 19.5 pounds/hp
WING LOADING: 4.2 pounds/square foot

VNE: 80 mph
VSO: 30 mph

PLANS: Both model and full-scale plans are available from the Oregon Aviation Historical Society & Museum.

PHOTOGRAPHY COURTESY OF **RICK BROWN**

The family tree is now up to date — from Les Long's original low-wing Longster, to *Wimpy*, to the historic *Little Gee Bee*, to the Story Specials and the popular Fly Baby — a simple design proved a lasting success.

Buz Buswell's daughter Annette Whittington, who is a director for the Oregon Aviation Historical Society & Museum, and her husband Dennis, who largely aided with the restoration.

an engine upgrade to the Continental A65 and increased fuel capacity. Now christened *Little Gee Bee* (no connection to the Granville brothers' famous racers), George flew the ship several times to Washington, D.C. By 1952, the regulations were changed to include amateur-built aircraft. In 1953, EAA was founded, and the rest — as they say — is history! Now, in 2023, we celebrate the 70th anniversary of EAA with a greater sense of appreciation for what George Bogardus accomplished with *Little Gee Bee*.

It would seem a fitting conclusion at this point, but the *Wimpy* legacy continued on with an interesting turn. After

The Oregon Aviation Historical Society & Museum

The Oregon Aviation Historical Society & Museum was founded in 1983 with the goal of preserving Oregon's rich aviation heritage for future generations. The museum collection includes a dozen heritage homebuilts that flew under Oregon state license.

Other famous airplanes include the Great Lakes flown by Tex Rankin and Dorothy Hester and both of the Story Specials featured on the 1960 *EAA Sport Aviation* cover. The museum's archives house numerous collections and thousands of photographs.

For more information visit OregonAviation.org, and see "Finding Aviation Legacy," Plane Talk, in the July 2018 issue of *EAA Sport Aviation*.

Meeting Buz

This is an excerpt from one of Lauran Paine's Plane Talk columns titled "Outlaws — The origins of homebuilding" that ran in our February 2018 issue.

In 2003, a gentleman wandered into my hangar and stuck out his hand and said, "Howdy. Name's Buswell. Myron. But everybody calls me Buz. Most everybody knows me. Probably more than I want them to."

He was right; everybody does know him, me included. We'd never been formally introduced (that's seldom necessary among airport bums), but I knew Buz had flown 42 B-24 missions in the Pacific. And he was a Beaverton Outlaw before and after the war.

I was meeting and listening to history; it was a happenstance that I treasure to this day. He talked about the B-24. He was proud of his service — as he should be. And he added, "Learned a lot of what I needed to know about airplanes from the Outlaws. We learned stuff about flying because we wanted to and we had to. We were kinda villains, really. Oh, it was a fun time. Lotta passion and sharing. We were doing what was right, promoting aviation."

He knew Les Long. He knew Tom, George, and a bunch of the others. He actually owned and flew *Wimpy* in the late 1930s. So when I write about the Outlaws, Buz's vignettes about them are included.

the war and the new regulations for homebuilders, Tom Story decided to build another Longster. With a friend he laid out tubing for three more low-wing craft.

Two of these ships were completed in 1955. Now known as a Story Special, they were both powered by the Continental A65 and included more internal refinements. They were flown locally from Bernard Field but eventually were sold to pilots in the Seattle area.

The second Story was owned by the Story Flying Club, and one of its members was none other than Peter Bowers. In an article Pete wrote for the June 1960 *EAA Sport Aviation*, he extolled the virtues of the Story Special design. That first color photo on the cover of the magazine featured the two Story Specials in formation over western Washington.

In 1957 EAA initiated a design competition, and the eventual winner was the Bowers Fly Baby. In Pete's recounting of the Fly Baby design, he spelled out in detail how the Story Special was the fundamental concept in his new homebuilt — see sidebar. The family tree is now up to date — from Les Long's original low-wing Longster, to *Wimpy*, to the historic *Little Gee Bee*, to the Story Specials and the popular Fly Baby — a simple design proved a lasting success.

The Oregon Aviation Historical Society & Museum was thrilled to acquire *Wimpy* after hearing numerous rumors of its existence. Roy Olsen, of Granada Hills, California, had acquired the much-modified aircraft in 1957, and he graciously donated *Wimpy* to the museum in 2005.

It required a full restoration and much had to be accomplished to bring it back to its original shape. Working with the four sheets of plans drawn up by George Bogardus, a number of hand-written notes by Buz Buswell, and many photographs in the museum archives, a plan emerged and was completed by a cadre of museum volunteers. With the original blue and cream paint scheme applied, *Wimpy* now shines on the museum floor as one of our heritage homebuilts. It is a definitive reminder of how our pioneer homebuilders paved the way for the privileges we have as EAAers today.

EAA

Note: Rick Brown, the photographer who provided many of the images for this story, died shortly before press time. We join Tim in mourning the loss, and extending our condolences to Rick's family and friends. – Ed.

Tim Talen, EAA 8615, has a master's degree in history and has devoted his life to the world of vintage aviation. He's completed award-winning restorations of airplanes too numerous to mention and was inducted into the EAA Vintage Aircraft Association Hall of Fame in 2014.

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Hard-to-Fly AIRPLANES

Do they really exist?

BY BUDD DAVISSON

PHOTOGRAPHY BY **CONNOR MADISON**

THIS IS NOT GOING to be your typical article. That's because it's not going to be an article so much as it is a personal essay. The subject is what makes some airplanes harder to fly than others. If you read the next sentence, you can turn the page and go to the next article because you'll have gotten the answer.

The answer is: An airplane is considered to be harder to fly when it is enough different from what a pilot has been flying that additional training is required. That's the entire answer.

Still with us? Okay, here's another statement that's absolutely irrefutable: Anyone reading this (assuming no serious physical incapacitations) can learn to fly any airplane with enough of the right kind of training. Let's repeat that: any airplane. We very much proved that during World War II. It was proved when, early in the war, our just-off-the-farm pilots who had only around 250 flying hours were knocking down experienced enemy pilots. Jessica Cox proves that every time she flies as she has no arms. My own flight logs prove that because they contain records of helping three one-legged pilots master the Pitts Special, which if you believe the rumor mills, is one of the hardest airplanes to land. Apparently, it's not.

"HARD" IS A FUNCTION OF UNFAMILIARITY

The word hard, as in harder to fly, is a word that is difficult (hard, if you will) to define. However, if you stand back and look at it, when we say something is hard to do, what we're actually saying is that compared to what we're normally doing, this new task requires us to put in more effort, and there will be a learning curve. It probably entails some processes with which we aren't familiar, and therefore we can't do it as well as others can.

In some cases, the new activity itself is just that — new. It can be a relatively simple task, but if we've never done it before, it's not only hard but also can be dangerous. Hand an axe to a lifelong New York City resident. Point them at a pile of firewood and tell them to split it. It's a foreign concept, and not only are they initially going to have a difficult time doing it, but a relatively benign process becomes dangerous as well. Insert just a little training and everything is copacetic.

It could be argued the same is true in going from airplane to airplane. Here the difficulty — the degree of "hardness" — is a function of what a pilot has been flying and what they're going to be transitioning into. The degree of difficulty experienced has little to do with what the pilot is going to be flying and is based almost entirely on what they have been flying, as compared to the new airplane.

MUSCLE MEMORY PLAYS A ROLE

The degree of difficulty also depends on how much time a pilot has in their original airplane. A lot of time in the same airplane hardens up their muscle memory. Even though our brain supposedly controls our eyes, hands, and feet, it's amazing how defenseless it can be when asking our body to do something it has done a thousand times but do it a different way — as in a new airplane that is different than the old one.

If the difference is small, as in going from a 172 to a 182, the muscle memory is easily refined to match the new airplane. However, if you're going from a 172 to a Bonanza, where the speeds, the sight picture, the weight, and the control feel is so much different, you're going to have to work a little harder.

An airplane is considered to be harder to fly when it is enough different from what a pilot has been flying that additional training is required.

The goal is to make our body forget what it already knows and reorient our control input to match what is required in the new bird. What the checkout process is trying to do is remodel our instincts so they match the demands of the new airplane. Sometimes, that's easier said than done.

PHOTOGRAPHY BY **SCOTT SLOCUM**

DIFFICULTIES RESULTING FROM DIFFERENCES COME IN DEGREES

The smaller the difference between two airplanes, the easier the transition. That's the concept that made the whole WWII training process work so well. The pilot was introduced to the third dimension in a 220-hp Stearman or something similar. Next the pilot went into a 450-hp BT-13 Valiant that was bigger and heavier. Then into the AT-6 Texan that was more than just a retractable-gear BT-13. It had 600 hp, it was significantly heavier, and its narrow gear and higher CG were less forgiving of sashays off the centerline.

The smaller the difference between two airplanes, the easier the transition.

Every step up, the training ladder grew in horsepower, weight, and speeds. So, the step from the T-6 into something like a Mustang was exciting but much less demanding than most believe. Lacking dual control Mustangs, the ground school leading into the airplane was intense and prepared the cadets for the incredible

PHOTOGRAPHY BY **BONNIE KRATZ**

noise and need to treat the throttle kindly. In truth, in many ways, the Mustang was easier and more accommodating than the Texan (been there, done that).

Today, the Stearman has a reputation of being extremely difficult on the ground. The BT-13 is seen as a modernized Stearman in terms of flying. The Texan is thought of as being capable of biting your butt before being untied. None of this is true. The reputations have come from the usual place airplane reputations come from — those who have never flown them. However, each of the WWII trainers are just demanding enough that the student had to learn the basics as they applied to each new airplane. They were climbing a ladder where each step was slightly more demanding than the one before.

MODERN TRAINERS ARE LESS DEMANDING

In today's civilian aviation market, the concept of slowly increasing difficulties is still being applied to training. The major difference from the WWII process is that every one of the trainers being used today, at every level, is specifically designed to be relatively easy to fly.

To make an airplane marketable, its design has to appeal to the widest market possible, and the biggest chunk of that market are civilian pilots never intending on being professionals. The basic skills the pilot develops are not as well developed as those learned in the WWII trainers. This isn't a problem because, assuming they remain in mainstream aviation, virtually every airplane they will fly is a product of the make-it-easy-and-they-will-come design concept. Part of which is toeing the line in FAA aircraft certification.

The degree of difficulty experienced has little to do with what the pilot is going to be flying and is based almost entirely on what they have been flying, as compared to the new airplane.

Regardless, low-demand handling is an unwritten rule of the modern aviation marketing environment and is necessary to continue bringing new pilots into the fold.

NEW GENRES STRETCH THE DEGREE OF DIFFERENCE

When vintage and homebuilt airplanes are tossed into the mix, everything changes. This totally rearranges the concept of "each step is slightly more difficult" because the first step into the new genre (vintage, homebuilt, etc.) is often larger with more differences.

If a new student pilot is originally learning to fly in vintage, homebuilt, or antique airplanes (a Cub, for instance), the slightly-increasing-level-of-demand concept, airplane to airplane, still applies. However, it applies only to those pilots who have learned in that environment. Remember, "hard" is defined by what a pilot has been flying. Quite often, the first step out of mainstream aircraft into the world of vintage/sport aviation puts the pilot into aircraft that are very different from what an individual has been flying in the past.

A major difference between mainstream "modern" aviation and vintage or sport airplanes is the simple fact that many of the latter are tailwheel machines. An editorial note here: If there's any apparatus in existence that has a more unearned reputation than the tailwheel aircraft, we don't know what it is. It has been proven it doesn't take one minute more to solo a new student in a Citabria

PHOTOGRAPHY BY **CONNOR MADISON**

or Champ than it does in a 172 or whatever. A new student, with no flight time, comes into the world of the taildragger with nothing to compare it to. It's not harder than what they flew in the past because they've flown nothing before. However, if the student comes into a Cub, Citabria, etc. from a 172, the differences are many. It's not harder, just wildly different. And making friends with those differences is the focus of the training required. From the outside, it looks "harder." From the inside, it's just another skill to be learned.

Besides having to learn a new skill (the tail wheel), a new sport or vintage pilot has to acclimate to a different, sometimes strange, environment. Most (not all) taildraggers are blind straight ahead. This is new. The airplane won't automatically correct for crooked touchdowns. This is very new. The need for solid, ball-in-the-center coordination until touchdown is critical (unless slipping or in a crosswind). This is new. Many taildraggers feature tandem seating, sometimes with the pilot in the back. This is new. Again, none of this is hard. Just different.

HANDLING STANDARDIZATION IS EVIDENT IN LATER DESIGNS

There's an interesting parallel between the ages of the vintage and homebuilt aircraft and the demands placed on pilots new to the given makes and models. Modern homebuilt aircraft designs pay homage to the handling demands that the FAA requires of certified aircraft. This is not to say an RV/Zenith/Lancair/etc. flies like a Cherokee or 172 because they don't. They are quicker and lighter, but in ways recognizable to the average general aviation pilot. It's the same feel as being taken out of a Chevy and put into a Porsche. The overall control and performance concepts are recognizable but sportier and more fun.

As you go back into the first generation of homebuilts, along with the vintage aircraft of the late '40s and early '50s, a difference is felt. The designers made little or no effort to tame adverse yaw and provide for leisurely glide slopes. During that time period, the pilot was expected to supply the rudder inputs to conquer adverse yaw. Again, this isn't difficult, but it's a major difference from designs minted in the last 30 years or so.

Added to this is the differences designed into the airframes to accomplish different goals. For instance, a Schweizer 1-26 sailplane doesn't fly at all like a Pitts Special, nor should they fly the same. Their goals and definitions of performance are diametrically opposed. Neither is "hard" to fly, but both require specific training to transition into them because few pilots have previously flown similar aircraft.

TRAINING BRIDGES THE DIFFERENCES

The bottom line is, training is a new pilot's life insurance. If they don't want to make the effort to take that training, they should stay out of those airplanes. Training is the gateway to safety. And there are few things as enjoyable as making friends with a new airplane, and that process is based on training.

So, are any aircraft actually hard to fly? Assuming the design isn't basically flawed, the answer is a resounding "no." However, there are lots of aircraft a pilot will encounter for which specific training is a necessity. It's as simple as that. EAA

Budd Davisson, EAA 22483, is an aeronautical engineer, has flown more than 300 different types, and has published four books and more than 4,000 articles. He is also a flight instructor primarily in Pitts/tailwheel aircraft. Visit him on AirBum.com.

PHOTOGRAPHY BY **LEONARDO CORREA LUNA**

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Hummingbird Flight Testing

Blade and engine adjustments

BY VIC SYRACUSE

THIS MONTH I'LL GET back to the flight testing of the Hummingbird. Yes, the 40 hours required by the Phase I operating limitations have been completed, but I am learning that properly flight testing a helicopter is a whole different ballgame than flight testing an airplane.

Most of the flight testing of other aircraft I have built has been uneventful, except for the Prescott Pusher. After completion of Phase I, it was off to the races, going places, and having fun. Helicopters are much more complicated with lots of moving parts that need to be measured, tweaked, and adjusted to play nice with each other.

It's still a lot of fun, and I remind myself that I built one to learn something new, and it is doing that quite well. Support from Vertical Aviation has been stellar and made it enjoyable as well.

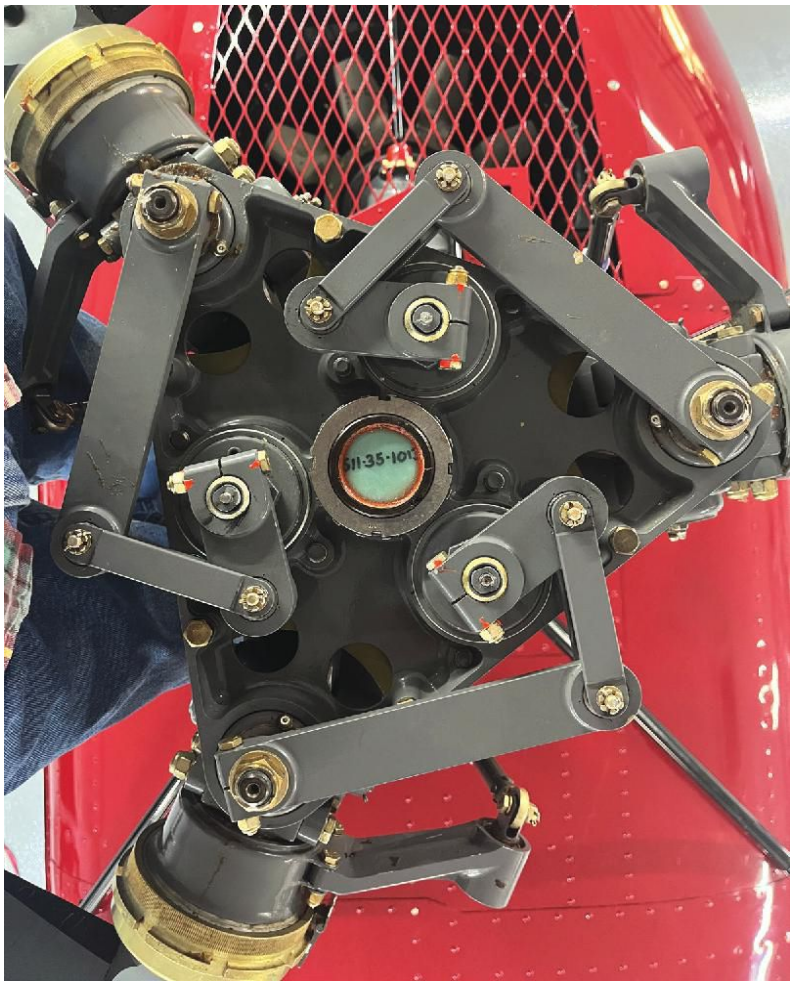
The only things required on a fixed-wing aircraft propeller are to use the proper torque on the mounting bolts and check the blade track at the tips. Balancing the propeller is a nice touch and usually makes for a substantially smoother ride but is optional.

Helicopter blades are at the opposite end of the spectrum. While propeller blades stay in a fixed-pitch position throughout a revolution (yes, even constant-speed ones), helicopter blades are continually changing in pitch. In forward flight, for example, the retreating blade needs to create more lift across itself as the relative wind has decreased. It does this by assuming a higher angle of attack.

Then, as it continues its arc and becomes the forward-moving blade, the angle of attack needs to be decreased. This is all accomplished at the hub through many moving parts — which all require adjustments. At the same time, all the blades need to be tracking in the same plane.

Initial adjustments for proper blade tracking are done by adjusting the pitch control links at the hub. On the Hummingbird, this is accomplished by adding or subtracting washers. There are multiple ways to measure or see where the blades are tracking.

Brad Clark at Vertical Aviation let me borrow his Chadwick-Helmuth balancer, a time-proven tool for adjusting blade tracking on helicopters. Chadwick balancers are expensive, and the newer digital models are almost prohibitively expensive for an individual owner with one helicopter.



In these pictures, you can see the pitch control links and blade dampeners installed on the rotor head.

DynaVibe has created a less expensive version. I have been playing with that one recently. The primary difference that I see on the Chadwick is that one can "see" the blade track by using reflective angles on the blade tips versus waiting for trackers using an optical sensor to take a reading and then display the results.

There is one other method that uses LED lights on the blade tips. Unfortunately, LEDs aren't usable during bright daylight conditions, and as you know, Phase I is day VFR only.

Prior to the first flight, the blade angles were carefully measured at the root and adjusted within one-tenth to two-tenths of a degree of each other. This is only a starting point. Once the blades are turning, they fly differently. Each blade is now flying through air disturbed by the preceding blade. Using a Chadwick requires two people in the cockpit, and I wasn't willing to do

PHOTOGRAPHY BY VIC SYRACUSE

that during initial flights. I felt there was too much risk. However, we did use it on the ground at rated rpm to get close.

After I had completed about eight hours of flight testing, I felt it was time to engage the help of another rated helicopter pilot to start doing the blade tracking. There are two components — adjusting for proper track in the hover, and then adjusting for proper track in forward flight.

Lots of short flights were done over multiple days. Hover, land, adjust. Repeat. Then fly, land, repeat. Each adjustment of one blade would also affect the other two blades. Forward flight needs to be at the same speed all the time, as changing the speed requires different adjustments.

In the end, it is a compromise between the hover and forward speed. The result was noticeable from a smoothness standpoint inside the helicopter. People watching the videos commented about how much better the blade track looked.

However, there came a point when I just couldn't seem to make any more progress. There was a noticeable shake in the cyclic control stick that was uncomfortable. There is one other component in the hub called a blade dampener that comes into play when the blades are turning. One is attached to each blade, and the primary purpose is to keep the blades in the proper lead/lag position as they traverse from one side to the other. They are oil-filled and adjusted at the factory. I rigged up a way to measure the speed of each blade as it traveled the full range of the dampener and noticed two of them were close in timing to each other, and one was substantially different.

This is where the support from Vertical Aviation came into play. Brad visited in person and brought some different dampeners. The transmission had a slight leak to it. Brad thought it would be a good time to change it out as well, so he brought a new transmission at the same time.

We installed the new transmission. While there was improvement, the shaking during startup was bad enough that hovering was out of the question. After many hours of measuring and trying some other solutions, Brad decided it was best to remove the rotor head, and he would take it back to his shop to thoroughly go over everything.

It turned out that two of my original blade dampeners were bad, and one he brought with him was also bad. He was back within a week.

Since the main blades were off, Brad took the time to make sure all the trailing edges were bent to the same angle using a special tool he had

I felt it was time to engage the help of another rated helicopter pilot to start doing the blade tracking. There are two components — adjusting for proper track in the hover, and then adjusting for proper track in forward flight.

The angle of the blade is adjusted by adding or subtracting washers on the pitch control links.

made. He also rebalanced the tail rotor blade. Once everything was reassembled, the difference was noticeable, and we were able to go flying and make good progress in short order.

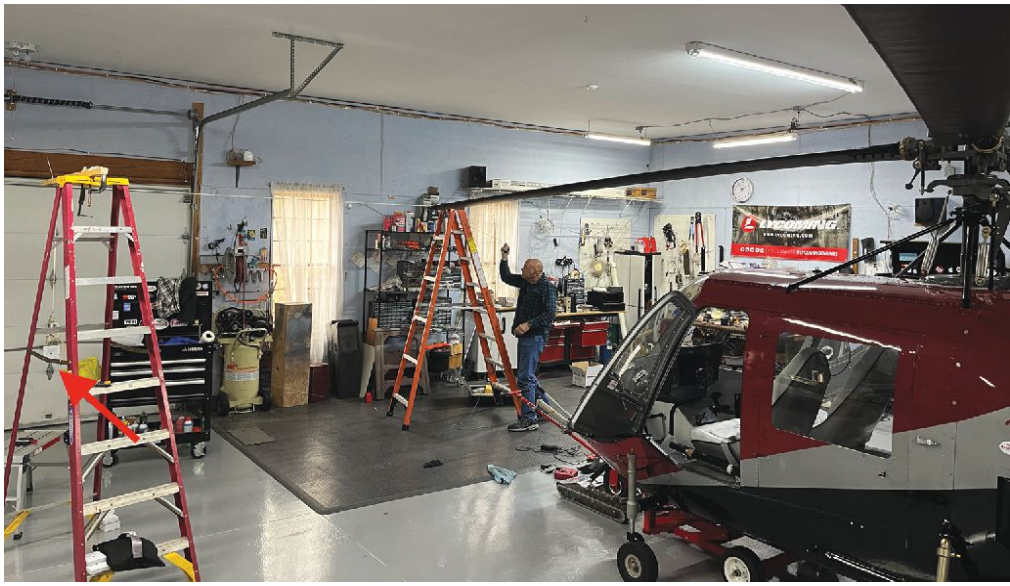
I've made a lot of progress since then, but Brad is continuing to tweak another set of blade dampeners that we hope will be the final solution to the stick shake. Now that I am out of Phase I, I can also use the LED lights in the dark to have another visual comparison.

The other area I was focused on during Phase I was the engine, as I am the first one to use the Lycoming Thunderbolt installed in the Hummingbird. Reliability has never been in question, but performance numbers needed to be figured out, especially fuel burn for cross-country trips.

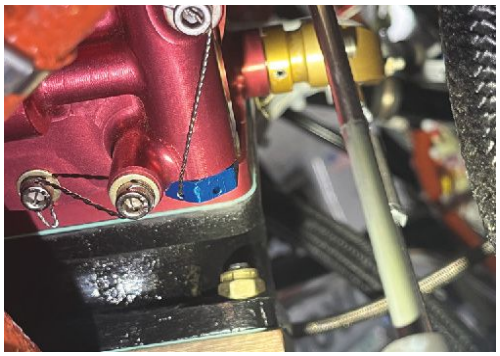
The injection system is an FM-200 from Airflow Performance, with which I am very familiar. Two of the features that I like are that the main jets are easy to change, and the injectors have removable inserts so you can balance fuel flow to the cylinders independently.

Most new engines run quite a bit hotter during the break-in period, and the helicopter is no exception. It's even worse because the initial flights are done in a hover, which requires more power than forward flight, the lack of movement means less cooling airflow, and the helicopter is hovering in its own hot air.

Here you can see the StrobeX light that is used during the blade tracking function of the Chadwick. The strobe light is pointed at the blade tips, on which reflective angles are mounted. The reflective strips each have a stripe in a different direction. Through the use of a magnetic pickup installed on the rotor head, the light is synced to the blades.



By using a simple pulley and weight system, I could time the blade travel across the full range of the blade dampener. They all need to be close to each other in timing.



It's easy to change the jet in the FM-200 fuel servo by removing the blue cap seen here to access the jet. Removing or installing a new jet only requires a flat-bladed screwdriver. Here's a picture of the various jets (top) and injector nozzles (bottom).

An A-frame gantry crane makes removal and installation of the rotor head and transmission easily done by one person.

PHOTOGRAPHY BY **VIC SYRACUSE**

The system came with a number 42 jet, which seemed lean to me. Sure enough, cylinder temps were touching 440-plus, and I didn't like that.

Don Rivera, who founded and owns Airflow Performance, sent a few extra jets and nozzle inserts to try. Installing a number 38 jet (smaller numbers mean richer jets) lowered the temps to right around 400 degrees, which was great.

As I continued through the test program and the engine break-in showed lower temps, I slowly worked back through the jets and am currently running a 40.5. I'm thinking by 100 hours I could be back to a 41 or 41.5. The fuel flow is substantially different between the 38 and the 40.5 — about 3 gph less with the 40.5. Fuel burn now at 75-80 knots is around 20 gph. With the 57-gallon fuel tank, we get a solid two hours plus almost an hour's reserve of fuel.

I know, some of you are cringing at the fuel burn versus speed. I do, too! But, it's a helicopter. It's not meant to go fast, and as my wife, Carol, says, "The view is awesome."

Now I'm waiting on the blade dampeners to arrive this week. Brad is personally bringing them and will again help with the blade tracking. We are also going to try some different strength control system dampeners to help eliminate some of the stick shake, if necessary.

Next month I'll continue to share some more on the flight testing progress. By the time you read this, I hope I will have met many of you in person at Oshkosh with the Hummingbird so you can see how much of a fun factor it has. EAA

Brad Clark from Vertical Aviation checks the trailing edges of the main blades and performs a delicate static balance of the tail rotor assembly.

Vic Syracuse, EAA Lifetime 180848, is a commercial pilot, A&P/IA mechanic, designated airworthiness representative, and EAA flight advisor and technical counselor. He has built 11 aircraft and logged more than 10,000 hours in 74 different types. Vic founded Base Leg Aviation, has authored books on maintenance and pre-buy inspections, and posts videos weekly on his YouTube channel. He also volunteers as a Young Eagles pilot.

What About Us Older Pilots?

Staying involved in aviation

BY GEORGE KARAMITIS

LANDING AFTER AN ENJOYABLE late afternoon flight and taxiing back to the hangar, I remain seated and just think. Out loud, I holler, "WOW!" This little airplane gives my heart an extra reason to keep beating. What a way to experience flight.

Speaking out loud to myself I ask, "George, just how long do you think you can keep doing this?" I don't like to hear myself saying those words, but the fact is, I am 82 years of age. My life is like today's setting sun.

I love being an older person. It allows me to be freer in expressing the thoughts developed through many years of experience. What do I have to lose? I am not alone in this mindset. I share these thoughts with many of my fellow pilots as they share their thoughts with me. Together we are on the same flight plan.

My whole life has been aviation. Even before kindergarten, the passion for flight was all-consuming. Professionally, as a young 18-year-old, I became an integral part of a U.S. Navy flight crew. I am very proud of that.

As time went on, I became a flight instructor for a major university and continued to instruct for 56 years in addition to a 32-year career as a pilot with Trans World Airlines.

I didn't get to this point by myself. Quite the contrary. Each and every person I have flown with has molded me into the person and pilot I am today. I know my fellow pilots, and they know me.

Aviation is an essential part of our very being. Then all of a sudden, we wake up some morning and realize we are senior citizens. The short definition is that we are old. Oh, we still have the skills to fly our aircraft, and some pilots can qualify physically, but other difficulties threaten our aviation lifestyle.

The inflationary cost of maintaining and flying our aircraft has become problematic. Add to that the difficulty in obtaining insurance. For us older pilots, this may be too much to overcome, and consequently, we are being grounded by economics beyond our control. Some of us are being forced to part with our aircraft. As this occurs, part of our lifelong love is being taken away.

As this happens, I have witnessed that some of my fellow pilots seem to lose a certain zest for life despite being physically able to fly. How sad this is. Their frequent trips to the airport become less and less, and, even more importantly, the camaraderie that was shared with other pilots becomes less and less. It's much more than just separating from an airplane. Rather, this becomes a drastic life-changing event.

So, how have I been able to cope with the severity of these various inflationary problems? To be honest, I have not escaped. However, I am dealing with a much lower basic cost. It's called an ultralight. Yes, I said ultralight.

Before you roll your eyes and contort your face into even more wrinkles, listen to what I am about to say. I address this to all pilots. Don't say to yourself, "When I get a little older, I will look into this." For us flyers, time flies even faster. I, as well as many of my fellow seniors, sat right where you are today. Do not become a casualty

The inflationary cost of maintaining and flying our aircraft has become problematic. Add to that the difficulty in obtaining insurance. For us older pilots, this may be too much to overcome, and consequently, we are being grounded by economics beyond our control.

PHOTOGRAPHY COURTESY OF GEORGE KARAMITIS

of having no plan. The ultralight way of flight may provide some answers.

You might ask, how did I become interested in the ultralight as a way to enjoy simple flight? This all began in the early 1980s. Several of my fellow airline pilots became dealers for various ultralight types. After a close inspection of several different models, I realized that these simplistic aircraft were well engineered.

Up until that point, I was fortunate to have owned several general aviation-type airplanes. I would fly these aircraft quite regularly. The ultralight intrigued me, and that's why I am so happy today. I gave myself a chance to honestly explore the type of flight the ultralight would provide.

For me, cross-country flying gave way to just getting airborne. Ladies and gentlemen, my fellow pilots, I know you, and I know you also would be converted.

So, how does a person go from the Beechcrafts, Cessnas, and Pipers, along with the many other general aviation and commercial aircraft, to a simple ultralight? My fellow pilots, it's an amazing transition. The strict discipline in following the proper procedures and coordinating with inside instrumentation is replaced by just looking out and using the real horizon for determining attitude and the wind in your face to sense your airspeed.

Can I just take you on a typical ultralight flight and share with you what I experience on every flight?

After my preflight is complete, I walk my little craft out of the hangar and set the parking brake. My Quicksilver is a 1983 model, so I have a recoil pull start. Most modern-day craft have an electric start. The first thing you'll notice is how close to the ground you are when sitting down in the center seat. That's okay.

Your sensation of speed is increased due to the low seat height. After lining up with the runway and applying takeoff power, the feeling of fast acceleration will take your breath away. You will think you are sitting in a go-kart doing 40-50 mph. In reality, your speed is only about 22 mph.

Once you break ground, your feeling from the initial climb is that you are going upward very fast. This lasts until you've reached about 300 feet of altitude. Then a noticeable difference in your perception of speed occurs as you gain separation from the ground. I call it a slow, calming sensation. It is the main reason why I love ultralight flight.

To add even more to that calming feeling is observing the noticeable effects of the wind. I have not gone backward yet, but I have parked a fixed-wing aircraft in the sky. My fellow pilots, it is difficult to put into words, but I know you would love doing this.

Remember, you will be doing this with no instrumentation other than a simple Hall airspeed indicator. Next add gentle

To all of my fellow older pilots that are, for whatever reason, in the position of having to part with your airplane, I share your pain. The reason I bring up the possibility of becoming an ultralight aviator is that it offers more manageable expenses. It will allow you to be your old self.

climbing and descending turns. You will think that you are wearing the wings.

Heading back to the airport is just like in all other aircraft I have flown. In an ultralight, it's best to fly a lower pattern altitude to give way to the faster aircraft and to use the radio to announce your intentions. I like doing the overhead 360 to a landing. I also like bringing my power to idle when beginning the turn and touching down on the numbers.

It's basic stick and rudder flying. Since you're sitting closer to the ground, your flare height will be lower than in other aircraft. You can do it. My fellow pilots, when the realization of what you just did hits you, and after shutting the aircraft down, you too will say "WOW!"

To all of my fellow older pilots that are, for whatever reason, in the position of having to part with your airplane, I share your pain. The reason I bring up the possibility of becoming an ultralight aviator is that it offers more manageable expenses. It will allow you to be your old self.

However, if aircraft ownership is not in your best interest, I offer some other suggestions. In today's world, almost all aviation organizations are making great efforts to recruit the younger folks. That effort is necessary for the continued growth of these organizations.

Within these aviation organizations, who better to help with recruitment than us senior pilots? Collectively, we seniors have a wealth of knowledge to impart to the younger generations; it will keep us connected with the many other aviation entities.

Join your local EAA chapter. Try to attend the various air shows. You will reestablish the camaraderie that pilots share.

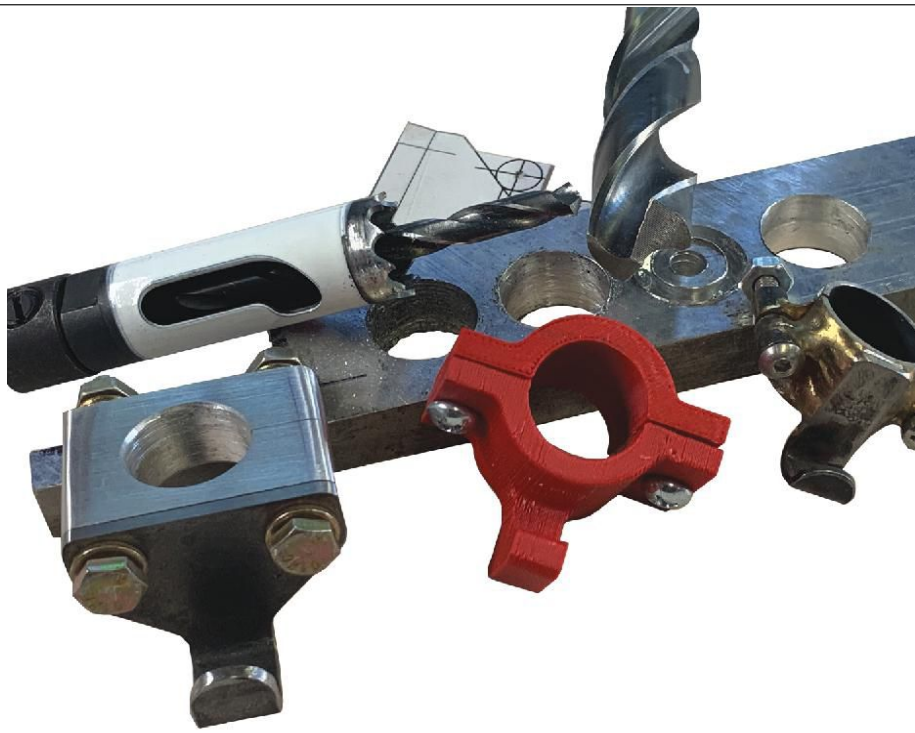
I'd like to make a humble request to all the aviation groups to help us seniors establish a pathway to yield these positive results. And then, when all is said and done, collectively we all will be able to say, "WOW!" EAA

George Karamitis, EAA 144192, is a retired TWA captain, holds an ATP with B-727 and B-747 type ratings, and has been a CFI for more than 50 years. In 2013, George received the Wright Brothers Master Pilot Award for more than 50 years of accident-, incident-, and citation-free flight.

Dutchman Clamps Revisited

There's more than one way to skin a clamp

BY BUDD DAVISSON



Right to left, we have the phases of Dutchman clamp technology as applied to seat belt hooks: old-school welding/brazing, 3D printing, and the Shop Talk way of doing it with hand tools and no welding.

WAY BACK IN 2016, Shop Talk visited the basics of making Dutchman clamps and showed one application for them: mounting hooks to hang seat belts from. Since then, several things have happened that made me think it might be time to go back and revisit the old Dutchman clamp and offer ways of bringing the concept up to date. Again, we'll use seat belt hooks as the application.

I said "several things have happened" — the first of those being how many times I've mentioned Dutchman clamps to homebuilders and drawn a blank stare.

Second, one of my students, John Conard, was taken by the sculptured aluminum seat belt hooks on my airplane, which are nothing more than exotic Dutchman clamps produced by a three-axis CNC machine. He took a photo, made up some drawings, and gave them to Chris Anderson, who does 3D printing professionally. The result was that a bag of Dutchman clamp seat belt hooks duplicated in space age plastic landed on my desk. Dutchman, meet the future!

Third, I recently stumbled across the original brazed Dutchman clamp seat belt hanger I fabbed for the 2016 Shop Talk. I saw it as being worthwhile. However, a person had to have welding or brazing capabilities to duplicate it, but many don't. That thought was rapidly followed by another, "How would I build something similar using common hand tools and relatively available material?" So, I did.

Most of the steps I came up with are chronicled in the photos.

THE MATERIAL

I envisioned hogging a Dutchman type of clamp out of 1/2-inch aluminum plate. I had a piece I had lifted out of the scrap bin at my steel supplier. However, enter eBay (naturally)! Search "1/2-inch aluminum plate" and you'll quickly see where you can get a chunk of 6061 for $20 that's more than what is required for the clamp. However, having that kind of scrap around the shop is always a good thing.

THE CONCEPT

The typical Dutchman clamp is made by welding or brazing small diameter tubing crosswise on opposite sides of larger tubing. Then the major tube, with the smaller ones attached, is cut in half crosswise, creating two half-circles with small tubing on both sides.

The halves are fit over another piece of tubing (longeron, etc.) and bolts through the small tubing hold the clamp tight. So, how to do that in 1/2-inch aluminum?

1. Lay out the dimensions and hole locations on the plate using Magic Marker, a square, and a scribe, which is a sharpened file.
2. Then "drill" a 3/4-inch hole through the plate.
3. Drill 3/16-inch holes 90 degrees to the big hole and on both sides through the narrow dimension of the plate for bolts.
4. Then saw the plate through the middle of the big hole creating two halves that will fit over 3/4-inch tubing. Anything can be mounted to it via the bolts.

TOOLING REQUIRED

We're making the assumption that this is being done by a grassroots homebuilder who doesn't have sophisticated items like milling machines, so we'll be doing workarounds with hand tools.

Drilling a 3/4-inch hole, which can be a challenge, can be done in a number of ways. All of them require a healthy hand drill as a minimum.

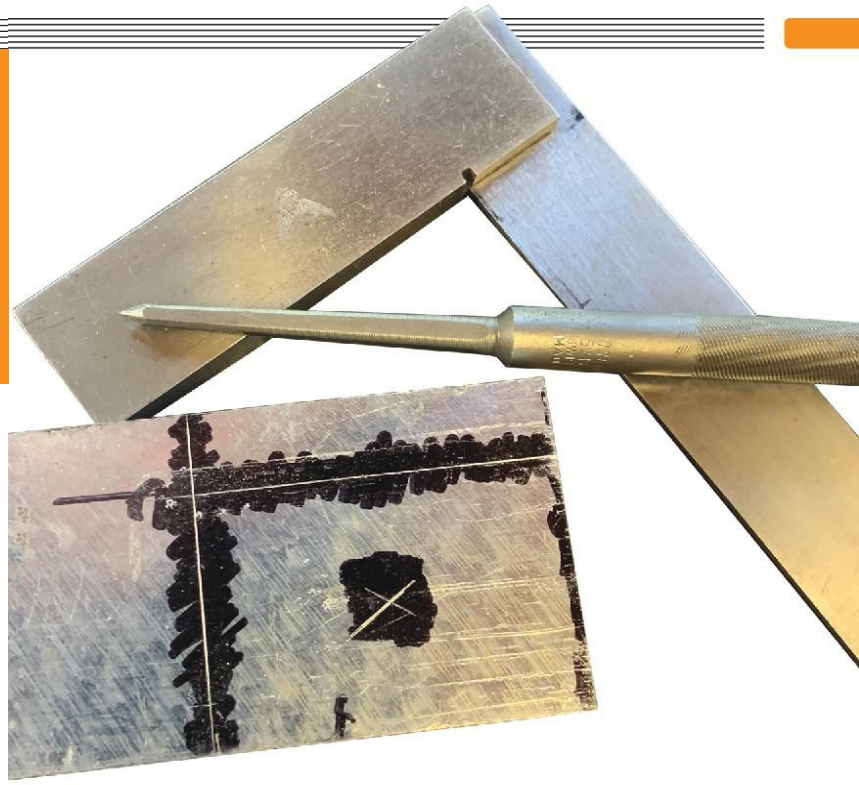
We're making the assumption that this is being done by a grassroots homebuilder who doesn't have sophisticated items like milling machines, so we'll be doing workarounds with hand tools.

A 3/8-inch power drill (as opposed to a 1/4-inch) would work, but a drill press, even a small one, would be much better.

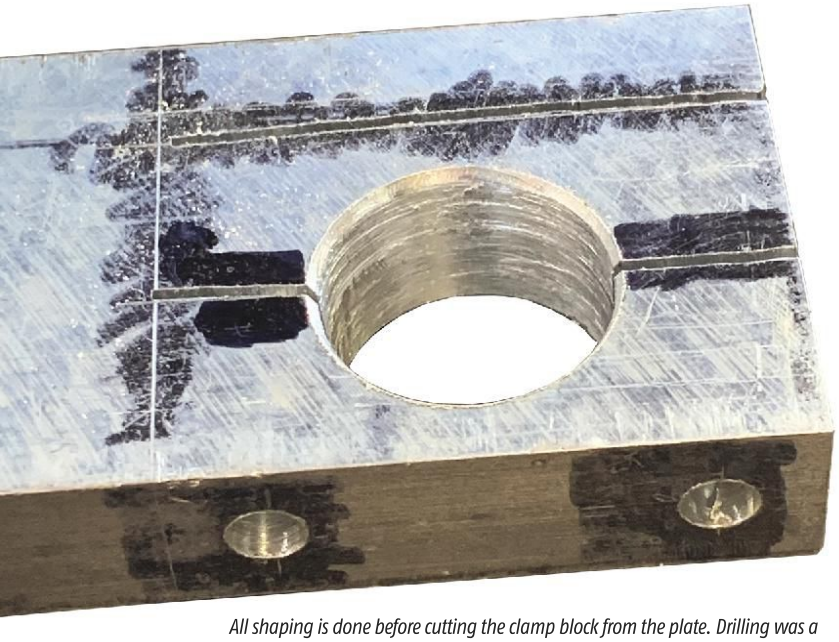
There are two different ways to drill that big hole. A hole saw is, in some ways, the easiest as it is a one-step operation. Using an actual 3/4-inch drill bit is more complicated because usually it'll require starting with a smaller hole, probably 1/4 inch, and working our way up to the 3/4 inch in 1/4-inch steps.

Just for the heck of it, I drilled three 3/4-inch holes just to see how the different drill methods worked. A cheaper hardware store hole saw went through, but it wasn't happy about it and needed some forcing. Plus, it wobbled. However, it did produce a round hole.

A higher dollar hole saw kept clogging with aluminum clumps that welded themselves to the teeth no matter how

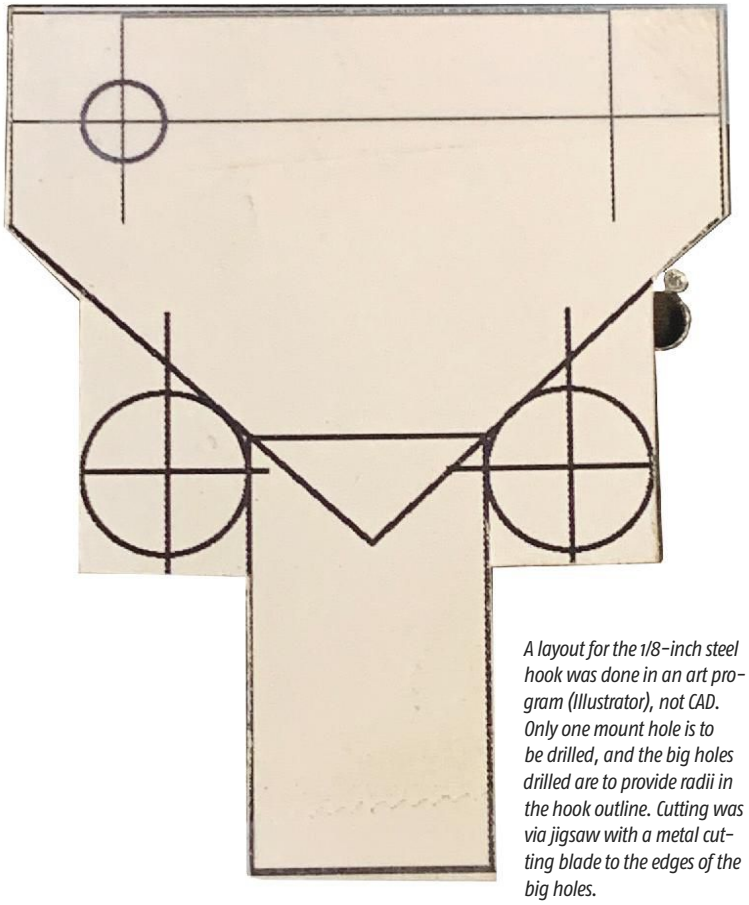


Here we're doing the layout on 1/2-inch aluminum scrap. Magic Marker provides the background, and a sharpened file is the scribe.



All shaping is done before cutting the clamp block from the plate. Drilling was a 3/4-inch hole saw in a 3/8-inch hand drill, and cutting was with a jigsaw. Edges were trued up on a belt sander.

The final product was bolted together and rough shaped on a belt sander with final finishing by hand (sanding block). Countersunk AN3 bolts were used to give belt fittings more room.



A layout for the 1/8-inch steel hook was done in an art program (Illustrator), not CAD. Only one mount hole is to be drilled, and the big holes drilled are to provide radii in the hook outline. Cutting was via jigsaw with a metal cutting blade to the edges of the big holes.

often I pulled it out and cleaned it. It didn't work, but my aluminum might have been soft. I did this with a hand drill.

I tried a new 3/4-inch drill bit (lots available on Amazon) without drilling a series of smaller holes and was pleasantly surprised to see it dig in and power its way through. However, I couldn't find one with a 3/8-inch shank to use in my hand drill, forcing me to use a drill press. So, the hole saw is the way to go. Just pull it out and clean it frequently.

When drilling the 3/16-inch holes that go the full 2-inch width of the block for the 10-32/AN3 bolts, here too pull the bit out and clean it every so often.

Note that all of the drilling and sawing were done before the final square was cut out of the 2-inch by 1/2-inch strip. That made handling the drilling/sawing processes easier. All sawing was done with a jigsaw and a coarse blade.

FINAL FITTING NOTES

Bear in mind that fuselage tubing is always painted or powder coated, which adds a dimension to the diameter. How much? We don't know until we try to fit the final product. One-half-inch sanding drums with coarse grit chucked into a hand drill will do a good job of removing aluminum to provide enough clearance. We don't need a close, precise fit. This is a nonstructural clamp, remember? Plus, when we cut it crosswise, the saw kerf will be at least 1/16

inch, which comes out of the hole diameter. So, when we tighten the bolts, the clamp will be clamping and won't move.

DOING A LITTLE DRESSING

From a functional point of view, there's no real need to do anything else to our clamp as it'll work as-is. However, the last thing we want in a cockpit is anything with sharp corners, so we'll sand all the edges, at least enough to soften them. A sanding block will work fine, and do the final sanding with 220 or 320 grit just to make it look good.

ABOUT THE BELT HOOK

We could be mounting anything on this clamp. However, since we're talking belt hooks, we'll make a hook out of anything we have lying around that is strong enough. I found a piece of 12-gauge iron that miked 0.105 inches in the scrap box. (You do have a scrap box, don't you?) Perfect and free.

First, we'll make a poster board pattern of the hook shape. However, before bending it to shape, we'll use the clamp block as a guide to drill the first mounting hole. Then we'll bolt the unbent plate to the aluminum and, using the block as a guide, spot drill the second hole. This way, regardless of how inaccurate we are while drilling the holes in the block, we're guaranteed that the holes in the hanger will match.

Once the holes are drilled, we can bend the hook, which can be done most accurately by clamping it in the vise sandwiched against a piece of at least 1/16-inch (or so) steel scrap to increase the bending radius. Since we're using something softer than 4130, we can just hammer it over the edge of the vise for the first bend. Clamp it to something about 3/8-inch thick to hammer-bend the lip.

So, there we are; we've blacksmithed a replacement for the usual Dutchman clamp and eliminated welding and sophisticated tools in the process. This kind of clamp can be used for mounting just about anything to tubing and eliminates welding on the fuselage tubing. This is a good thing. EAA

Budd Davisson, EAA 22483, is an aeronautical engineer, has flown more than 300 different types, and has published four books and more than 4,000 articles. He is also a flight instructor primarily in Pitts/tailwheel aircraft. Visit him on AirBum.com.

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FUEL DRAIN VALVES

BY DICK KOEHLER, EAA 161427, EAA TECHNICAL COUNSELOR/FLIGHT ADVISOR

FUEL DRAIN VALVES ARE essential to remove debris and water from the low point(s) in your fuel system. There are many types, but most brands have equivalents to those made by the Curtis Superior Valve Co. Perhaps the most common is the Curtis CCA-1550 valve, which is used in most gascolators and wing tanks on many Piper aircraft. The valve is brass and has a 1/8-inch new pipe thread (NPT), which is a tapered thread designed to jam for a tight, leakless seal. The valve is opened by pushing up and gently rotating the crossbar, and it can be locked open with a quarter turn. The internal seal looks like an O-ring but actually has a P-shape. In the past, mechanics would substitute a small O-ring, but that's not good maintenance.

If the valve is leaking, it is likely due to a bit of debris stuck in the seal. A piece of grass, metal filing, or even a human hair can allow the valve to seep fuel. One approach that sometimes works is to open the valve wide open and drain a lot of fuel, such as a pint or more, and hope the debris will be flushed out. A variation on this step is to open the valve and put a blast of air from your compressor inside the valve, momentarily reversing the direction of flow and hopefully dislodging the debris. Be sure to remove your fuel cap to allow the pressure to escape. Fuel tanks can burst with a relatively low pressure increase of only a few pounds per square inch. If the debris is in the drain in a gascolator, disassemble the gascolator and get to the valve from the inside.

If all attempts to clear a leaking valve fail, your best option is to replace the valve. An FAA ruling a few years ago determined that the valves cannot be overhauled, meaning that you should not replace the seal in the field. In fact, the original synthetic rubber seals are no longer sold so your best option is to replace the entire valve. The good news is that the valves are relatively inexpensive and readily available from most aviation supply houses. The most recent Aircraft Spruce & Specialty Co. price on the CCA-1550 is $17.60, so just buy a new one.

Another reason you may want to replace the valve is due to age. A 10-year limit on the seal is established by the manufacturer based on the synthetic rubber's shelf life. This can be significantly reduced if using fuel with alcohol in it.

The biggest problem you will probably have is removal of the old valve. Remember that the valve was screwed in to a jam condition using the NPT tapered threads. It should have been put in with a thread sealant, preferably Teflon based, but it probably wasn't, and now you have to break it loose. Also remember that the body is soft brass. If you simply use an open-end wrench or, worse yet, an adjustable wrench, chances are the flats on the brass body of the valve will give way prior to the valve rotating. You then are faced with using Channellock pliers or vise grips and pretty much destroying the valve to get it out.

Standard fuel drain (lower left) and one with the crossbar ears cut off (upper right).

A much easier approach is to cut off the protruding crossbar ears and use a deep socket or slip on a box-end wrench. (See photo.) The best removal tool is a deep six-point socket. It will easily remove the valve if the crossbar ears are removed. The crossbar ears can be cut off easily with a fine hacksaw, razor saw (available at hobby shops), or (carefully) with a cutting wheel on a Dremel-type tool. Be careful about generating heat around a leaking valve. A third option is to modify a deep socket by cutting notches or relief grooves in the socket so that it will slip over the ears on the valve. The edge of a disc on an angle grinder can fairly easily cut the notches, but do it carefully. As a bonus, the notched socket will also be an excellent installation tool.

Install the new valve with appropriate thread sealant (Teflon tape or EZ-Turn fuel lube), and do not over torque. A good technique is to lightly torque the valve in place and then put in fuel. If there is a leak around the threads, continue torquing just until the leak stops. Over-torqued fittings can crack, which leads to a much more complicated repair. EAA

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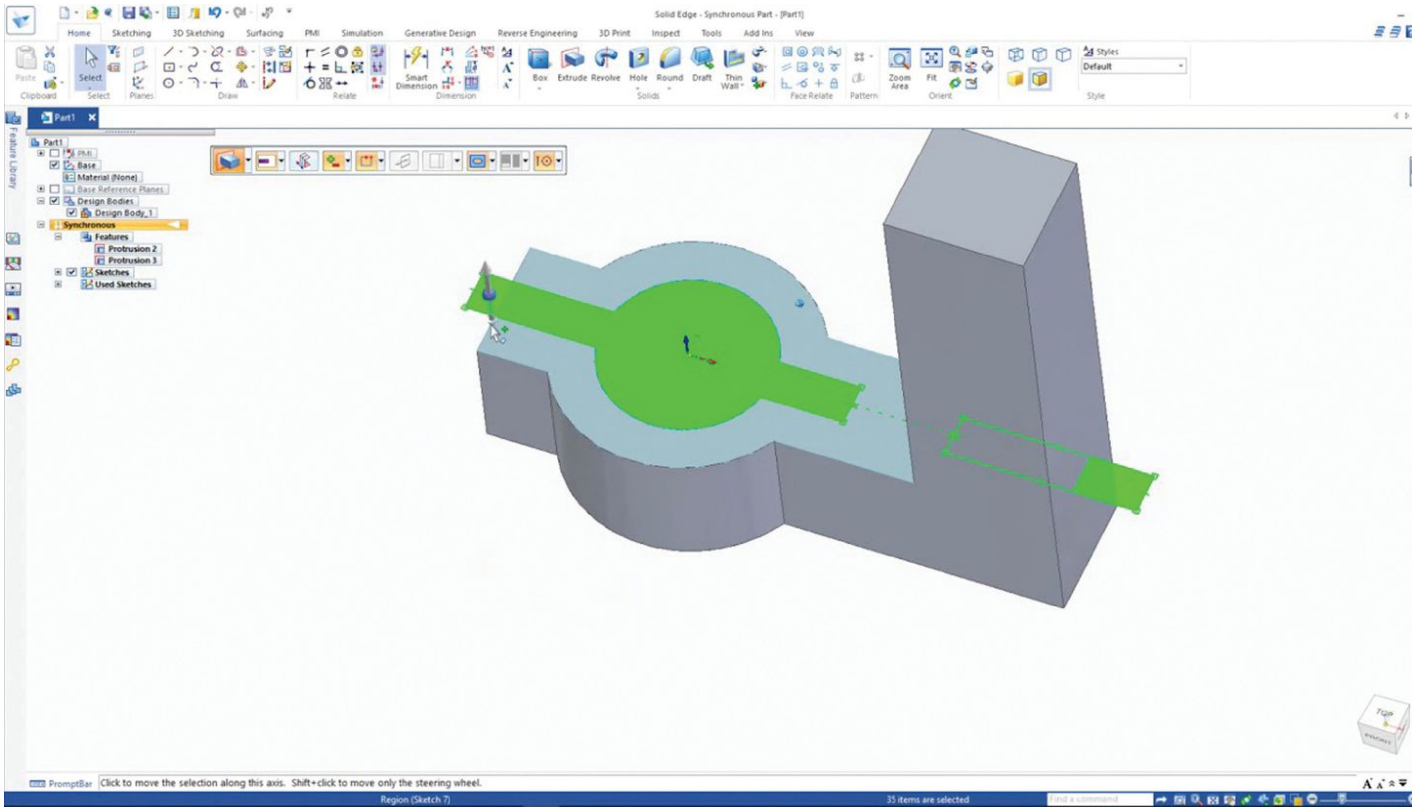

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Better Than New

Arkansas Cessna 170B

AFTER 9/11 OCCURRED I never believed I would return to general aviation, but in 2018, when I was 62, my son became interested in aviation. So, the bug bit again. I started the search for an airplane with a good airframe and low-time engine and found N163W. It had a Continental O-300D with 100 hours since major overhaul, perfect! It was a 1956 Cessna 170B, one of the newer models, so to speak, since it was the last year 170s were manufactured. The deal was finalized, and after a 10-hour checkout, I proudly flew the airplane home.

I immediately contacted my two trustworthy A&P/IA mechanics, Jorge and Scott, and shortly after the restoration began. Jorge and Scott supervised the work I undertook since the airplane was going to remain a standard category aircraft. I learned and discovered much when removing the interior, instrument panel, and all wiring throughout. At the end of six months of labor-intensive work, many of the airplane's parts had been replaced, as well as some new skins.

N163W was now ready for panel work. Jeff and Neema, my avionics experts, took over, and they were also gracious enough to allow me to assist with the planning of the panel. After much discussion and brainstorming, the approach to the new panel was formed. New panels were cut, powder coated, and nomenclature engraved. Trial fitting the new gear was a sign of progress. After installing the switches, breakers, and engine and cabin control cables, Neema and Jeff installed a brand-new harness, and we began connecting the components. My excitement increased as we neared completion of the panel because by this time it was approaching one year since the propeller had been turned over.

Testing and configuration were completed, and it was time to fly! To my astonishment, the O-300 started immediately, and after clearance I taxied onto Runway 36. Everything checked out during the run-up, and I was cleared for takeoff. With anticipation, I lined up on the centerline, powered up to full throttle, and N163W was airborne. It was a 20-minute flight, with Jeff from the avionics shop as my co-pilot and technical support. Twenty minutes around the patch was proof everything

The restoration of N163W has been a wonderful and rewarding process, and it has allowed me to meet some really talented professionals in the aviation business.

worked perfectly so it was time to land. Winds were light at 350 as I lined up on final for 36. The touchdown was smooth and easy, just what I expected from the old girl. Back in the hangar, I received two thumbs-up from Jeff and Neema.

Now I was ready for the next steps; paint and interior work. Fortunately, I found two shops that worked hand in hand between paint and interior. Roger's company applied the paint, and Dean's team refurbished the interior. The restoration of N163W has been a wonderful and rewarding process, and it has allowed me to meet some really talented professionals in the aviation business. Now my old 170B has been restored better than it was in 1956, and I look forward to many years of enjoyable flying in the future.

Paul J. Davis, EAA 1380042; Springdale, Arkansas
Email: n5981r@aol.com

Mini *Man O' War*

Illinois Van's Aircraft RV-8

ONE POSITIVE THING THAT happened in the year 2020 was that I finished and flew my Van's RV-8. I fly for United Airlines, and due to the COVID-19 pandemic I ended up with some free time, so I put it to good use and finished the airplane. The build took seven years, four months, and seven days (747) from the day I started until the day the designated airworthiness representative said I was official. When I would visit EAA AirVenture Oshkosh I always loved the RV-8s as they had that similar look to the P-51. My wife, Tricia, and I were dating when she bought me the preview plans for the RV-8 as a gift and started my love for building.

I began building in my two-car garage and eventually moved into an industrial building along with my mentor and best buddy Glenn Vokac, EAA 289540. Glenn was building his second RV-8 in this shop, and we were close to the same stage in the build process. Glenn is an EAA technical counselor and a Lindy winner with his first RV-8, which was a great resource to have. Eventually, Tricia and I moved into our current home in Poplar Grove, Illinois, in BelAir Estates, which is an airpark (C77) in northwest Illinois. This is where we ended up finishing the RV inside our own hangar. Overall my build took a little more than 1,900 hours to complete.

The RV-8 was a slow build, which I worked on mainly through the winters here in the Midwest. It is powered by an Aero Sport Power IO-375-M1S engine producing 200 hp turning a Hartzell two-bladed composite propeller. I attended the Aero Sport Power engine build school with Darren Jones to get hands-on experience. It has dual P-Mag ignitions, a Plane-Power internally regulated 60-amp alternator, a Sky-Tec high-torque starter, and a four-pipe Vetterman exhaust system.

The leather upholstery was produced by Classic Aero Designs in red and gray and included custom armrest pads, stick boot covers, and passenger headrest. Holding us tight in the seats are three-tone (dark gray/light gray/red) five-point Hooker Harnesses. The floor is covered in a Flightline Interiors carpet kit. I used Rust-Oleum satin granite gray for my interior paint color.

My wife, Tricia, and I were dating when she bought me the preview plans for the RV-8 as a gift and started my love for building.

The avionics include the Dynon Avionics SkyView system. I have a 10-inch SkyView Touch, 7-inch SkyView Classic, two Dynon comm radios, Dynon intercom, and Dynon autopilot control head. Feeding the Dynon system with certified navigation is a Garmin GTN 625xi for all my IFR en route and approach capabilities. Behind the scenes I also installed the Dynon ADS-B In/Out module, transponder, ARINC comm module, dual backup batteries, and two autopilot servos. In addition to these instruments I added the uAvionix AV-30 as a standalone backup system to the Dynon components. Lighting is provided by AeroLEDs AeroSun VX lights in the wingtips and tail.

Powering all of these devices is Vertical Power's VP-X electronic circuit breaker system.

Some modifications I did include custom forward armrests housing a DJM Mfg. throttle quadrant, wingtip hinge attachment, avionics bay access panel, forward baggage floor quick-removal panel, floorboard access panels on left and right, gear tower access panels, and a one-piece empennage fairing, just to name a few.

I had always loved the P-51D named *Man O' War* due to its unique paint scheme and history. Early on I decided to honor Lt. Col. Claiborne H. Kinnard Jr. of the 334th Fighter Squadron, 4th Fighter Group, 8th Air Force of the U.S. Army Air Forces. His P-51D had a distinct camouflage pattern on the wing, fuselage, and tail. My goal was to replicate the scheme as closely as possible on an RV-8. This was accomplished with help from Jonathan McCormick of Plane Schemer who put the design to the RV-8 profile. The paint masks he provided assisted my painter, Jim Kidd of Poplar Grove, in bringing the scheme to life. I had the opportunity to work alongside Jim during the painting process. This allowed me to gain invaluable experience in painting techniques. The main fuselage is silver with a red nose and tail. The scheme incorporates the European theater D-Day invasion stripes and the blue and white star and bar insignia. Unique to this scheme is the camouflage pattern on the top of the airplane, which I did in olive drab.

Tricia and I are fortunate to live in a community centered on aviation. We are proud members of EAA Chapter 95 of Morris, Illinois, in addition to our home EAA chapter, 1414 of Poplar Grove. We invite you to follow our journey flying our RV-8 on our YouTube channel @therv-8pilot or our website RV8-Hangar.com.

Michael Foss, EAA 1068340; Poplar Grove, Illinois
Email: michaelfoss@me.com

NEW MEXICO
MURPHY REBEL

FOLLOWING SIX YEARS OF BUILDING, November Seven Niner Zulu Tango took flight in January 2023. The maiden flight of our Murphy Rebel was uneventful. It's powered by a newly overhauled Lycoming O-320 (160 hp) and swings a McCauley 75-inch prop. Empty weight is 1,000 pounds. My son helped with the entire build process. We installed all analog gauges, but with a single electronic instrument: an AV-30 for the attitude indicator, since there is no vacuum system on the engine (no gyros). My home field elevation is 6,500 feet. Initial flight performance showed a 1,200 fpm climb rate and 120 mph at 2300 rpm at 8,000 feet. I'm following the *EAA Flight Test Manual* for my Phase I test period — an excellent resource! Our primary mission for this rugged little airplane is backcountry traveling and camping. Here in New Mexico, there are many high-elevation public-use backcountry airstrips to visit. I'm hoping this Rebel, equipped as it is with a 44-gallon fuel capacity, will be adequate for exploring the wilds of the Southwest. The FAA assigned 25 hours for my flight test period — let the flight performance data gathering begin!

Dennis Kirby, EAA 68826; Sandia Park, New Mexico
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ONTARIO
ROSEBRUGH SUPERHAWK

WHILE ATTENDING SUN 'N FUN, longtime homebuilder Roy Rosebrugh came across Auto PSRU's display of a Corvette engine designed for aircraft use. Having a substantial amount of aircraft parts, he envisioned a project that would take him more than 10 years to complete.

Roy searched out more parts and pieces he needed from around Canada and the United States. He built a rotisserie in his garage so he could work on the wings and fuselage sections at any angle. The fuselage was built in three sections — the door posts forward, the center section, and from the back window to the tail. The wings and tail sections were projects in and of themselves.

The aircraft has a three-bladed MT variable-pitch propeller. The outside air is forced by a fan in the tail section through a duct running along the ceiling.

The aircraft went through ongoing and then the final assembly inspection process by the Canadian MD-RA. The first flight was a thrill but uneventful. The aircraft required no adjustments and flew straight and steady hands-off. I completed the test flying following the *EAA Flight Test Manual* and the Canadian MD-RA requirements. The certificate of airworthiness arrived in December 2021, just in time for Christmas and for Roy's 95th birthday in February 2022.

Bob Pellow, EAA 431581; Greater Madawaska, Ontario, Canada
Email: bob47pat@gmail.com

PENNSYLVANIA
SONEX AIRCRAFT SONEX-B

THIS IS MY SONEX-B. I began building in February 2018 and made the first flight in December 2022. It is powered by an AeroVee Turbo engine. Instrumentation is MGL Avionics. The airplane and engine have performed well. My Sonex is hangared at Doylestown Airport (DYL) in Bucks County, Pennsylvania. This is my second build. In the mid-'80s I built a Sonerai II. I'm a CFI-G and tow pilot at the Philadelphia Glider Council in Hilltown, Pennsylvania.

Peter Hoey, EAA 479027; Doylestown, Pennsylvania
Email: peterfhoey@gmail.com

WASHINGTON
VAN'S AIRCRAFT RV-6A

I'VE BEEN FLYING FOR 48 years. Most all of my time is in jets: U.S. Air Force fighters, corporate aircraft, and airliners. I'm that prima donna who puts a write-up in the maintenance logbook, hands it off, and heads to the bar. Someone will fix it overnight; I'll fly it again tomorrow. I fly and break stuff. I neither build nor fix stuff.

Until now. Now I have an RV-6A in my hangar. Suddenly I am still holding the logbook after my squawks. What happened to that handoff/cocktail scheme I was enjoying? My friend, James Flynn, who sold me this RV-6, is the builder. I am the owner. I state this to give credit where due. As many projects go, this undertaking was 90 percent complete with 90 percent to go when it stalled. Jim, with his wife, Karen, started building it more than 25 years ago. Their intent was this Van's would be their GA aircraft. But they made the mistake of buying a C-182, and that building motivation faded. I bought this RV after Jim reengaged in completing it with the help of several others, namely a few of our neighbors here on Evergreen Sky Ranch (51WA). They know how to build. Did I mention I don't? But that began to change as they brought me into their sphere of expertise and skill.

I am quite enjoying this side of aviation. The fixing part. Even the "trying to fix it" part, which is where I spend a great deal of my mechanical moments. But being on the building and fixing side has deepened my understanding when I am flying this wonderful bird. This was especially so during the Phase I 40-hour flyoff. The work from all, with the rewards shared, culminated when I flew this beautiful experimental to Oshkosh in 2022.

Larry Kauffman, EAA 1481137; Auburn, Washington
Email: kauffman737@gmail.com

FROM THE EAA BUILDERS LOG

EAA's online Builders Log is free for all EAA members to use to document their projects. It allows members to post an unlimited number of entries, which can consist of photos, text, PDF documents, Excel files, and more, to create a detailed record of the work done on build and restoration projects alike. Start documenting your project at EAA.org/BuildersLog, or follow this month's featured project via the link at EAA.org/Extras.

Name: Mickey Mathieson, EAA 1345987
Location: Waikoloa, Hawaii
Aircraft Make and Model: Zenair CH 701
Project Start Date: October 4, 2019

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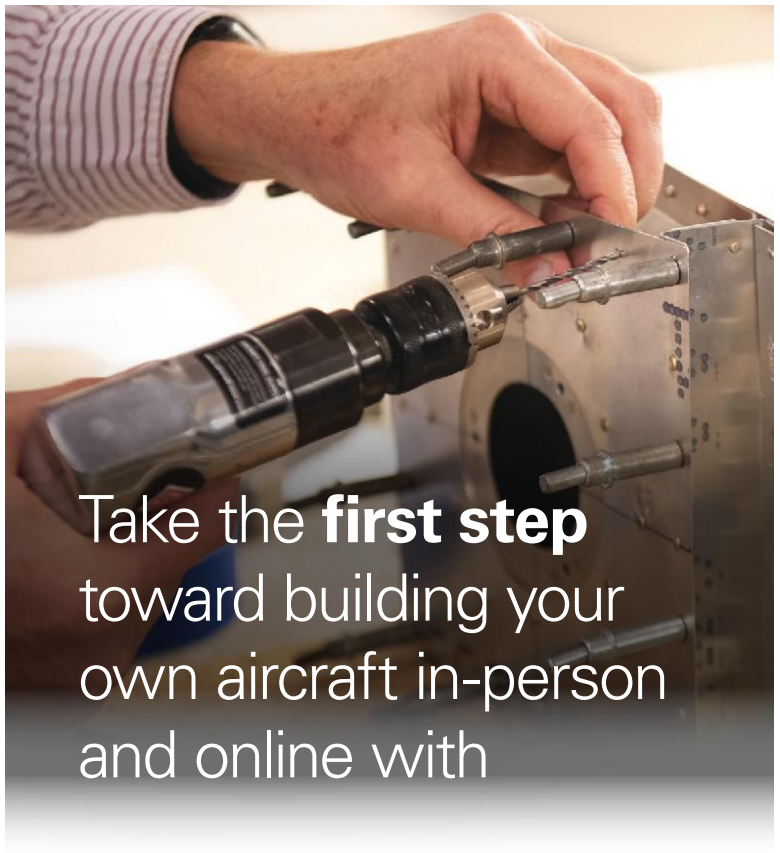

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From South Carolina to Oshkosh by Ultralight

BY JADE MORRIS, EAA PUBLICATIONS INTERN

AFTER 42 SHORT HOPS in six days, 14-year-old Alina Scott made her first trip to EAA AirVenture Oshkosh all the way from South Carolina in her Aerolite 103 ultralight!

Alina was born into the world of aviation. Growing up in Virginia, her family always made it a priority to attend AirVenture. Her father is a pilot, so throughout her aviation journey, her dad has provided reassurance that she can achieve great things. Although her mom is not a pilot, she supports Alina wholeheartedly.

Alina started by flying paragliders to see if aviation was something she wanted to pursue. Even though her first flight in a paraglider did not go as planned, she knew this was something she wanted to continue and improve.

Eventually, she tried her hand at flying an ultralight. Her first flight was in an Aerolite 103, the same model she flew to AirVenture. After she reached this milestone, her determination and perseverance only grew.

"Because I accomplished this, now I feel like I can accomplish more. I am not saying it was easy to get here, but once you are done with it, you are like, 'That is it!'" Alina said. "It takes patience, which is the hard part, but once you're done, you realize you did it, and it was not impossible. I can do more."

Alina has been coming to AirVenture since she was born. She loves attending because it is always an action-packed event. She sees it as a place where everyone can find something they enjoy, from cooking shows to jewelry booths to air shows and demonstrations. She always takes away information she can use to grow in her aviation career.

Arriving several days before the start of AirVenture, Alina stayed at a hotel but prefers camping. "When we were at the hotel, this didn't feel like Oshkosh yet," she said. "We camped out on Sunday night; it was the first day that felt like Oshkosh. You have to walk to breakfast, walk to the showers, the trainer for P-51 [T-6] flying by waking up everyone, and the guy who yodels on the speakers — it is all a tradition for people at AirVenture."

The future is bright for Alina, as she plans to continue mastering her craft of flying. She wants to keep improving and accomplishing everything she can in aviation, and hopes to soon earn her pilot certificate. Eventually, she wants to join the Air Force and be fully immersed in aviation. And, of course, she wants to keep attending AirVenture for years to come. EAA

WELCOME, NEW EAA CHAPTERS

EAA's local chapters are about people, bringing together individuals interested in learning more about aviation as well as sharing their own knowledge. To find a local chapter and get involved in grassroots recreational aviation in your own backyard, see EAA.org/Chapters.

CHAPTER 1686
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TENLEY O

YOU MAY RECOGNIZE TENLEY ONG, EAA 1388744, f written relatable stories about working toward h pilot, is also one of the hardworking volunteers w cleans and sets up the forum buildings but also h cial newspaper of EAA AirVenture Oshkosh, for afraid to cover subjects people want to know. Fr 50th anniversary flyover to how much free stuff the AirVenture grounds, Tenley loves being invo

"I've been involved in a lot of stuff in my shor encountered ... a community quite like the aviat in the last couple years has been incredible, and

Tenley, originally from Sacramento, fell in lo of flying cars and flying to school. In high schoo Sacramento. "I was looking at the ground and a ent angle ... I couldn't stop thinking about it," sh instructor, and the rest is history.

She first got involved with EAA through her Sacramento, California, in 2020. She worked on ally mentoring other young pilots and earning a along with Ray scholars from her chapter to Ai pavilions and getting the forum stages ready. W subject Abigail Oleniczak, EAA 1157455, wrote chapter was doing.

"I was like, 'Hold up! That's really cool! I wa *Today* Managing Editor Hal Bryan and reporte

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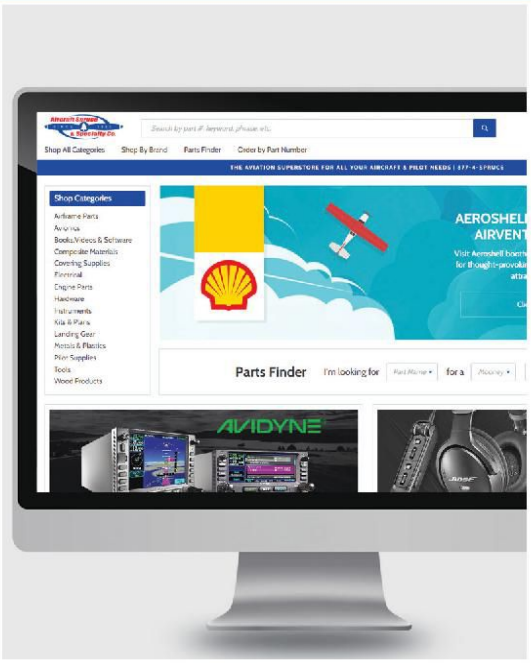

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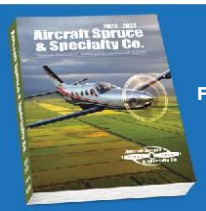

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