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Vol. 69 No. 4 | April 2020



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Darrell Kuhn's Grasshopper restorations

Credit Where It's Due

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Soar-By-Wire

The Nixus fly-by-wire sailplane

Raffle

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P.92

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Musings From the Museum

The other 51 weeks at Oshkosh

BY JACK J. PELTON

WHILE YOU'RE READING THIS column in the beginning of spring, it was written just as we finished a terrific event here in Oshkosh — our Winter Flight Fest. This was a combination of two popular annual events, our skiplane fly-in and an event called Family Flight Fest. While skiplanes landed on the snow-covered grass runway of Pioneer Airport, there were dozens of hands-on activities and demonstrations inside the museum, including model building, flight simulation, and free-flight and radio-controlled aircraft flying. EAA members and people from our local community got a taste of all things aviation, not to mention a hot bowl of chili.

The weather doesn't always cooperate, but it certainly did this year. We had record participation, with more than 25 airplanes and 1,600 people in attendance. Events like these showcase the fact that Oshkosh can be a destination and a place to immerse yourself in The Spirit of Aviation all year long. For me, the skiplane fly-in is a chance to see a type of recreational winter flying that wasn't a part of my life growing up in sunny Southern California. It's absolutely fascinating to my wife Rose and me to see such a variety of airplanes taking advantage of the crystal-clear visibility and improved performance that comes from a cold, sunny winter day. Everything from ultralights to J-3 Cubs, Aeroncas, Stinsons, and Cessna L-19s, all adapted to operate off snow, some with straight skis, others with wheel penetration versions that allow them to use hard surface runways as well.

Inside the museum, I'm proud of the activities that we make available for young people to experience and get immersed in hands-on aviation activities. It's so much fun to watch all those kids at the various stations throughout the building, working on model aircraft, flying a simulator or a hand-launched glider, or watching the popular indoor RC air show.



We have other events throughout the year, including our annual ultralight fly-in, our September Swing hangar dance, the Christmas in the Air holiday festival, and more. In addition, Pioneer Airport is busy with Young Eagles flights and classic biplane rides throughout the warmer months. We're also excited about two new major exhibits opening in the museum this year. The first will present and commemorate the history and impact of the Women Airforce Service Pilots (WASP) during World War II, and how their legacy lives on in the female aviators of today. Later this spring, we'll open a permanent exhibit in the Eagle Hangar featuring a newly restored Bell UH-1 "Huey" helicopter. This will provide a focal point for us to honor those veterans who served during the Vietnam War, as we do World War I, World War II, and Korea.

In addition to our museum, your EAA membership gets you free admission to more than 300 museums and science centers across the country and around the world, via the Association of Science and Technology Centers (ASTC) Travel Passport Program. This is something my son and grandkids have enjoyed extensively. As an example, for two adults and four children to get into the spectacular Museum of Science and Industry in Chicago, the regular price for tickets comes to about \$95. However, if you're an EAA member, all six of you get in absolutely free. And that's just one example of hundreds.

As you and your family plan your spring breaks or summer vacations, be sure to take advantage of the ASTC Travel Passport Program, and also consider a trip to your museum to discover how much fun you can have in Oshkosh in the "offseason." And, of course, we hope you'll come back in July. *EAA*

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Vice President of Programs, Chapters, Education, Museum and

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Editor in Chief: Jim Busha

Senior Editor: Hal Bryan

Senior Copy Editor: Colleen Walsh

Copywriter/Copy Editor: Jen Knaack

Assistant Editor: Ti Windisch

Multimedia Journalist: Christina Basken

Production Coordinator: Kayla Floyd

Graphic Design Manager: Brandon Jacobs

Staff Photographer: Connor Madison

Digital Marketing Manager: Sara Nisler

Social Media Coordinator: Sam Oleson

Print/Mail Manager: Ron Lindgren

Contributing Writers: Budd Davison, Chris Glaeser, Steve Krog,

Lauran Paine Jr., Charlie Precourt, Robert Rossier,

Beth E. Stanton, Vic Syracuse, Lisa Turner

ADVERTISING

Advertising Manager: Sue Anderson / sanderson@eaa.org

Mailing Address: P.O. Box 3086, Oshkosh, WI 54903-3086

Phone: 920-426-4800

Email: editorial@eaa.org

Website: www.EAA.org



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One Stunning Staggerwing!

Everybody wants a Staggerwing - *don't you?* Especially one like *this*? Wearing its 1944 livery, this jewel earned owner Granger Haugh Best Light Transport at Oshkosh last year. And Flabob-based West Coast Air Creations took home the Silver Wrench award for their top tier restoration of this nostalgic classic. *Wow!*

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Your Airplane Is Ready. Are You?

The Great EAA Aircraft Raffle
By Jim Busha

ON THE COVER: This one-of-a-kind Patriot Aircraft PA-18 replica is ready for the winner of the great EAA Aircraft Raffle.
Photo by Connor Madison

ON THIS PAGE: Say hello to Bo the Bonanza, one of the hardest-working vintage airplanes flying today.
Photo by Scott Slocum



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THE GREEN DOT

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DETAILING AEROEDUCATE AND PROJECT 21

The Green Dot crew sat down with EAA vice president of programs, chapters, education, museum, and AirVenture features and attractions Rick Larsen and EAA Aviation Foundation vice president of philanthropy and donor stewardship Ken Strmiska to discuss a pair of new EAA programs that will change aviation for the better: AeroEducate and Project 21.

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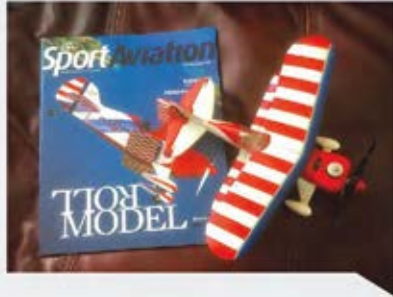
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THAT STORY WAS THE PITTS

I'M READING MY

FEBRUARY 2020 copy of *EAA Sport Aviation* with an old friend (photo attached). Thanks for another great issue and, as always, a compelling read.

—
John A. Ehlers, EAA 1302185
Brookfield, Wisconsin



I JUST WANTED TO say thank you for the great article about me and my airplane in *EAA Sport Aviation*. This was a real bright spot in my life. I also would like you to pass on my thanks to Connor Madison for the wonderful photos.

—
Bill Smith, EAA 496718
Yorktown, Indiana

Each One's Worth a Thousand Words

I RECEIVE SEVERAL AVIATION magazines every month, but none bring me as much delight as each new issue of *EAA Sport Aviation*. While I enjoy the technical tips, safety discussions, and flying stories, I have to admit it's the photographs that really capture my imagination. The composition and quality of the pictures are truly first-rate. Whether it's a warbird or Harry Ballance's glorious Stinson, rag and tube or the latest composites, every issue inspires me to get out to the workshop while simultaneously beckoning me to linger on each page just a little longer. Keep up the good work!

—
Bruce Barnes, EAA 1346768
Houston, Texas

She's a Keeper

I'M JUST NOW GETTING around to reading the January 2020 edition of *EAA Sport Aviation*. As I was reading "The Affordable Simplicity of the Aerolite 103," I was thinking this is a really well-written and informative article. I made a point to check who the author was at the end and learned that Christina Basken is an intern with EAA. Pretty good writing for an intern! I hope to read more of her work in *EAA Sport Aviation*.

—
Till Gerhardt, EAA 571697
Savannah, Georgia

Till — We couldn't agree more! Hopefully you noticed the change to the masthead in the February issue. Christina the (former) intern has joined us full-time as a multimedia journalist. — Ed.

Limitless

THAT WAS A HEARTWARMING and extremely well-written story in the February 2020 issue of *EAA Sport Aviation* by 16-year-old Madelyn Pritchett about her first solo flight ("No More Limits," Members/Chapters in Action). For several years I taught a class of high school juniors, and I know well the average writing skills of 16- and 17-year-old teens. If Madelyn's article was not ghost-written, then she appears to be an exceptional student. If she doesn't plan on flying as her life's work, then this girl has the qualifications for some kind of career in writing!

—
Lou Antonacci, EAA 73154
Hampshire, Illinois

It definitely wasn't ghostwritten, Lou. Prior to sharing it with us, Madelyn submitted this story as a writing assignment at school. When we asked about her grade, she told us, "Mrs. Dossett was very gracious and gave me a high A!" We were happy, but not surprised. Maybe she'll come intern for us — after all, it appears we have an opening. — Ed.

Goodwill, Great Photos

WHAT A FANTASTIC READ/VISUAL. The number of pictures included in this article ("Goodwill Barnstorming," February) really makes the presentation pop, at least for those of us who probably will not get a chance to experience this type of aviation lollapalooza!

Thanks so much to Lauran Paine Jr. for all his down to earth writings each month, but especially so for this stunning trip with the barnstormers.

—
Merle Cochran, EAA 108961
Nekoosa, Wisconsin

But Where?

I JUST WANT TO take a moment to comment on a couple of excellent recent articles by George Karamitis (Ultralight World). Yes, the love of flying and our ability to participate evolves, and I'm excited about the prospect of building an Excalibur kit with my twin sons.

Only problem? I'm number 12 on the list for a hangar at Captain George's home airport, KAVO, as well as a half-dozen airports in the vicinity. Hangar space is horrendously scarce, and let's be honest, they don't build them like they used to. Now it's T-hangars that really can't be shared, especially with a builder.

The bottom line is a lot of us want to build and fly; we just need someplace to do it. *EAA*

—
Wendell Thorne,
EAA 679912
Ellenton, 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.

The logo for Daher, featuring a stylized red and white square icon to the left of the word "DAHER" in a bold, white, sans-serif font.

DAHER

Two aircraft are shown in flight against a backdrop of a sunset sky with scattered clouds. The aircraft in the foreground is a larger turboprop plane, likely a Kodiak, with "KODIAK 100" visible on its nose. The aircraft in the background is a smaller, high-wing aircraft, likely a TBM. Both are flying towards the left of the frame.

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CRAFTED FOR AVIATORS

Protecting a Passion and Pathway

Proposed Remote ID rule would ruin traditional model aviation

BY TOM CHARPENTIER, EAA GOVERNMENT RELATIONS DIRECTOR AND LILY JOHNSON, EAA GOVERNMENT ADVOCACY SPECIALIST



OVER THE LAST SEVERAL years, we have said a lot about unmanned aircraft system (UAS) integration. As UAS inevitably become more common in the national airspace system (NAS), EAA continues to hold the position that the safety and utility of manned flight must be held paramount. To this end, manned aircraft must have the right of way, must be able to navigate the same airspace they do today, and should be subject to no new equipment requirements. So far, all UAS-related rules promulgated by the FAA have been consistent with those principles with respect to manned aircraft, though we have concerns for manned operations away from public-use airports below 400 feet.

Unfortunately, in the FAA's latest push to safely integrate UAS into the airspace, the agency endangered the one segment of the UAS industry that was already safely integrated: traditional model aircraft. The FAA's notice of proposed rulemaking (NPRM) on Remote ID for UAS sets forth a broad mandate for UAS to carry onboard identification and position-reporting equipment. It would also set strict limits on the manufacturing and approval of such equipment and the UAS carrying it. Aside from limited protections for some operations from a limited number of fixed flying sites, the NPRM does nothing to distinguish between traditional modeling and newer drones that are capable of flight beyond visual line of sight.

While drones have represented a rapidly evolving challenge for regulatory agencies — despite the vast majority of users being safe and responsible — there should be no doubt that traditional model aviation poses no risk to the safety of the NAS. To the contrary, model aviation is where many of us got our start and how many EAA members continue to enjoy aviation. We see model aviation as important to the pipeline of future aviation talent and have even partnered with the Academy of Model Aeronautics for our Young Eagles Build and Fly program, which aims to introduce children to the fundamental hands-on skills that they will use someday as homebuilders, mechanics, and pilots. Remote ID as proposed would end traditional modeling as we know it for absolutely no good reason. Again, for the past 80 years, model aircraft have never posed a risk or interference to manned flight in the NAS; that is perfect integration.

We filed comprehensive comments on behalf of EAA to the NPRM's docket last month, adding to tens of thousands of comments from the community. Many of you filed comments based on the guide we shared in *eHotline*. Thank you! Our comments make it clear that we don't believe that any additional restrictions on traditional modeling are warranted, but we also worked hard to propose a solution that the FAA was likely to accept with the least burden on modelers.

In a nutshell, our proposal would allow unlimited flying of traditional models (those incapable of beyond visual line-of-sight flying) without Remote ID at registered club fields and private flying sites in perpetuity. Those flying in other areas would simply notify the FAA when and where they are flying. There would also be a process for waivers to accommodate events such as conventions, competitions, and special flying days away from pre-approved fixed sites. We also proposed doing away with an extremely burdensome registration requirement for modelers and asked that the privacy of operators be protected.

Additionally, we recognize the responsible operators in the UAS community outside of traditional modeling and implored the FAA to work with other user groups such as FPV (first-person view) and Part 107 operators to find workable solutions with minimal burden.

Working within the confines of this NPRM and the law as currently written by Congress, we believe we have forwarded a workable alternative to the FAA's proposal that has a good chance of success and will allow traditional modeling to continue with minimal disruption. No matter the outcome, we will be ready to take the next steps to keep this ill-conceived proposal in check.



COLD WEATHER, HOT TOPICS

EAA and the FAA enjoy another successful Winter Summit

BY SEAN ELLIOTT, EAA VICE PRESIDENT OF ADVOCACY AND SAFETY



EARLY IN FEBRUARY, EAA once again held its annual EAA/FAA Recreational Aviation Summit, also known as the EAA/FAA Winter Summit, with FAA leadership officials here in Oshkosh, Wisconsin. This event is important both to EAA and the FAA. We have evolved to a level of strategic discussions that are both impactful from a safety standpoint and enabling from a general aviation standpoint.

Our track record over the 16 years of meeting together speaks volumes for what's been accomplished. From the FAA's better approach to airman making honest mistakes through the Compliance Program to allowing a qualified test pilot to accompany the builder of an experimental amateur-built aircraft during Phase I flight testing via AC 90-116, many safety-enhancing policy changes have originated during the Winter Summit.

This year was focused on our biggest initiative: MOSAIC. Much has been done toward the key elements of MOSAIC becoming reality in one form or another. As with any complex rulemaking package, the specifics have shifted around to some degree, but the end goal of enabling better safety and growth for GA is still well within play.

At the top of the list is a whole new definition for light-sport aircraft (LSA) that should allow much more capable GA aircraft to

participate and up the opportunity for sport pilots to enjoy types they are most familiar with. Weight is hopefully going away as a limit, and new performance-based metrics will be driving the definition instead. Also of significance is the allowance of a multitude of powerplants, including electric and hybrid options, under LSA. There is truly a lot to be excited about coming in the next several years.

Often the question "When?" gets asked when these monumental policy shifts are discussed. The U.S. Department of Transportation website now reflects a target of 2023 for publishing a final rule, so we can certainly expect to see a notice of proposed rulemaking well before that published deadline.

This year's Winter Summit was certainly another groundbreaker. Many aspects of GA will be impacted, and we continue to make a difference through working with the FAA for the betterment of safety in all of GA. After 16 years, it is more than a little gratifying to see the results of what can be done by getting together with the agency and working on solutions that make a difference for all of us.

MORE MOSAIC READING

For an in-depth introduction to MOSAIC, see "Pushing GA Forward With MOSAIC" in the January 2019 issue of *EAA Sport Aviation*.

EAA SUPPORTS PROPOSED NATIONAL CENTER FOR THE ADVANCEMENT OF AVIATION

EAA IS ONE OF several dozen aviation organizations to support bipartisan legislation introduced by Sens. Jim Inhofe and Tammy Duckworth in February that would create a National Center for the Advancement of Aviation to promote aviation and aerospace as a whole.

"What I think is important is this becomes a national center with public and private support to encourage and foster all

aspects of the aviation industry, from assemblers to pilots," EAA CEO and Chairman of the Board Jack J. Pelton said. "Ideally, this should help create an efficient effort that supports job creation, as opposed to a more fragmented approach."

The National Center for the Advancement of Aviation would focus on four primary areas: aviation and aerospace STEM curriculum, workforce development,

economic and safety data and research sharing, and a forum for cross-disciplinary collaboration.

This robust collection of endorsers is made up of more than 50 aviation groups, including EAA Warbirds of America and the Type Club Coalition. *EAA*



For more information on these stories and others, visit www.EAA.org/advocacy.



▼ TOP STORY

EAA'S SPIRIT OF AVIATION MOBILE EXPERIENCE BRINGS FLIGHT TO EVENTS THROUGHOUT THE UNITED STATES IN 2020

EAA WILL DELIVER THE excitement of flight throughout the United States in 2020 as the Spirit of Aviation mobile unit, sponsored by the National Air Traffic Controllers Association (NATCA), visits numerous events in 2020. The traveling experiential exhibit introduces EAA to enthusiasts through aviation activities for people of all ages.

“Over its first two years of nationwide tours, the Spirit of Aviation Mobile Experience welcomed tens of thousands of people who discovered the wonders of flight and the possibilities available through EAA,” said Rick Larsen, EAA’s vice president of programs, chapters, education, museum, and AirVenture features and attractions. “In 2020, we will continue to welcome people to discover more at aviation-themed events throughout the country, while also engaging those who are already aviators and EAA members with updated activities and all the opportunities EAA offers.”

The Spirit of Aviation mobile unit will be making at least seven appearances in six

2020 SPIRIT OF AVIATION MOBILE EXPERIENCE SCHEDULE

- **April 17-18:** Purdue University Aviation Day; West Lafayette, Indiana
- **May 13-16:** Joe Nall Fly-In; Woodruff, South Carolina
- **May 29-30:** AOPA Fly-In; San Marcos, Texas
- **June 12-14:** Chippewa Valley Air Show; Eau Claire, Wisconsin
- **September 5-7:** Lunken Airport Days; Cincinnati, Ohio
- **September 11-12:** AOPA Fly-In; Rochester, New York
- **October 16-18:** Fort Worth Alliance Air Show; Fort Worth, Texas

states during 2020. Local EAA chapters will be involved at each tour stop, and EAA senior leadership team members will be

hosting grassroots aviation sessions at each location. Check the Spirit of Aviation Mobile Experience Schedule sidebar for the dates and locations in 2020.

The 53-foot traveling exhibit is a rolling billboard for EAA, including graphics highlighting a Long-EZ homebuilt aircraft that represents EAA’s experimental aircraft roots. Visitors will be able to enjoy Redbird flight simulators, EAA’s Virtual Flight Academy, the NATCA air traffic control simulator, build-your-own Horizon Hobby gliders, and more. It also includes promotions for EAA AirVenture Oshkosh and the EAA Young Eagles program, as well as a general aviation aircraft on display.

“The Spirit of Aviation Mobile Experience is not only a place to introduce aviation to the public, it also will serve as a place to engage and strengthen our ties with current EAA members and chapters, as part of EAA’s mission to grow aviation participation by sharing The Spirit of Aviation,” said Charlie Becker, EAA’s director of chapters and homebuilding.

YOU CAN NOW BUY SELECT PRINTS OF EAA'S PHOTOGRAPHY ONLINE

EAA IS EXCITED TO announce that prints of some of the best of our aviation photography are now available at Photos.EAA.org. We’ve partnered with a third party to offer a variety of print and product options for you to showcase select photography produced by EAA. Browse through our galleries, select the photo you’d like to have printed, and then view the product options. We will be adding more images to the galleries in the future.



APPLICATIONS FOR EAA'S 2020 SPORT PILOT ACADEMY NOW OPEN

THE BENEFITS OF IMMERSIVE, small group flight instruction are coming to Oshkosh, Wisconsin, again in 2020 as EAA hosts five Sport Pilot Academy sessions beginning in May.

The EAA Sport Pilot Academy offers a direct path to sport pilot certification through a three-week training program that eliminates obstacles such as scheduling conflicts and instructor availability. The program takes participants from the first flight through their sport pilot checkride at EAA facilities in Oshkosh.

“The success of our previous Sport Pilot Academy sessions over the past two years has encouraged us to expand the program to five sessions in 2020,” said Sean Elliott, EAA’s vice president of advocacy and safety. “The Sport Pilot Academy is a way for those committed to learning to fly to earn that pilot certificate with a strong support system around them at EAA.”



The three-week program offers one-on-one and small group instruction, with flight training in a new Van’s RV-12iST aircraft equipped with the latest Garmin avionics. Lodging, meals, and camaraderie with fellow students are all included, as well as additional aviation experiences that can be found only in Oshkosh.

The 2020 Sport Pilot Academy sessions will be held on the following dates:

- May 9-31 (Collegiate Sport Pilot Academy)
- August 8-30
- September 5-27
- October 3-25

The Collegiate Sport Pilot academy is a scholarship-based session. Up to five scholarships are awarded to students attending a post-secondary institution and focusing on an aviation program such as aeronautics engineering, aviation management, airframe and powerplant maintenance, and more. Applications for that session closed March 20, although the others are still open to applicants.

Complete information and requirements are available at www.EAA.org/sportpilot-academy. Major sponsors of EAA’s Sport Pilot Academy include Garmin, Rotax Aircraft Engines, and SteinAir, with additional support provided by Sensenich Propellers, AeroLEDs, and EarthX Lithium Batteries.



— **When you think “German” the first thing that comes to mind is “quality engineering!” Okay, maybe the second thing.**

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U.S. NAVY RHINO DEMO TEAM ATTENDING AIRVENTURE 2020

THE U.S. NAVY RHINO DEMO Team, which flies the F/A-18F Super Hornet, has included EAA AirVenture Oshkosh 2020 on its schedule, released February 10. The team is part of Strike Fighter Squadron (VFA) 106,

based in Virginia Beach, Virginia, and has listed July 23-26 as its appearance dates at Oshkosh.

“The demo flight profile highlights the mobility, versatility, and power of the most lethal, carrier-based strike fighter aircraft in the world, the F/A-18F Super Hornet, nicknamed the ‘Rhino,’” said VFA-106 Commanding Officer Dan Catlin. “The team also works with the Navy Legacy Flight program to exhibit the lineage of naval aviation to the civilian community.”



13TH ANNUAL EAA WOMENVENTURE DETAILS ANNOUNCED

EAA WOMENVENTURE 2020 ACTIVITIES are highlighted by guest speaker Capt. Bebe O’Neil at the WomenVenture Power Lunch. Additional activities include the annual group photo on Boeing Plaza, evening programming at Theater in the Woods, and more. *EAA*



2020 SPORTAIR WORKSHOP DATES

- April 18-19, 2020; Oshkosh, Wisconsin
- July 20-21, 2020; Oshkosh, Wisconsin
- July 22-23, 2020; Oshkosh, Wisconsin

Check out www.EAA.org/sportair for the complete schedule of workshops.



BRIEFLY NOTED

GAMA State of the Industry Press Conference

The General Aviation Manufacturers Association (GAMA) published the results of a study of the overall health of general aviation. The study, which was co-sponsored in part by EAA and other organizations, revealed that general aviation supports more than 1.1 million jobs and \$247 billion in economic output.

Collier Trophy Nominees Announced

The National Aeronautic Association named nine finalists for the prestigious award and will meet to determine a winner in early April. The nominees include the Airborne Collision Avoidance System Team, Bombardier Global 7500, Gulfstream G500 and G600, Hubble Space Telescope Team, magni500 Electric Propulsion System, Project Heaviside, Stratolaunch Carrier Aircraft, U.S. Air Force-Boeing X-37B Orbital Test Vehicle Team, and Unmanned Aircraft Systems Traffic Management Team. The trophy will be formally awarded on June 11.

Garmin Autopilot Approved for More Aircraft

The company’s GFC 500 can now be installed via STC in the Piper Cherokee 235; the Piper Saratoga 301, 301T, 301FT, and 301XTC; and the Cessna 177B, 177RG, and F177RG. The GFC 500 has previously been approved for installation in most Beech Bonanza aircraft and many Cessna models, as well as the PA-28 and certain PA-32s.

New Prop for RV-12 Series

Van’s Aircraft now supports the installation of a Sensenich three-bladed propeller on the popular light-sport aircraft. Van’s displayed the configuration at EAA AirVenture Oshkosh 2019 and received plenty of interest before completing the engineering and testing required to make it available for order. The Sensenich prop can be ordered either as part of a new powerplant kit for the RV-12 or as a stand-alone item.

IAC Trophy Winner Announced

The International Aerobatic Club announced that Leigh Hubner, EAA 1234332 and IAC 439393, is the winner of the annual L. Paul Soucy Trophy. He was awarded based on the scores from his performances across five contests, including the U.S. National Aerobatic Championships. The L. Paul Soucy Trophy is awarded to a pilot who achieves the highest scoring percentage across at least three contests, including the U.S. Nationals.



For more information on these stories and others, visit www.EAA.org/extras.

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A standard single-engine/generator IDEP hybrid installation in a VTOL cargo drone.

Propulsion Partners

Continental and VerdeGo Aero

BY BETH STANTON



AS THE URBAN AIR MOBILITY (UAM) industry continued to grow in diversity and numbers, the team at VerdeGo Aero noticed a phenomenon. Markets for other types of aircraft — such as fixed-wings and large drones — were becoming increasingly interested in the new propulsion technologies developing to support UAM.

When VerdeGo Aero was founded in 2017, the original plan was to design a UAM vehicle. In mid-2018, the company recognized that the industry had a need for hardware vendors focused on enabling technologies that make the electrification of flight possible. VerdeGo Aero stopped its aircraft development and pivoted to the design and manufacturing of hybrid electric powertrains to support innovative aircraft designs.

In the Urban Air Mobility Showcase at EAA AirVenture Oshkosh 2019, VerdeGo Aero's flexible hybrid electric system and strategic partnership with Continental Aerospace Technologies gained visibility.

"The propulsion building blocks that we're working on create the ability for aircraft designers all around the world to get creative with new aircraft configurations that are uniquely tailored to electrification," said Eric Bartsch, EAA 673688 and VerdeGo CEO.

JET-A ENGINE AND IDEP

Turbine and piston engines each bring compromises when applied to hybrid electric powertrains. Continental — a leader in design, certification, and manufacturing of general aviation engines — has developed a clean sheet, Jet-A burning piston engine optimized for hybrid power generation. VerdeGo Aero's Integrated Distributed Electric Propulsion (IDEP) system architecture, when paired with the Continental Jet-A piston engine, is more economical, quiet, fuel-efficient, and scalable than hybrid electric systems using turbine engines.

The combination of Continental's Jet-A piston engine portfolio and VerdeGo Aero's hybrid leadership provides capabilities that are unique in the market. The creator of the IDEP technology is Dr. Pat Anderson, VerdeGo Aero's chief technology officer. Pat is a pioneer in aero hybrid electric technology and led the program for the world's first piston gas-electric hybrid aircraft, the Eco-Eagle, which flew in the 2011 CAFE Green Flight Challenge.

ARCHITECTURE AND POWER

The VerdeGo Aero engineering team has created a modular system that allows for different configurations that can support a variety of aircraft designs. The system architecture is composed of engine, generators, a battery pack, power distribution, electronics, control systems, and cooling systems.

Electric vertical takeoff and landing aircraft (eVTOL) require high power for short periods of hovering during takeoff and landing while using much lower power for cruise. The system is designed around supporting situations where peak power demands are much higher than the constant power demands.

Using either single- or twin-engine hybrid systems, the platform is targeted for conventional or eVTOL aircraft up to 7,000 pounds. The largest scale systems will be capable of delivering 1,000 peak hp with 450 continuous hp. Smaller systems will generate 500 peak hp with lower continuous horsepower.

BATTERIES

Since the battery pack can represent a significant fraction of the total weight of a hybrid system, high power and energy density are critical. VerdeGo Aero explored a wide variety of battery technologies and partnered with experts in the battery industry to deliver enhanced battery pack performance, economics, and safety.

Although VerdeGo Aero started this work to provide a battery pack to be used inside a hybrid powertrain, this created an unexpected opportunity to create a stand-alone battery pack product line for markets where battery electric power alone is sufficient.

THREE INGREDIENTS

Some recipes that are cooking in the UAM space call for “unobtainium.”

“It’s a very popular ingredient in our industry,” said Erik Lindbergh, EAA 672161 and VerdeGo Aero executive chairman.

The VerdeGo Aero team has determined a “three-ingredient principle” to identify companies that are headed for success in this market — a technology niche or advancement that makes it compelling or stand out, a sound business plan, and a strategy for significant funding.

“Otherwise, there’s a ton of different wonderful ideas out there that will go nowhere,” Eric said.

Many people are familiar with costs involved in building experimental aircraft but are shocked to learn that bringing a new aircraft to market costs hundreds of millions of dollars.

“This doesn’t mean that the people who succeed in this market are going to be big multibillion dollar companies,” Eric said. “There are some startups that are very well positioned.”

“The propulsion building blocks that we’re working on create the ability for aircraft designers all around the world to get creative with new aircraft configurations that are uniquely tailored to electrification.”

— Eric Bartsch, VerdeGo Aero CEO

MANY MODELS

VerdeGo Aero has developed relationships with dozens of companies throughout the past several years and has seen many different business models. Working with a wide range of manufacturers has given the company a window of insight into this emerging market.

“There are a lot of different niches that will be successful,” Erik said. “So, the good news for everyone competing in this market is that it’s not going to be a winner-take-all kind of thing because there are lots of different markets.”

He noted that the market is very complex.



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INNOVATION

CUTTING-EDGE DEVELOPMENTS

“Those who have been in this industry a long time and have weathered the startups and the storms really understand that this is a tricky market, fraught with regulators, regulations designed for safety, and all the processes that go along with that,” Erik said. “It’s a very complex market. Yes, there’s a lot of money flowing in, and there’s a lot of creativity that’s coming. But it’s going to take longer than most of the new entrants in this market thought.”

As the unabashed enthusiasm begins to wane after the reality of complex challenges sets in, some companies are beginning to rethink their game plan.

“Now people are coming to us and going, you guys really have the technology that we need,” Erik said. “How can we play?”

PAST AND FUTURE

A hangar housing a dedicated hybrid electric propulsion facility opened in January 2020 in Daytona Beach, Florida. Here, the engineering team is installing the Continental piston engine on the world’s largest hybrid electric powertrain system built to date. The team is pleased with the performance it is seeing in the computer modeling. Once the system is operational, it will go into full-scale testing, followed by production design refinement and testing with simulated installations in customer aircraft.

The founders of VerdeGo Aero hoped a particular milestone would happen — a manufacturer would come to it with an application for its hardware that VerdeGo Aero had never envisioned before.

“It’s one thing when you have the intended uses of your hardware,” Eric said. “But then people come in and say, ‘Hey, we see that you’re developing this capability. Here’s what we want to do with it,’ and have that be something that’s completely new, that no one has worked on before.”

This milestone has now happened multiple times.

“It’s been a really cool thing to see this because that says we’re transitioning as an industry,” Eric said. “All of these different efforts are building on each other to really get us to somewhere radically different.”

In 2002 when Erik celebrated the 75th anniversary of Charles Lindbergh’s 1927 New York to Paris flight by retracing his grandfather’s path across the Atlantic, Continental supplied his engine. Continental’s CEO Rhett Ross had noticed the work at VerdeGo Aero and approached Erik about a new Jet-A piston engine under development at Continental that might align with their technology.

“So, all this really came from a long-ago relationship,” Erik said. “From commemorating the way we started air transportation in the past to driving the next revolution of air travel for the future.” *EAA*

Beth E. Stanton, EAA 1076326, majored in English because it involved the least amount of math. She finds it hilarious that now she is a pilot and writes stories about airplanes and technical stuff. She can be reached at bethstanton@gmail.com.



MANY MODELS

Top: A standard twin-engine IDEP hybrid installation in a VTOL UAM aircraft.

Bottom: A standard twin-engine IDEP hybrid installation in a next-generation fixed-wing aircraft.

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WHERE

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PHOTOGRAPHER

Dustin Ebel

Growing Your Chapter by Giving Wings

EAA's Flying Start program

BY SERENA KAMPS, EAA CHAPTER FIELD REPRESENTATIVE



"I'VE ALWAYS WANTED TO learn to fly but ..."

How often do we hear this from friends, relatives, or co-workers? Perhaps you've even had that thought yourself. Flying is a dream that so many have yet very few accomplish.

Perhaps they never even started, driven away by stories of expense or difficulty. Maybe they started but work or family commitments got in the way. For many, the dream, although perhaps relegated to the back of their mind, never quite dies. EAA chapters have the perfect opportunity to rekindle the spark and provide these folks a direct avenue into flight training through EAA's Flying Start program.

Flying Start was developed to provide adults who have an interest in learning to fly a clear pathway to achieve their dream through their local EAA chapter. Chapters are uniquely suited to provide a gateway through the airport fence and debunk the myths around learning to fly while providing direct guidance to training options and opportunities for mentorship within the chapter.

Flying Start, an EAA program that was originally started in the 1990s, was overhauled and brought back with a kickoff during EAA AirVenture Oshkosh 2018. Since then, more than 80 chapters have hosted a Flying Start event. Chapters who have participated in the program and held Flying Start events report back about how they have both gained new members and invigorated those who have been around for years, and they strengthened community ties in the process.

HOW THE PROGRAM WORKS

The program targets those who have always wanted to learn to fly but haven't started yet. EAA chapters identify these individuals (parents of Young Eagles are often great candidates) and invite them to participate in the Flying Start event. On the day of the event, participants are welcomed in a relaxed environment with perhaps some coffee and doughnuts where they can meet and mingle with chapter members.

Next, everyone assembles in a classroom-style area for an EAA-provided presentation and video that covers reasons for learning to fly, types of aircraft available to fly, the flight training process, introduction to local flight instructors, aircraft access, and cost. Anecdotes from various chapter members about their experiences learning to fly or how they've been able to use their pilot certificate are also great to include.

Following the presentation, participants are introduced to and paired with pilots from the chapter who will provide each one an Eagle Flight. If the weather is not conducive to flying, pilots will work out a time with participants to fly soon after.



PATHWAYS

SPOTLIGHT

TABITHA YEOMANS

Tabitha Yeomans, EAA 1204058, had already begun flight training when she received her Ray Aviation scholarship, but the extra help provided allowed her to push through and finish her training. Tabitha passed her private pilot checkride on January 12, just a few years after her Young Eagles flight in May 2016.

Tabitha felt motivated to pursue aviation after she prayed and the word "pilot" popped into her head. Soon after that, she sought more information and eventually took that Young Eagles flight. She completed her training in a Cessna Skyhawk and has her eyes on bigger aircraft as she begins IFR training with a goal of being an airline pilot someday. In the meantime, she is looking forward to taking her friends flying and spreading the joy of aviation.



Young Eagles

Since 1992, EAA members around the world have shared their passion for aviation with more than 2 million young people through EAA's Young Eagles program. Visit www.EAA.org/youngeagles to learn how you can join the ranks of others who help inspire the next generation of aviators.



EAA Ray Aviation Scholarship Fund

The Ray Aviation Scholarship Fund is a scholarship program that is supported by the Ray Foundation, managed by EAA, and administered through the EAA chapter network. Through the generous support of the Ray Foundation, EAA provides up to \$10,000 to deserving youths like Tabitha for their flight training expenses, totaling \$1.2 million in scholarships annually. Visit www.EAA.org/rayscholars for more information on this powerful program.

BENEFITS TO PARTICIPANTS

Participants will walk away with the knowledge of what it takes to obtain a pilot certificate in terms of time and cost. They will learn about different types of certificates available, different types of aircraft to fly, various flight training options available in their local area, and how EAA and their local chapter can help them throughout the flight training process.

They will have a clear understanding of what steps they need to take to begin flight training and come away excited, inspired, and motivated with the realization that achieving their dream is well within their reach.

BENEFITS TO CHAPTER

Through hosting a Flying Start event, chapters have the opportunity to grow their chapter by recruiting new members from among those who participate. Chapters are encouraged to offer each one a free six-month chapter membership to pair with the six-month EAA membership they receive with their Eagle Flight.

Current chapter members will enjoy coming together to share their passion for aviation with others who have the same interest by mentoring participants. The chapter's position as the local access point to aviation will be reinforced as new pilots are created, strengthening the general aviation community as a whole.

Participants will walk away with the knowledge of what it takes to obtain a pilot certificate in terms of time and cost. They will learn about different types of certificates available, different types of aircraft to fly, various flight training options available in their local area, and how EAA and their local chapter can help them throughout the flight training process.

START PLANNING NOW

International Learn to Fly Day is May 16. This provides a great time for your chapter to plan to host an event — but it is fast approaching so start planning now. To learn more about the program and to register your chapter to host an event, go to www.EAA.org/flyingstart. In keeping with our goal to make all of our chapter programs easy to implement, EAA provides everything you need to successfully plan, promote, and execute your event, including a program handbook with event planning checklists, customized materials to help you promote your event, and a brand new online registration tool that all chapters are strongly encouraged to use.

There is nothing quite like seeing the light in a person's eyes as they experience flight in a small airplane again, or perhaps for the first time. The excitement generated when they realize that learning to fly is not out of their reach is contagious — and you'll probably gain several new chapter members as a result. What's not to like? Make it a point to be part of this excitement and plan to host or attend a Flying Start event in 2020!



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PATHWAYS

EXPLORING AVIATION

STARTING OFF RIGHT

EAA Chapter 323's Flying Start success stories

BY ED GRIGGS, EAA 1269116

TWO EVENTS INFLUENCED

CHAPTER 323's decision to host a Flying Start event last year. First, several of our members attended EAA's Flying Start webinar. This is when the chapter first gave thought to Eagle Flights. Then EAA Chapter 323 President Mike

McLendon, EAA 1130815,

attended a Chapter Leadership Academy in Oshkosh. This stimulated many ideas and ways to improve the chapter. Mike gave one idea a priority: the Flying Start program.

We knew our chapter had the resources and know-how to do this successfully. A call went out via newsletter and at a chapter meeting for any willing and able pilot to volunteer as the Eagle Flights coordinator. Adam Yavner, EAA 1190755, answered that call. He quickly addressed three areas of concern: reaching local potential aviators, putting them in touch with the right mentors, and fostering goodwill with local residents while introducing them to their airport.

Plans began to form, and it was decided that International Learn to Fly Day would be our goal. So on May 18, Chapter 323 started its EAA Flying Start program under the guidance of Adam, along with mentor pilots in Mike, Frank Connery, and Rick Simmons.

At that first meeting, four eager attendees – Wayne Wallace, Brian Baca, Tracy Rains, and I – showed up to the inaugural presentation. Due to the weather, we were unable to fly, so we rescheduled for the next weekend to coincide with Chapter 323's Charts and Legends event on Memorial Day weekend.

"We reached a good core group of people of all ages and walks of life from the area who can not only pursue their own goals but can be a source of support to each other as they do so," Adam said.

The core group of Eagles has since gained four new members with the addition of Rheuben Gammel, Katherine Hill, Rebecca Yavner, and Gill Baca. Katherine, EAA 1321996, said her Eagle Flight was awesome and expressed thanks to the chapter for making her Memorial Day weekend special.

"I've always wanted to get my pilot's license since I was young since I have several pilots in my family tree," Katherine said. "I was so excited to learn about the Eagle program and can't wait to start learning all I can with a great group of people!"

For my part, I am one of those "guys" (the 80 percenters) who started their training years ago and never completed it. I think it is both fitting and ironic that Adam signed my logbook almost 31 years to the date of my first flight on April 26, 1988. I've never felt the encouragement and friendship that I feel with Chapter 323, and it gives me hope that I will be able to fulfill my goal and dream of becoming a pilot at last! *EAA*



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Flying — It's in the Blood (and the Genes)

Four generations of flying Slingers

BY STEVE KROG

SOME OF US WERE introduced to aviation watching television series like *Sky King*. Others learned about airplanes by building balsa wood models and reading *Mechanix Illustrated*. But for 80-year-old Charles (Charlie) Slinger, EAA Lifetime 128066, it began at age 5.

The Wright brothers introduced the entire world to the wonders of powered flight in 1903, more than 116 years ago. But the Wrights hold nothing over the Slinger family who have been flying airplanes for eight decades.

It all started with David Slinger, Charlie's father and a true adventurer, who decided to follow his dream and learn to fly in 1946. Flying for pleasure only, David first owned a Piper J-3 Cub and then a Piper Vagabond. The interest in flying quickly rubbed off on Charlie, who recalled the fun times of flying in the J-3 Cub with his father. Charlie was truly bitten by the aviation bug, but school, part-time jobs, a stint in the U.S. Army, launching his own business, getting married, starting a family, and building a family life had to be a priority.



The entire flying Slinger family together for Charlie's 80th birthday. From left to right: Kent, Dave, Sherry, Charlie, and Lee.



The Slinger family patriarch, David, giving his father-in-law a ride in the J-3 Cub.

Finally, in 1976, it was time for Charlie to pursue his dream of learning to fly. Through work, he became acquainted with Wisconsin Aviation Hall of Fame inductee Roy Reabe. Roy agreed to teach Charlie. By late March 1976, he had earned his private pilot certificate.



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“Roy was a great instructor who believed in the old school method of instructing,” Charlie said. “Attitude, air-speed, and coordination were key. All types of stalls were practiced nearly every flight. I believe I was the last non-Reabe family member that Roy taught to fly.”

Inheriting his father’s lust for adventure, Charlie was always looking for the next challenge. The private pilot certificate was only the beginning for this driven aviator. Over the next two decades, Charlie acquired additional certificates and ratings including private pilot — glider, private pilot — seaplane, private pilot — multiengine, commercial pilot — single and multiengine, instrument rating — single-engine, and commercial pilot — glider. He also became a highly qualified glider tow pilot.

Charlie has been the owner and caretaker of a number of airplanes over the years, including a Porterfield, an experimental Cub (which he built), a Cessna 150, and several Piper PA-12 Super Cruisers. Always one to help promote aviation to young men and women, Charlie has sometimes offered his airplanes to others to be used to achieve flying goals. Several years ago, a young woman from Hartford, Wisconsin, was ready to solo on her 16th birthday. After she completed solos in five different tailwheel aircraft, Charlie offered his Porterfield to her if she wanted to try for a sixth airplane solo. She was up for the challenge, as was I, her instructor, and we proceeded to fly the Porterfield. Once I found her to be comfortable and safe, I hopped out and she made three beautiful landings in Charlie’s Porterfield.

Charlie and his wife, Sherry, were blessed with two sons, Kent and Dave. Both were bitten by the aviation bug and became pilots. Kent soloed in a Piper PA-12 on his 16th birthday and passed his private pilot checkride on his 17th. He began his working career in finance as a banker, but aviation was still a passion. Kent continued to pursue the required advanced ratings and then made a career change to aviation, quickly rising to captain, flying for Air Wisconsin Airlines. Eventually, the travel and time away from his young family caused him to rethink his career path. Financial interests had

continued to be a high priority, and Kent, with some additional study, left the professional aviation world and became a certified public accountant.

Dave, equally bitten by the aviation bug, recalled some of his early memories of flying. At about the age of 8, he and his brother would sit in the back of a Piper Cherokee watching and riding along while his father was taking flying lessons.

“One distinct memory I have was that Dad’s instructor, Roy Reabe, was a real stickler for understanding and performing every kind of stall imaginable,” Dave said. “Up the nose would go, then pitch downward with Roy saying, ‘Push on the yoke and use the rudder.’ It seemed like that was all they did for an hour at a time!”

Dave was truly enamored with flying airplanes, but school and working in the family business kept him away from flying until he was 19. Once he started, though, he pursued flight with a passion. After three months and instruction in three different airplanes, Dave had a private pilot certificate in his pocket. Soon thereafter, he invited a waitress, Lynnae, to go for a flight and the rest is history. A year or two later, Dave married Lynnae, relocated to Wyoming, and began providing for his family. A son, Lee, joined the couple a year later and life was good. Though the family had grown, Dave never lost his love for airplanes and continued flying whenever he could find the time. Another year passed when Dave learned he was going to become a father a second time. Then, tragedy struck. Just days before giving birth, Lynnae was involved in an automobile accident. Neither Lynnae nor the daughter she was carrying, to be named Rebecca Marie, survived.

Filled with grief and instantly becoming a single father to a then near 2-year-old son, Dave turned to flying as a way to help deal with the loss and clear his mind. He resumed flight lessons and earned advanced ratings, including commercial pilot — airplane and glider, instrument rating, and multiengine rating. He is currently working on earning a certified glider instructor rating. He’s also certified for glider towing. Lee became an “airport bum” at that early age and was soon adopted by the entire airport gang.

Fast-forward a few years and Lee was also bitten by the urge to fly after being a passenger in the Piper Archer that the family owned and flew regularly. Only 13 years old, it seemed that flying gliders was going to be the first step in his aviation career. After all, both his grandfather, Charlie, and his dad, Dave, had learned to fly gliders, so it was only natural that he followed in their footsteps.

Lee began taking glider flight lessons in a homebuilt SGS 2-33. Handling a glider came naturally, and it was quite apparent that as soon as he turned 14, he would be ready to make his first solo flight.

“Being a flying family, my Grandpa Charlie made the trip from Wisconsin to Wyoming to experience my solo flight firsthand,” Lee said.

What made this flight truly special was that Charlie, an experienced glider tow pilot, provided the tow for Lee’s memorable first solo flight.



Lee's first passenger after passing his checkride was his grandmother, Sherry.



Photo proof of reaching an altitude of 24,300 feet.

Grandfather Charlie and Grandson Lee briefing before Lee's first solo flight.



Just a short time later, at age 16, Lee was ready to advance to the next step in his flying career — the private pilot glider checkride. And who again had the honor of providing the tow? Grandpa Charlie! It was a very proud day in the Slinger family with Lee in the glider, Charlie in the tow plane, and Dave and Grandma Sherry proudly observing the entire event. After the checkride and all necessary FAA paperwork were completed, Lee had the pleasure of having his grandmother as his first passenger with Charlie again doing the towing.

The day that Lee was to take his private pilot — glider checkride, the surface wind was quite brisk. When the oral portion of the checkride concluded, the examiner asked Lee if he still wanted to make the flight. Lee answered affirmatively, and the examiner then asked if the tow pilot was willing to make the tow in the wind. Lee replied, “My Grandpa Charlie is my tow pilot and has flown thousands of hours in tailwheel airplanes. I know he’ll want to make the flight!”

Following in the aviation family footsteps, Lee was not satisfied with just earning a private pilot glider certificate. There were challenges to be attempted, and he vigorously pursued them. Most glider pilots strive to earn the Soaring Society of America Silver Badge consisting of three parts: time of flight, distance of flight, and altitude in flight.

Lee has completed and has been officially recognized for completing all three parts, earning the Silver Badge. Achieving two of the three parts was especially memorable because Grandpa Charlie was directly involved. On an Easter Sunday, while Lee was still in high school, Lee and Charlie obtained permission to penetrate Class A airspace (should they be able to get that high), donned warm clothes and supplemental oxygen, and launched in the glider. Lift, updrafts, and wave windows cooperated in the Minden, Nevada, area, and together they achieved reaching an official 24,300 feet. Once there, they descended and rode the wave back up to 24,000 feet again.

“It was really cold, but I was not going to give up as long as Lee was not giving up,” Charlie said. “We were both nearly frozen when we got back on the ground, but what a thrill to accomplish this with my grandson.”

Shortly thereafter, Lee was ready to try for the glider flight distance leg, the last of the three legs of the Silver Badge. Again, Grandpa Charlie played a vital role. With Charlie doing the towing, Lee launched from the Owl Canyon Gliderport in Wellington, Colorado, flew over the mountains, and eventually landed in Laramie, Wyoming. Once the distance leg was accomplished, it was time to fly the glider back to Owl Canyon. However, the winds were not cooperative. Charlie again had the pleasure of making that tow from Laramie.



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STEVE KROG

Another memorable trip occurred several years ago when Charlie, Dave, and Lee loaded the Archer and flew to Alaska. Each took turns doing the flying both to and from there.

"One of the memorable flights I made during my glider flight training was on a day when my instructor was going to teach me thermal training," Lee said. "We flew continuously for about 2.5 hours when we received a radio call stating we should head back to the airport as the surface winds had really picked up. By the time we made our way back to the airport, the surface winds were gusting over 30 knots. I managed to get the glider safely on the ground, but with the wind as strong as it was, I could keep the wings in the air and the glider balanced on the center wheel. I just couldn't move without help."

While continuing with his glider flights, Lee began powered flight lessons in the family's Piper Archer, all while going to high school. He progressed rapidly and, at age 17, earned the private pilot — single-engine land certificate. All of this was accomplished before graduating from high school!

Additionally, whenever Lee traveled to Wisconsin to visit his grandparents, he would get dual instruction in his grandfather's experimental Cub, a classic tailwheel airplane. It wasn't long before he mastered tailwheel flying, and I had the distinct pleasure of signing Lee's logbook for the tailwheel endorsement he needed to legally fly solo in tailwheel aircraft.

Now 22 years old, Lee holds the private pilot — glider and single-engine land aircraft certificates. He has also earned the FAA A&P mechanic certificate and is employed by Flying Rhino Aviation in Alliance, Nebraska. Lee is also working on acquiring his instrument rating when time allows.

The Slingers are a true flying family and have made many flying trips together. Charlie and Sherry have flown all over the United States together, first in one of the Piper PA-12s he owned and later in the Piper Cherokee 180.

"There were times when it was so cold when we left Wisconsin to head south that we would put the airplane in a heated hangar overnight," Charlie said. "We'd preflight, load the luggage, and then board the airplane before opening the hangar door. Once it was open, friends would push us out of the hangar. We'd start the airplane, do a pre-takeoff check, and launch before the cabin got too cold. There were times when flying the PA-12 that we would tape the door and windows shut to keep the cold air drafts to a minimum."

Charlie and Dave once flew the Piper Archer to St. Thomas, Virgin Islands, while Sherry and Lee flew commercially.

"It was a fantastic flight with Dad and I sharing the flying duties," Dave said. "We made a very good cockpit flight team."



The flying Slinger family. From left to right: Son Dave, Grandson Lee, and Charlie holding the propeller that was on patriarch David's J-3 Cub.

Another memorable trip occurred several years ago when Charlie, Dave, and Lee loaded the Archer and flew to Alaska. Each took turns doing the flying both to and from there. Once in Alaska, they did a lot of sight-seeing, flying throughout the scenic state to our far north. Charlie, Dave, and Lee all commented that it was “a trip of a lifetime.”

Over the last eight decades, aviation has played a significant role in the Slinger family beginning with the patriarch, David Slinger. Although David is no longer with us, his love of flight and adventure was passed on to three generations of the Slinger family. In memory of the family patriarch, Charlie, Dave, and Lee posed for a photo holding the propeller that flew on David's first airplane, the Piper J-3 Cub that started it all! *EAA*

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.



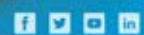
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LISA TURNER

COMMENTARY / AIRWORTHY

Spring Cleaning

Is a clean and organized airplane an airworthy airplane?

BY LISA TURNER

STILLNESS AND QUIET HUNG over the small airport in a protective cloak. Clumps of melting snow streaked with dirt littered the grass. A hint of spring warmth rippled through the 48-degree air, humid after an early morning rain.

I parked the car in front of the T-hangar with the window down and turned off the ignition to drink in the quietude, watching the rays of the emerging sun begin to pierce the fog over the lake.

“Spring’s right around the corner!” came a shout from the corner of the hangar. Startled, I looked over to see Dave, a hangar neighbor.

I shook my head and smiled.

“It’s only April, Dave,” I said. “It could easily snow tonight, and we could wake up to 15 degrees in the morning.”

“No, no, winter is leaving,” he said. “I can feel it in the air. Are you going to pull your machine out and fly this morning?”

“I was thinking about it. I need to look at the airplane and list out the things I need to do and check before I bring it out of storage. I don’t think I’ll get it all done today. How about you?”

“I’ve got to go flying. The day is gorgeous, and I’ve been away too long. I can’t wait to get back in the air,” Dave said, waving his arms at the sky.

“Oh, I didn’t realize you’ve been flying all winter in the snow and ice,” I said. “You’re brave.”

“No, I haven’t flown for five months. But the airplane’s been in the hangar; it should be fine,” Dave said, disappearing into his hangar.

He’s braver than me, I thought. I collected my bucket of cleaning supplies and jacket and went into the hangar next door. It was a lot colder inside, so I opened the bi-fold door and let the fresh air, now in the 50s, into the chilly space.



CLEANING ACRYLIC (PLEXIGLAS) WINDOWS

If your aircraft windows are already scratched, hazy, or smoky, you have two choices. The first is to replace them, and the second is to have them professionally repaired. I say professionally because it is a lot of work, it’s easy to mess up, and there are multiple systems available. This is not a job for the fainthearted. You should research systems carefully because everyone has a different opinion.

If your windows are in good, clear shape, then you can keep them that way by following these steps:

- The keywords for acrylic window cleaning are sensitive and gentle. The material is sensitive to scratching, and you want to use gentle cleaning techniques. Have a supply of clean, premium-grade microfiber cloths or clean, lint-free cotton. The cleaning liquid you use should be acrylic specific, or you can use clean water with a few drops of mild dish soap.
- Flush debris, dust, dirt, and bugs from the windows with a gentle fan stream of water. Many experts tell you to use your bare hand to dislodge debris while doing this. You certainly can do this, but you may want to use a clean wetted microfiber cloth instead. Why get bug guts under your fingernails?
- Once you have the large debris gone from the surface, put some of the cleaner on the wet cloth. Then, gently wipe the window with a vertical rather than a circular motion. Turn the cloth so it’s moving the dirt to the inside and use more cloths if that one gets dirty.
- When you dry, use a clean cloth and wipe gently, just enough to get rid of wet streaks.



MORE INFO

See "Haven't Flown in a While?" from the November 2018 edition of *EAA Sport Aviation* for more details about how to bring your aircraft out of storage safely.

Ten minutes later I saw Dave pull his Decathlon out onto the ramp. Shivering, I left my hangar and walked over to the Decathlon. It was encrusted with dirt and dust. Cobwebs crisscrossed the

cockpit as gossamer threads connecting the controls and the seats, stretching back into the baggage area. A pile of magazines and books lay in the passenger seat with shirts and jackets on the floor. Dave grabbed a roll of paper towels and started spraying the windshield with a bottle of Windex.

"Wait! No!" I shouted, but I was too late. Dave was already wiping and scrubbing.

"I can't figure out why this cleaner isn't working on these streaks," Dave said. "It seems like it makes them worse."

"Stop," I said. "You *are* making it worse with the paper towels, and that cleaner isn't good for Plexiglas. You need some clean cotton cloths and Plexiglas cleaner. I have some. Let me get it."

I was feeling like a nag as I returned to the hangar. I gave Dave the Plexi-Clear and several clean cloths and then retreated to the hangar, afraid I would get more annoyed by what I was seeing.

The sun was rising on the horizon, reflecting brightly off the still-wet tarmac. Everything glistened, and the air was fresh and clean. The windsock hung limp in the center of the field. Definitely a flying day. As I turned back to my checklist, I wondered for a second if I could hurry it up and fly today.

"No, it's not safe," my brain said.

"Hey, Lee," Dave said from outside. "Can you come over here a minute?"

I walked over to the Decathlon. Dave was in the cockpit, cobwebs connecting him to the ceiling.

"Listen," he said. I heard a loud solenoid click. "Dead battery. Can we hand-prop it or can we jump-start it?"

I couldn't bite my tongue any longer. There was so much I wanted to say. I went ahead and said it.

"Dave, look, I know you want to get in the air," I said. "It's a gorgeous day. We all have go-fly fever. But there will be more days like this soon. My advice is to cool it. Do a total and complete preflight and make a list of things you need to do to get back in the air safely. You don't know what other things besides the battery need servicing. Clean the airplane so you can see everything it needs. Then go flying."

There, I'd done it. My typical shy self, emboldened. I braced for Dave to respond in anger, for him to tell me to butt out.

Dave looked at me with disappointment on his face. He climbed out of the cockpit.

"Actually, you are right, Lee," he said. "Thank you."

I breathed a sigh of relief.



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IS A CLEAN AND ORGANIZED AIRPLANE AN AIRWORTHY AIRPLANE?

Not necessarily. There are plenty of airplanes flying that are completely airworthy and also have a mess in the back seat and a layer of dust on the surfaces. There are also plenty of airplanes that are neat and clean but not safe to fly.



Dust magnet.

I propose that an aircraft – any aircraft – that is kept clean and organized will give the pilot earlier indications of problems.

QUIZ

THE NO. 1 REASON TO CLEAN YOUR AIRPLANE IS:

- A. Improve aerodynamics
- B. Impress your friends
- C. Find and address safety and maintenance issues
- D. Improve fuel efficiency

Answer: C. Find and address safety and maintenance issues. It's easier to identify corrosion areas, loose fasteners, leaks, and faulty adjustments when the components are clean and visible. To some extent, aerodynamics and fuel efficiency may be positive but aren't the top reasons. Of course, impressing your friends is right up there, but shouldn't be No. 1!

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WHY SHOULD YOU CARE ABOUT CLEANING YOUR AIRCRAFT?

I propose that an aircraft — any aircraft — that is kept clean and organized will give the pilot earlier indications of problems. Whether it's a powered parachute, an ultralight, a Beech Bonanza, or an RV-7, clean components allow us to inspect faster and feel more confident about finishing a preflight correctly. Other factors include:

- **Clean windows**

See that little tiny speck off the right side? Is that another airplane? It will be much easier to identify when you're scanning the sky if the Plexiglas is really clear.

- **An organized cockpit**

Knowing where things are will reduce the time to locate what you need. An organized cockpit will reduce the panic factor if there's an emergency.

- **Clean surfaces and components**

Being able to see everything will enable you to identify and address corrosion — an extra critical factor in older aircraft.

- **Clean fittings and engine**

You'll be able to identify leaks and see torque seal, and visually make sure that cotter keys and other keepers are in place.

- **First impressions and resale value**

We love our airplanes and want others to admire them as we do. A clean airplane is far more inviting and even *looks* safer than a dirty one.

CRITTER DAMAGE CHECK

Did you find mice in your fabric-covered airplane? Be sure to check what you can't identify through the existing inspection covers by taking a suction cup and pulling on fabric panels to make sure they are all still attached.



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CLEANING YOUR AIRCRAFT

Did I talk you into it? If so, here are some tips and tricks for cleaning your aircraft.

- **Clean as soon as you get back from a flight**

Why? It's easier to get the bugs and grit off the surfaces right away. If you wait, not only is it harder to get the contaminants off, but also you'll be less likely to do it.

- **Use the right methods and materials**

It's a lot easier to ruin aircraft surfaces than it is automotive surfaces. Cars and trucks have tempered glass that is tougher to scratch than acrylics, but they are heavy. The acrylic windows in aircraft are tougher and harder to crack than the windows in automobiles, and much lighter, but they are sensitive to abrasion (see sidebar).

- **The trouble with covers**

If you hangar your aircraft, a cover designed to fit your airplane with a protective inner coating can keep contaminants off. However, even good covers can produce scratching on windows. If you keep your aircraft outside, the benefit a cover provides will outweigh the somewhat accelerated wear on the windows.

- **Consider critters**

Whether your airplane is inside or out, critters will try to take up residence. If you're flying often, it's less likely but still something to check. Mice love getting into fabric-covered craft and silently chew through lacing, which causes structural damage (see sidebar).

- **Get organized in the cockpit**

The next time you fly, look around inside. Would anything go flying in turbulence? Do you have to reach for anything you need? Is there anything blocking controls or sightlines to gauges? Think of ways to improve how the interior is organized so you're not distracted during flight.

DO'S AND DON'TS FOR CLEANING YOUR AIRCRAFT

| ✓ DO | ✗ DON'T |
|--|--|
| ✓ Check the pilot's operating handbook for advice on cleaning. | ✗ Grab the first cleaner handy. It could damage aircraft surfaces. |
| ✓ Tape areas like the pitot tube, static port, and other areas where you don't want washing fluids. | ✗ Pressure clean an aircraft unless the manufacturer recommends it. Follow directions exactly. |
| ✓ Find out what the aircraft manufacturer and the coatings (paint) manufacturer say about cleaning techniques and products to use. | ✗ Pressure wash the engine like you do with cars and trucks unless the manufacturer says it's okay. Follow the directions exactly. |
| ✓ Use water to flush dirt and debris from surfaces. | ✗ Use high hand pressure to scrub acrylic. Even with a wet clean cloth, it can produce scratches. |
| ✓ Use waxes and fillers that are specifically designed for what you are cleaning and polishing. | ✗ Wipe dry surfaces, especially plastics. It will introduce scratches. |
| ✓ Use only clean, premium microfiber or lint-free cotton cloths to clean acrylics and paint. | ✗ Use paper towels on acrylic (Plexiglas), Lexan, or paint. It will introduce scratches. |
| ✓ Inspect all leading edges, particularly the propeller, for debris and corrosion. | ✗ Use gasoline, alcohol, acetone, MEK, lacquer thinner, or ammonia-based glass cleaners on acrylics, and check before using them on paint or other metal components. |
| ✓ Use a clean, soft bristle brush for metal and paint areas. A pressurized garden tank sprayer is helpful (not the same as a pressure washer). | ✗ Leave the airplane in the sun without drying off all of the wet areas, or you could add streaks and spots that are difficult to remove. |

- **Look for and address corrosion**

Corrosion can hide in corners and be covered by dirt. Inspect leading edges and the propeller carefully. If you live in a coastal area, this is especially important because of the salt air.

As thorough as you may be on your preflights, the attention given to cleaning produces a more detailed focus that can help you identify items that you normally would overlook.

Have you hand-washed your car or truck only to find a dent or scratch you hadn't noticed before? This is a great reason to clean your airplane. As thorough as you may be on your preflights, the attention given to cleaning produces a more detailed focus that can help you identify items that you normally would overlook. Besides having your friends and family ooh and ahh over your aircraft, you'll be confident that your aircraft is clean, organized, and airworthy. *EAA*

Lisa Turner, EAA Lifetime 509911, is a manufacturing engineer, A&P, technical counselor, flight advisor, and former DAR. She built and flew a Pulsar XP and Kolb Mark III, and is researching her next homebuilt 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 <https://DreamTakeFlight.com>.



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Engine Out by the Numbers

Practice leads to preparedness

BY CHARLIE PRECOURT AND CHRIS GLAESER

LAST MONTH, I DISCUSSED some good techniques for “when the engine goes quiet,” and I want to continue the discussion regarding some additional tests that you can accomplish with your own aircraft. Chris Glaeser, a test pilot colleague and volunteer on our safety committee, provided some thoughts from his experience flying U.S. Air Force F-16s. Over to you, Chris.

FROM CHRIS GLAESER

According to industry safety expert Ron Wanttaja, EAA 275698, a study of nearly 450 experimental amateur-built (E-AB) engine failure accidents between 2008 and 2018 showed that 42 percent occurred during takeoff or initial climb, 43 percent were en route, and 12 percent happened in the traffic pattern.

Before takeoff, I like to review four things:

- Abort criteria.
- Where I'll land following an engine failure below 500 feet.
- Planned actions for engine issues above 500 feet.
- Immediate actions for a thrust loss.

I always compute my takeoff distance at maximum gross weight, then add about 30 percent more distance to determine an abort point and make sure I have plenty of runway remaining for the abort. If I haven't lifted off before that point, the takeoff is aborted. The *EAA Flight Test Manual* flight test card 10 discusses how to test for takeoff performance. Many of the E-AB accidents in Ron's database are partial power failures, and a failure to be airborne when expected is all you need to know to abort.

Once power is set, I target specific parameters to verify if the engine and propeller combination are performing properly. These parameters can be rpm, manifold pressure, and both fuel flow and fuel pressure. All it takes is a targeted look at those parameters in the initial part of the takeoff roll. If your avionics are programmable, the airplane will provide a caution or warning if you set the limits of these key parameters and will alert you if a parameter is out of limits subsequent to your targeted look.

Once airborne, I maintain runway heading, which results in the aircraft drifting with the crosswind. This will reduce the turn radius necessary for an emergency 180 back to the runway, and any turn

Any delay in lowering the nose following a loss of power on takeoff will result in a very slow airspeed.

following engine failure should be made into the wind. Maintain V_Y (best rate of climb speed) to maximize your climb rate, while reducing your distance from the runway. Below 300 feet AGL, an emergency landing should be made with only 15-30 degrees of heading change maximum. This heading change can be increased at altitudes above 300 feet AGL. I always turn crosswind at 400 feet in the traffic pattern to minimize my distance from the runway. By 500 feet on crosswind, I am pretty much assured of being able to accomplish a downwind landing, having already achieved a 90-degree heading change. Don't forget to preplan for the use of crosswind runways, if one is available.

If your engine fails during initial climb, your “first responsibility is to maintain flying speed. The pilot must immediately lower the nose to achieve the proper pitch attitude necessary to maintain the appropriate approach airspeed. Make the initial turn into the wind.” That quote is directly stated in the FAA's *Glider Flying Handbook* to help pilots in the event the towrope breaks during the initial part of the climb. It stresses an immediate nose-down move to maintain adequate airspeed.

Here is a test you should do to understand how your particular airplane performs in a similar event. For safety, do this test at or above 3,000 feet AGL:

- Stabilize at V_y at takeoff power and take-off configuration.
- Note the pitch attitude (it will be a few degrees higher during actual takeoffs).
- Retard the power over 3-4 seconds, simulating an engine failure.
- Immediately lower the nose to achieve V_G (best glide speed) and record the necessary pitch attitude.

A typical takeoff attitude is around 6-9 degrees nose up for a C-172, and a typical glide attitude is approximately 2 degrees nose down. Note that V_y in a C-172 is approximately 72 knots, while V_G is approximately 68 knots. Any delay in

lowering the nose following a loss of power on takeoff will result in a very slow airspeed. Note the difference between the climb pitch attitude and the required pitch attitude for best glide is at least 8 degrees nose down. This critical maneuver is rarely practiced.

Repeat this test at or above 3,000 feet AGL with one change: delay your initial pitch-down movement for 3-4 seconds, simulating the shock of an unexpected engine failure and a delayed response. Be sure to prepare for and avoid a stall. Be certain to note how fast the aircraft decelerates.

Now lower the nose to achieve V_G and record the necessary pitch change. It will need to be significantly lower than the pitch attitude in the first test. You will likely be shocked at how low the nose must be to accelerate back to V_G . It's so low that it is very likely that many pilots are unwilling to drop the nose enough during a real low-altitude engine failure. A

lack of practice (at altitude) of this maneuver is quite likely a major factor in many loss-of-control accidents associated with takeoff engine failures.

Bottom line: If you have a loss of engine power on takeoff, your first move *must be to lower the nose* to maintain V_G , then turn as appropriate for your altitude.

Noting that nearly half of engine failures occur during en route operations, always keep a suitable emergency airport in mind. Use the "nearest" function of your GPS and make sure the nearest airport(s) are always visible on the screen. Applications such as ForeFlight now have predicted glide information available that can be visually depicted on top of the moving map. Note that during an en route engine failure event, your tailwind glide range is substantially greater than gliding into a headwind, so your best solution might be an immediate turn to take advantage of the tailwind, especially with high winds at altitude.



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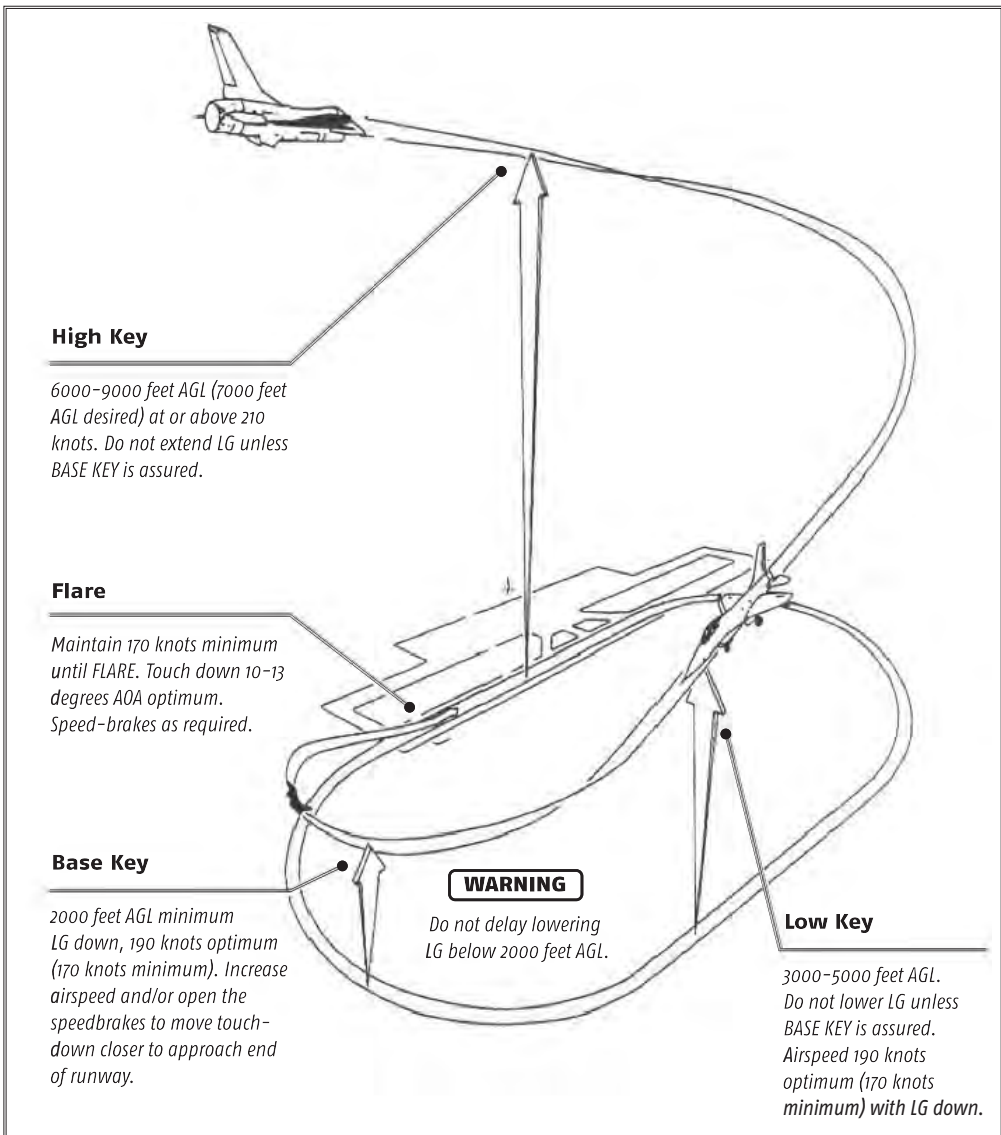




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FLAMEOUT LANDING PATTERN



When I was a U.S. Air Force F-16 test pilot, we were required to routinely demonstrate proficiency in flameout landings. In addition, we always practiced simulated flameout landings at the beginning of test flights that were engine test flights or loss of control (high AOA) test flights because risk of an engine flameout was more likely. Many engine test flights involved an intentional engine shutdown for relight tests. On one occasion, I needed to perform an actual flameout approach after multiple unsuccessful restart attempts.

Note that there are three notes in this F-16 diagram regarding a minimum speed of 170 knots (slightly above V_C). V_C was considered an absolute minimum speed at all times.

I personally fly V_C plus 10 knots during all engine-out approaches in my RV-7A to keep a little bit of energy “in the bank.” Going below V_C at any time is a really, really bad idea because regaining V_C will require you to lower the nose significantly. If you are short of the runway on final and below V_C , you have zero options for stretching your glide, while V_C plus 10 knots allows you to extend your glide slightly. In strong winds, it’s difficult to judge the winds accurately going from a tailwind at “low key” to a headwind on final, and I therefore like to aim a little long and fly a little fast until I can accurately judge the final glide angle.

You should perform glide tests at altitude to determine your altitude loss in a 360-degree

turn (“high key”), and a 180-degree turn “low key” using the EAA FTM flight test card eight. Knowing your own aircraft’s performance is essential in intercepting this flameout landing pattern. Charlie’s aircraft lost 925 feet in a power-off 360 in a 30-degree bank turn and 825 feet in a 45-degree turn. You should be comfortable in this maneuver in any case as the Airman Certification Standards requires an emergency descent between 30-45 degrees of bank. To achieve a final approach rollout altitude of 300 feet, Charlie could use a high key of 1,200 feet, low key of 800 feet, and “base key” of 500 feet (all based on a 30-degree bank). You might need an extra 360 turn if you arrive at high key with too much altitude, or you may need to otherwise modify the pattern to lose energy. In any case, it’s better to widen the downwind, S-turn, or sideslip than to extend final beyond your normal pattern. Practicing a flameout pattern from pattern altitude (1,000 feet AGL) works well if abeam the numbers and using this point as your low key. Charlie also suggested aiming one-third down the runway to provide a pad for stronger-than-expected headwinds or errors in your approach. Perform S-turns or slips on final to bleed excess energy, but don’t extend flaps until you are certain you have the runway made.

Also note that F-16 pilots do not extend the landing gear until they have intercepted the flameout pattern (unless they are below 2,000 feet). If you have an aircraft with retractable gear, it’s good to know how the gear affects your descent rate and how long it takes to fully extend and then take both into consideration. Redo FTM flight test card eight with the gear up and the gear down (honoring maximum gear speeds) to see how this affects your descent rate.

After you’ve completed these tests, put an engine failure overhead diagram in your pilot’s operating handbook, and make a habit of practicing these approaches from different setups such as high key, low key, or longer range during cruise flight.

Fly safe! EAA

Charlie Precourt, EAA 150237, is a former NASA chief astronaut, space shuttle commander, and Air Force test pilot. He built a VariEze, owns a Piper JetPROP, and is a member of the EAA board of directors.

Chris Glaeser, EAA Lifetime 552070, is a former United States Air Force F-16 test pilot, has over 500 glider flights, and is a member of the EAA board of directors’ safety committee. He is also a flight advisor for EAA Chapter 878 in Maple Lake, Minnesota, and owns an RV-7A.

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Homebuilding Benefits

Hint – you'll end up with a lot more than just an airplane

BY LAURAN PAINE JR.

BUILDING AN AIRPLANE IS a life-changing experience. Okay, that may be a bit of an overstatement. But for many, it *is* an experience of significant proportions. How's that?

Where am I going with this? Reflecting, I had a 20-year experience with both building and flying my RV-8. Here's the deal: I had been flying professionally for 30 years before I stumbled upon experimental aviation. I guess I was just too busy making a living to raise my head to see what else was out there. I'd owned a couple of store-bought airplanes – a Champ and a Stearman. And, as I did in the military and the airlines, I dutifully learned all their particular systems and procedures. Pilot stuff!

But here's what I didn't know that I didn't know: how airplanes are engineered and put together. Oh, I had cursory knowledge but not practical knowledge. When you build an airplane you really get to know the mechanical stuff because you *built* the mechanical stuff. That, as it turns out, is “an experience of significant proportions.”

It's like this: If I had an electrical problem with my experimental, I could more easily figure it out because I knew every wire, its gauge, solenoid, relay, and connection in the airplane. I put them there! I could trace the whole thing in my mind. (Okay, many of you will remember the intermittent tachometer that drove me daft for a while. But, we did finally get it fixed by using shielded wire!) Ditto the hydraulics. And the fuel system. And the instruments. Which, I suppose, is why builders can do their own condition inspections. They know every nut and bolt in their airplane. All of that is rewarding and satisfying.



When I say I stumbled onto experimental aviation, it's true. One day, my son showed me a small ad in a magazine about a neat little airplane called an RV-8. It was offered by a company called Van's Aircraft, and it was just up the road from us in North Plains, Oregon. With not much else on the schedule that day, we drove there not really knowing what to expect. The business was in a big old barn-type building. We walked in, and there were airplane parts everywhere. It smelled like an airplane place. Know what I mean? The people were friendly, like airplane friendly, honest, upfront, and fun. What's not to like about all that?

Learning by doing is a motivating process.

After a couple of hours of touring and talking, I'm beginning to think, "Well, for cryin' out loud, this is doable." Never mind that I knew nothing of the processes involved. Perhaps it helped that I grew up on a ranch and had to do hands-on mechanical stuff all the time. Not fancy mechanical stuff, just had to be done stuff. Like, when my bicycle chain broke, I fixed it. When the tractor broke, we fixed it. No money or time to have someone else do it. I barely knew a rivet from a rabbit, and I certainly knew nothing of torque. On the ranch, we tightened the nut with a big wrench until "you couldn't tighten it no more." So, I wasn't particularly knowledgeable, but I wasn't really afraid either.

Next thing I know, my son and I are driving down the road with a tail kit rattling around in the back seat. I was motivated by the fact that you buy the airplane in segments. Buy one kit and work on it, buy the next kit when you're

ready, and, before you know it, you have a paid-for airplane. After we got the parts home, I spread them out and thought, "What now?" I just dove in. I pieced together some scrap aluminum and began practice riveting. Boy, I mashed some doozies on that scrap. (I still have it.) I didn't attend any build classes. I know they're great, but none were convenient for me to attend at the time. I read Van's instructions, which were quite thorough and good. With no previous airplane-building experience, I did not stray from them. If Van said, "Do it this way," that's how I did it. All the while, learning was taking place. Sure, you rivet with a rivet gun and a bucking bar or a rivet squeezer — pretty straightforward — but you learn that a good rivet has a lot to do with gun pressure and a sense of timing. It's a rhythm. And with the squeezer, it's important to have the gap set just right for the rivet you're squeezing. Learning by doing is a motivating process.



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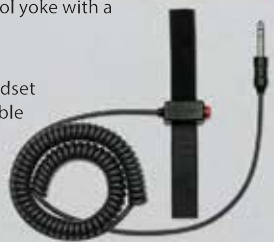
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LAURAN PAINE JR.



Knee-deep in projects ... that's a good thing!

BOAT

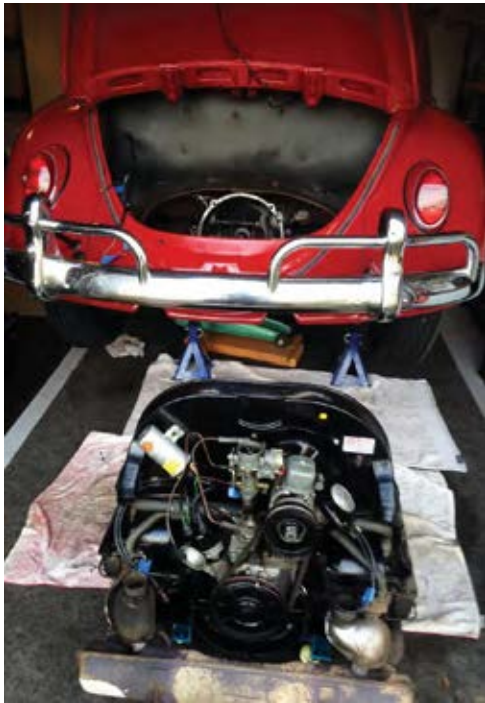
I pressed forward to bulkheads and ribs and spars and fuselage parts and fuel tanks and landing gear and canopy and engine hanging. The key for me was to go slow and think about it three times before doing it once. One airport bum said to me, "You do good work, but I dang sure wouldn't pay you by the hour." Then it was on to epoxy and fiberglass. That was a little bit yucky.

Finally, after six or so years of building, I flew what I had built. While taxiing out, I was gazing at all the assemblies I had done, but once I pulled out on the runway and put the power to it, it became a project no more. It became an airplane. And here's one of the results of all that: It gave me a feeling of confidence that, if I could successfully build an airplane, I could do a whole lot of other things I had not previously thought of doing. That's the point of this column: Once you learn new skills and gain confidence, the world is your oyster. You develop a thirst for projects and accomplishments. In my book, that's a good thing. We're all different, so perhaps it helps that I'm wired such that I can't just

It gave me a feeling of confidence that, if I could successfully build an airplane, I could do a whole lot of other things I had not previously thought of doing.

sit. I have to be doing something. I'm not a cruise ship type of guy — not that there's anything wrong with that — and I don't have to see the Alps or the pyramids. I'm happiest when I'm knee-deep in a project. That's just me. Truth be told, I've met a bunch of you who are the same way. The majority, it seems, are airplane builders. (Perhaps it's the company I keep!) Many are serial airplane builders. I get that.

So, I'm now building an RV-7 with my son and grandsons. It's a shared experience that I really enjoy, but the process is slower. My son works, and the boys are busy with school. They get to building stuff when



Volkswagen project with engine out.

VEHICLE

they can. That is okay because it's not about a timeline, it's about the project.

Meanwhile, I've taken on some other projects that I probably would not have attempted before airplane building. I restored one of the first tractors we had on the ranch, a 1953 Ford. I love the rugged simplicity of the old stuff. My first car was a 1959 Volkswagen Beetle, so when I found a '64 Beetle that was stored in a barn for 19 years, I bought it and restored it. I even took the engine out and installed a new clutch and oil cooler. I did it the same way I did the airplane: slowly and methodically. And I properly torqued the nuts! Now I've taken on a whole new (to me) concept. I'm building a wooden boat. I didn't want a store-bought boat, I wanted a boat I could build with my own hands. Amazingly to me, the kit came with CNC machine-cut marine-grade plywood. It reminded me of the CNC parts that were in the RV-8 kit. Initially,

you wire the parts together with — get this — safety wire. They didn't suggest it, but I used my aircraft safety wire pliers. Bingo! Then you epoxy the parts together. And then you fiberglass the whole dang outside of the boat. That used to be "yuck," remember? Now, not so much. I'm figuring it out. The key is the proper "wetting" of the fiberglass.

I've visited several hangars across this great land over the years and, hey, almost all of them have other types of projects in them. Especially at the more rural airports. Aviation is a passion all its own, but it's a passion that lends itself to all manner of other endeavors.

Build an airplane. The benefits will stay with you for life. **EAA**

Lauran Paine Jr., EAA 582274, is a retired military pilot and retired airline pilot. He built an RV-8 and has owned a Stearman and a Champ. Learn more about Lauran at his website, www.ThunderBumper.com.

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ROBERT N. ROSSIER

COMMENTARY / STICK AND RUDDER

Seeking Subtle Signs of Trouble

There's more to taxiing than just going slowly

BY ROBERT N. ROSSIER

WE DON'T TYPICALLY THINK of taxiing as a critical phase of flight. We mosey along at slow speed while keeping the nose wheel or tail wheel on the yellow line, watching for signs and obeying the markings. Simple, right? It's a Sunday stroll in the park. But the truth is there's a lot going on during taxi and there's a lot the pilot needs to be doing to stay on top of the situation. If we don't get it right, there's a potential for some very real excitement just getting to the runway, or soon after takeoff.

FLIGHT CONTROL POSITION

Especially on a windy spring day, it's important to be aware of the relative wind while taxiing and make the correct control inputs to avoid an unintended upset. With a strong enough wind, we could find ourselves in trouble before we even get to the taxiway. One day a good many years ago, I watched a pilot taxiing in from the runway during particularly windy conditions. As he headed onto the ramp, he had a roaring tailwind that was pushing his tail up and hence his nose down. He clearly recognized the low-nose condition and hauled back on the yoke as hard as he could to pull the nose up. What he wasn't recognizing was that with the wind behind him, he needed to move the yoke in the opposite direction and position the elevator in the down position to stop the wind from lifting the tail. With no radio available to warn the pilot, all we could do was watch. Finally, the wind got the best of him, and the prop ground into the tarmac, sending a blizzard of sparks into the air. It was an expensive mistake — and one that could have been easily avoided had the pilot followed the proper technique.

One way to avoid this problem is to first set the heading bug to the wind direction to help keep track of it while taxiing. To recall the proper elevator and aileron position, remember to fly up and into the wind if it's in front of us (yoke back, ailerons into the wind) or down and out of the wind (yoke forward, ailerons out of the wind) when the wind is behind us.

WATCHING THE INSTRUMENTS

Another important task to manage is checking your flight instruments to see that they are working correctly. While they might all appear to be fine when the aircraft is stationary, we need to see what happens when we're moving, particularly during a turn on the ground. The practice of checking the flight instruments during taxi, which takes just a second or two, can help to identify some problems that could present serious challenges once in the air.

As we make a turn, we need to watch for a few important things to happen. First, the turn indicator should indicate a turn in the proper direction with the ball swinging to the outside of the turn. Since the turn indicator is typically an electrically operated gyro, we can check for a flag indicating a power problem. If that's the case, we'll want to stop and then check that the circuit breaker powering the turn indicator is properly set.





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The directional gyro (DG) should also indicate a turn in the proper direction as we turn the aircraft, but don't forget to look at the compass to see that it is swinging freely. If the DG isn't responding correctly, double-check that the vacuum system is working properly, providing adequate vacuum to drive the DG. Either way, we should have the problem checked out before flight. If the magnetic compass isn't working, it is likely because of a fluid leak, which we might otherwise note by a kerosene odor in the cockpit.

During all turns on the ground, the attitude indicator should remain steady, upright, and unmoving, indicating a wings-level attitude. If it is moving unnaturally, or indicating something other than a wings-level condition, then we have a problem. Since it too is typically gyro-driven, we should again double-check the vacuum indicator to see that it is indicating proper vacuum.

Even for a planned VFR flight, having all the flight instruments in proper working order can be essential. While we might do fine in clear skies with less than a full panel, the situation can change unexpectedly should haze develop, visibility drop, or night fall. Instrument-rated pilots aren't immune, either. Just a quick dash through a cloud deck to get up or down can be challenging if the instruments are amiss. A partial panel flight in IFR conditions can be an overwhelming challenge.

BRAKE CHECK

Although we should have already tested the brakes when we started the engine, it's a good idea to do another brake check once we're moving to verify their dynamic operation. Do they pull equally, or is one softer than the other? Do they drag? Does either feel spongy? While we might get away with taxiing with less than perfect brakes, the problems could come when we're attempting to land at the end of our flight. The time to find the problem is now before we launch into the bright blue beyond.

DEVELOPING SITUATIONAL AWARENESS

One of the first things most of us like to do after engine start is put on our headsets and listen. It's never too early to

hear what's going on and start creating a mental picture of the environment on and near the airport. One of the first things we want to do is check the weather conditions (automatic terminal information service, automated surface observing system, etc.), but at nontowered airports, we also want to listen in on the common traffic advisory frequency as soon as possible. Among the things we want to know: Who is taxiing where? Which runway(s) are in use? Is there any vehicle movement? Where is the traffic in the pattern? Are there any reports of runway problems (wildlife, birds, debris, ice, snow, etc.)? More than a few times, I've heard pilots reporting takeoffs or landings on cross runways and have been able to avoid conflicts that could otherwise have been disastrous.

AVOIDING DISTRACTIONS

Perhaps one of the biggest dangers during taxi is getting caught up in distractions, and it's easier than we might think for that to happen. Casual chitchat with passengers can easily take your mind off what we should be doing, causing us to deviate from our normal taxi routine and miss important communication and other safety-related clues.

But it's not just passengers who can distract us. Another way we get off track is to start setting up our navigation equipment while on the move — programming our GPS, inputting a flight plan, or completing other tasks that pull our eyes into the cockpit or divert our attention. As with texting while driving, tending to such cockpit duties while in motion can put us at significant risk.

While it seems like taxiing an aircraft to or from the runway might be the least worrisome phase of any flight, any undetected problems can sneak up on us unexpectedly and put us in a compromised or even downright dangerous position. But if we develop the proper habits and pay attention to procedure and protocol during taxi, we can add a whole new level of safety to our flying. *EAA*

Robert N. Rossier, EAA 472091, has been flying for more than 30 years and has worked as a flight instructor, commercial pilot, chief pilot, and FAA flight check airman.



THE WILLS FAMILY'S
ADOPTED MEMBER



BY BUDD DAVISSON

A large, stylized logo for 'Bo'. The letters 'B' and 'o' are in a gold, serif font with a dark blue outline. Inside the 'o', the word 'Boonza' is written in a dark blue, cursive script. The background features a dark blue and gold curved graphic on the left and top.

WHEN DOES AN AIRPLANE

cease being just a machine and become a valued member of the family that will remain for as long as family members are still flying? Ask Robbie Wills, EAA 1199240, of Conway, Arkansas, about their housemate *Bo*.



Left: Robbie Wills discovered airplanes while using them to cover his state as a politician. Then he left politics behind and threw himself into restoring his Bonanza.

“I don’t think anyone in our family can imagine not having *Bo* around,” Robbie, 52, said.

When an airplane is an obvious part of a family, it is easy, and most often correct, to assume that the pilot’s background conforms to the rubber stamp biography of most GA pilots. As a child, the future pilot is running outdoors to look at every airplane as it flies over. Soon there are model airplanes everywhere in the bedroom. Then he or she solos at 16, gets his or her private at 17, and finally buys his or her first airplane just out of high school, college, or just after returning from the service. With few exceptions, that’s the funnel through which most of us find ourselves directed to places like EAA AirVenture Oshkosh. However, Robbie is an entirely different breed of aerial cat. He didn’t start flying until well into adulthood. Although, in various subtle ways, the interest was always there.

“Both of my parents were teachers,” he said. “Dad a history teacher and Mom a science specialist. The closest I came to family aviation was my granddad who was going through U.S. Army Air Forces’ flight training at the end of World War II. The war ended before he could be deployed overseas, but he had gone through enough of the training phases that it never left his mind. He talked about it constantly and would sometimes take me to air shows.”

Robbie went to college for mass communications, including advertising and publishing, but he was drawn to law school. That’s where he got the bug to get into politics.

“That may have been because my dad taught civics as well as history,” he said. “Both he and Mom hammered the way government works and citizenship into us kids. So, in one way or another, politics had always been part of my upbringing, but I didn’t know it. Then I was standing in line to vote in 1996 and a very clear thought formed in my head. It said, ‘Hey, I think I’d like to try this.’”

Two years later, he was on the ballot running for the state legislature.

“I lost my first race,” Robbie said. “But in 2000, I ran for county commissioner and won. Then, in 2004, I won my first election for the legislature where I served three terms.”

In his final term, Robbie served as speaker of the house in 2009-2010.



His taste for politics faded, but his interest in helping to shape policies stayed with him. Aviation weaseled its way in at the same time.

“I now consider myself a ‘recovering politician,’ which is a process in itself,” he said. “And nowadays, as a lawyer and lobbyist, I work with a lot of legislators assisting them in various ways,” he said. “Here, I can affect policy while avoiding all the politics and the BS associated with them.”

However, Robbie said it was through the political process that he discovered flying and the way in which general aviation can be of use to lots of professions and small businesses.

“I can’t honestly say why it took me so long to get into flying, but when it happened, it was definitely because I’d tag along with several different legislator friends who used their own airplanes to cover the state,” he said. “Also, I had gotten a better understanding of the way general aviation worked when I was involved by our local leaders in the planning of a new airport for Conway. While flying around the state with others, I began to feel the pure joy of flying. Then, one day, a state representative who has a Bonanza gave me the phone number of a local CFI. Things clicked, and two and a half months later, I passed my private pilot checkride.”

It seems as if things repeatedly just fall into place for Robbie. First, it was fellow legislators and their airplanes. Then it was being turned on to a local CFI. Then, it was a fellow attorney losing his medical and deciding Robbie was the right guy to buy his C-182.

“I had clients all over the state, and the 182 worked well,” he said. “I flew it 250 hours and got my instrument rating in it, but it didn’t have an autopilot, which my CFII stressed that I needed. He said, if I was going to fly IFR solo, I needed the autopilot. Period. I hated to sell the airplane, but obviously, I needed something that was more capable.”

Then something else fell into place as if it was ordained that it happen.

“Almost as soon as I started looking for another airplane, I spotted a 1969 E33A Bonanza in *Trade-A-Plane* that wasn’t even 35 minutes by air from where I lived.”

Naturally, he went over to take a look, and it turned out to be a good airplane. It had a fairly fresh paint job, and the panel had been redone only a few years earlier, including a Garmin G500 and an S-Tec 55X autopilot.

“It was built at the very end of the E33A run,” Robbie said. “The fourth from the last, to be exact. The E33A was the first of the straight tails to carry the legendary name ‘Bonanza,’ and it had a 285-hp IO-520 up front. Prior to that, they were called Debonairs.”

He bought the airplane and joked that for the entire flight home, he was rehearsing what he was going to tell his wife, Dana.

“She’s a CPA and has a strict one-airplane-at-a-time rule – and I hadn’t sold the 182 yet,” he said. “However, she was fine, and the 182 went to a new owner almost immediately.”

Robbie and Dana’s two daughters dubbed N2939A *Bo the Bonanza* (the feminine Bo, as in Bo Derek). He has flown it for a few years, overhauling the engine and making other improvements along the way.

“The only thing really wrong with the airplane was its interior,” he said. “It was not only getting worn, but when you got in the airplane, it didn’t smell like an airplane. It smelled like a hot asphalt driveway – slightly oily and smelly. That was because of the sealant the factory had used inside the fuselage. That is a common comment about lots of Bonanzas of a certain age.”

Below: The “Bo” in Bo the Bonanza is the feminine “Bo” as in Bo Derek.



One of the better parts of owning a Bonanza is that the American Bonanza Society (ABS) is extremely strong in all areas of ownership. If an owner has a question, ABS has plenty of folks who not only know the answer but also can often help solve sticky problems. In this case, very sticky problems.

“When a lot of Bonanzas came out of the factory, the inside of the entire fuselage was sprayed with a petroleum-based corrosion preventative,” he said. “It was a thick gunk that had a surface not unlike a pickup truck bedliner or undercoating. It was basically aerial tar, and removing it to install a new interior is a nasty, messy job. It’s one of those kinds of things everyone should do at least once to remind themselves why they’ll never do it again. There’s a very good reason why having this kind of work done professionally is expensive.”

The two things that are almost always jobbed out by individuals who are upgrading their airplanes are the paint job and the interior. Those are seldom done personally. It is also seldom that an attorney is visualized as getting extremely dirty doing his own interior work.



Left: The 1969 E33A was the first straight tail in the breed to carry the name "Bonanza." Prior to that, they were "Debonairs."

“One of the reasons I did the entire interior myself is that I’ve always been a DIY type of guy,” he said. “I figure, why hire someone to do what I can do myself? Besides, I like doing stuff with my hands. I like looking back after a day’s work and seeing a concrete difference in something. Politics is often a gossamer subject, but there’s nothing gossamer about the stuff in the belly of a Bonanza fuselage.”

Throughout the process, Robbie said he wore out more than 20 plastic scrapers, a case of air mask filters, a pair of coveralls, and more rubber gloves than he can count.

“First, you have to take every single bit of everything out of the fuselage,” he said. “This includes all of the upholstery, the carpet, seats, and, where possible, bundle and protect the wiring. Then you brush on the



“The existing insulation was a semi-rigid foam and was a real jigsaw puzzle,” he said. “So, before I pulled it out, I numbered each piece, shot photos of it with my phone, and carefully laid it out on the hangar floor in place as each piece came out of the airplane. Then I got big sheets of aircraft-approved foil-faced foam and used the existing pieces for patterns.”

Once those were ready to go back in, Robbie tackled the interior upholstery — starting with the side panels.

“The side panels were something of an archeological dig because they had been re-covered at least twice before, and I could peel back each layer and see how it used to look,” he said. “Some of it was pretty ugly. I was going to use leather and fabric, but, of course, it all had to be aircraft certified so I had to jump through hoops to get that treatment done. I was working with complete animal hides, so I needed a good-sized workbench to accommodate that kind of work. The hides went on over aluminum panels, and I was brushing contact cement on, which really smelled and presented a possible fire danger, so I was careful while doing that. A couple of fire bottles and a strong fan were required equipment.”

Below: Besides being an adopted member of the family, “Bo” is a major part of Robbie’s business. He uses it constantly.

stripper, which is really scary stuff, and let it soften the sealer. You have to get every bit of the stripper and sealer out. Working around the rivets, such as in the corners where stringers hit the skin, requires more than a little patience. Then, you get in there with steel wool and rub, rub, and then rub some more. When that’s all done, you shoot zinc chromate primer over everything. Even then it takes a while for the ‘oil well’ smell to go away. It’s when you’re in the act of shooting the primer and everything suddenly takes on a uniform, clean look that you know you’ve really accomplished something. After a long, grubby process, it’s instantaneous visual progress.”

Robbie noted that all of this is being done inside a small area that traps all the vapors and isn’t easy to ventilate. This was especially challenging since Robbie is more than 6 feet tall.

“I felt as if I was trying to clean a big sewer pipe on my knees with a toothbrush,” he said.

The interior of most aluminum fuselages has some sort of insulating and sound-deadening foam affixed to the inside of the skin that is exactly cut to fit between the structural members and systems.



Right: At 51 years of age, Bo is definitely a vintage airplane, but Robbie brought it up to 2020 standards when rebuilding the panel.

Upholstering seats, even if using pre-stitched kits, can be something of a challenge because they have to fit just right to look good. Plus, after 50 years of use, some of the interior structure needed repair.

“One of the driving reasons I did the seats myself was just to see if I could do it,” he said. “I wanted to take on the challenge. I talked to the folks at Airtex, and they were not only incredibly helpful but convinced me I could do it myself. I reasoned that other folks had done it so surely I could, too. Airtex had seat upholstery kits that were designed specifically for my airplane. Unfortunately, when they arrived, there were no instructions. However, there was the universal problem-solver — YouTube.”

Between YouTube and the folks at Airtex, Robbie got it all worked out — but not without a few hitches.

“When I got all the upholstery off, I could see that there were some broken areas in the framing that I had to have welded,” he said. “Also, the reclining assemblies for the back seats were broken and had to be replaced. I replaced all of the webbing and the padding, starting with the back seats first. When all of that was done, I tackled the cream-colored faux leather headliner, which turned out to be easier than I expected because the kit fit almost perfectly.”

Robbie said the best moment of doing the interior was the first time his wife and kids got in the airplane afterward.

“They all agreed that it smelled like a new car instead of an oil well,” he said. “That’s real progress!”

Robbie “freshened up” a few things on the panel, including a new Garmin G5, but he said most of the equipment was still functional.

“However, after the autopilot developed an issue, I pulled it out and sent it back to the factory for repair,” he said. “I think they completely rebuilt it because it came back looking brand new inside and out.”

He also switched to LED nav lights, replaced landing gear door seals, and spent time taking care of little details.

“Even though *Bo* is a family bird, of the 300 hours a year that I fly it, many of which are fairly short flights, at least 75 percent of that is for business,” Robbie said. “I have clients all over the state, which is pretty rural, and *Bo* makes a three-hour drive into a 30-minute flight. As a family, we’ve also taken *Bo* on some epic cross-country trips, as far away as Seattle, Los Angeles, Miami, and Boston. Plus, both the airplane and I are thoroughly IFR capable, so weather seldom stops us. Nor do I have to scud run, which in the mountains around here can be pretty dangerous. I do pick and choose my weather situations carefully, but most of the time we go. I flight plan 165 knots, about 190 mph, and we always get it. At that speed, I’m burning about 14 gph, so I have five hours of range with a solid reserve. So, when I toss the family in the airplane headed for the beach, we have zero problems carrying what we need to go wherever we want to go.”



When asked about the long-term outlook for *Bo*, Robbie is optimistic.

“I know that there will eventually come the time when I can no longer fly her, but that’s quite a way down the road,” he said. “Also, once in a while, I think about what I’m going to do, when, and if, I retire. That’s when I might wind up with a lighter aircraft because I oftentimes visualize myself living out my retirement as a banner tow pilot at the beach. Although my wife has the aforementioned one-airplane rule, I’m certain that if that other airplane were paying for itself, she might let me have it. However, so far, a glitch in my banner towing plans is finding a CFI who can train me and sign me off for doing that. In the meantime, however, *Bo* is staying with us. You don’t turn a friend out into the world.”

Incidentally, it’s worth noting that *Bo* is no kid. However, at 50 years of age, it’s still living a useful life and provides the same

utility as a flying machine that’s much newer and more expensive. We sometimes forget that vintage airplanes can provide much more than just fun and satisfaction. The Wills family will vouch for that.

Isn’t it nice when a family tale has a happy ending? *EAA*

Below: If it looks like a Bonanza, flies like a Bonanza, and sounds like a Bonanza, even Beechcraft finally decided you might as well call it a Bonanza.



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 www.AirBum.com.



LIAISON BARGAIN FLYERS

STORY AND PHOTOGRAPHY
BY JIM BUSH

KEEPING HISTORY ALIVE

THERE ARE A LOT of avenues to warbird ownership. Just pick up any one of the trade papers and magazines or look online at the dozens of websites and you are instantly bombarded by hundreds of airplanes or projects of every shape, size, and color that are for sale. If money were no object, then obtaining that rare fighter would be no big deal. The most difficult decision you would have to make is whether the airplane matches your significant other's eye color.

However, for most of us, that dream is far from reality. Money, or lack thereof, is the No. 1 thing holding us back from our dream of flying a warbird. But is it? Although it's just about impossible to learn how to fly or purchase an airplane with good looks alone, owning a

warbird can still be accomplished with some hard work, a little sweat, some creative ingenuity, and a willingness to learn new things. Many of these are hidden talents buried deep inside all of us. Sound too good to be true?

Surprisingly, no, because as Darrell Kuhn, EAA 326842, said, he experienced all of the above during his journey to the sky.

"As a kid growing up on a farm in northern Wisconsin, our family didn't have a lot of money," he said. "I always dreamed of flying and would look up in envy at the airplanes overhead. I was always under the impression that learning to fly was not only a hard thing to do, but it was very expensive as well. I always figured I would never be able to attain my dream. But that all changed when I answered a simple ad."





RESTORATION ADDICTION — NO KNOWN CURE!

IN 1999, Darrell answered an ad in Nebraska for an Aeronca L-16A project. Although Darrell was unfamiliar with this model, he knew it had tandem seating, sported an 85-hp engine, and was a military version of the Champ. Darrell wasn't even deterred by the seller telling him on the phone that the wings had been stored in a farm shed alongside some cattle, the fuselage had numerous pits in it, and the sheet metal looked like it had been driven over by a truck — now that's honesty!

"Some of the parts were missing, and some that were there were only good for patterns," he said. "But previous experience helped me plan farther ahead."

This helped Darrell keep his costs down, and it also enabled him to enjoy the project more.

"Except for the nose bowl, I ended up making every piece of sheet metal on the airplane along with new interior panels, fairings, window trim, cowlings, engine baffling, and air box," he said. "The nose bowl was in sad shape, so I decided to throw it out — that was until I found out how much a new one cost. I put it back on the shelf, and it stared at me for the next five to six years before I got up enough courage to tackle it. After a couple of days with a welder, a hammer, and a little lightweight filler, it looked pretty good, but not good enough. I summoned the help of a good friend who works at a body shop, and he made it look better than new. Remember, sometimes all you need is a little help — so don't be shy, go ask for it!"

Darrell attacked the fuselage of the L-16A next and found it had "greenhouse" windows at one time during its military career. Although Darrell had no idea how to fasten all those windows around the fuselage, he stumbled into a fellow L-16 owner at EAA AirVenture Oshkosh, and the rest of the pieces fell into place.

"I was lucky to meet this guy at AirVenture because he not only explained the process but he loaned me the original plans and let me make copies of them," Darrell said. "Remember, there is a lot of networking and help offered out there by perfect strangers who all share the common airplane bond and want to see your project take flight. I can see why people removed the glass years ago and covered it with fabric, though. I can install a headliner in an afternoon, but it took me a lot longer to build a greenhouse. I spent considerable time trying to duplicate the bend lines in the aft edge of the top glass. They have sharp bends at the edge to match the fuselage stringer lines, then seem to fade to nothing as they blend into the natural arch of the glass. Needless to say, I spent hours with hardwood blocks and scraps of glass before I achieved the desired look."

As one set of problems was solved, Darrell proceeded with the next one — the wings. Although they were intact, both sides were in bad shape after spending an eternity with a herd of cattle. Darrell made new spars, leading edges, and wingtip bows and repaired or replaced most of the ribs along with adding a wing tank. With everything covered, Darrell took a different approach to the paint scheme.

"I covered the entire airplane with Poly Fiber and finished the fabric with Poly-Tone," he said. "I chose to use Aero-Thane on the metal because it gives it a softer tone. I had been told by fellow L-16 restorers that the original metal color did not match the fabric at the factory, and so I tried very hard to get the right 'unmatched' look. I also wanted to duplicate the factory colors and markings, and I recall it took four full days and a 'mile' of free line tape to make the insignias on the fuselage alone. I must have got it right because when someone asks me where I got the decals from, I consider it a compliment."

Darrell's L-16 finally took to the Wisconsin sky in 2007, eight years after it was rescued from a Nebraska barn. To most people, it might seem like a long time to spend on one project, but you have to understand that Darrell is not like most people. And if you think Darrell was done, well, I guess you don't know him very well because as a restorer he was not satisfied to remain idle for long. Darrell bought an Aeronca L-3 Defender project.

GRASSHOPPER GURU

DARRELL HAD WATCHED this particular L-3 for many years. He knew the family that owned it. They flew it for a while until the fabric got really bad on it. The fellow had always intended to restore it himself. But, you know the old saying about the best-laid plans — sometimes life just gets in the way.

“When it came up for sale, two things prompted me to buy it,” Darrell said. “It was close by, and I was looking for another project.”

When Darrell bought the L-3, it was in pieces. The owner couldn’t afford to have it rebuilt and put all the pieces in his garage. Eventually, the Aeronca was sold to a neighbor who intended to rebuild it. But his health went bad before he could do it.

“I knew it was there all the time,” Darrell said. “I had just finished the L-16, when this fellow’s son called me and asked, ‘Are you still interested in that Aeronca?’ It kind of fell into my lap at that time. The major airframe pieces were mostly all there — but no engine.”

For some reason, Darrell was smitten with Aeroncas, especially the warbird ones. When he first bought the L-16, he really didn’t know anything about it and had no particular intention to restore it to original.

“I was just going to make a Champ out of it,” Darrell said. “Then I learned more about the military versions and decided to put it back original, as original as I could. That’s when I started to lean toward the military variants.”

When he bought the L-3, he became even more involved with the history and learning more about the Aeronca factory.

“I got started with Aeroncas purely by accident,” Darrell said. “I grew up poor. As a farm kid, I didn’t have any money, but I wanted to fly. The cheapest thing that I could find to put together, to get in the air, was a ’38 Aeronca Chief. I hauled that home in pieces and put that together, and I flew that. I flew that airplane for 25 years. But through that, I met some Aeronca people, got information about Aeroncas. You tend to gravitate toward what you know because I don’t really know much about Taylorcrafts or Cubs. I’ve been around Aeronca people, but it all started strictly by chance, and some of the great people I’ve met along the way.”

Darrell also discovered that the military versions were worth a little more money when you got it done than the civilian model. Darrell began his next 10-year journey restoring the L-3 back to original.



Liaison cousins. The L-3 (foreground) and the L-16 were Aeronca Aircraft Corp.'s contribution to the military.



Darrell and Candee Kuhn pose in front of their L-3.



DARRELL'S TOP 11 TIPS

RESTORATION ADVICE FOR BEGINNERS

1

Don't be afraid to try something new. The only time you will fail is when you give up before even trying.

2

You can count on making mistakes and do-overs in the beginning, but these will soon be a distant memory when everything starts to click as your project takes the shape of an airplane.

3

Don't be afraid to ask someone for help. Almost everyone in aviation is willing to lend a helping hand to see your project succeed.

4

You could stare at your project all day long in frustration trying to figure out your next move when all you really need is another set of eyes to get you moving again.

5

Make and fit all sheet metal before you cover your airplane to avoid damage to fabric and finish.

6

Don't buy cheap masking tape, unless you like the looks of a cheap paint job.

7

Don't rush yourself or try to hurry your project along. Enjoy the process because the people you will meet and the friends you will make along the way are worth more than the completed airplane itself.

8

Remember that your money is worth more in your engine than it is sitting in your savings account — especially when you are flying over large forests or bodies of water.

9

Fabric work is not difficult. In fact, it is fun if you take your time and enjoy the fruits of your labor. The manuals are easy to read for the beginner, and there are videos and seminars available to help you as well.

10

The thing I have learned the most through my restoration processes is that if you have a desire to rebuild or fix something and get stuck, there are a lot of people who will come to your rescue. They will lend you tools, give you advice, and extend helping hands as long as they can see you want to learn. The airplane world is second to none, and it is a wonderful community full of people who share the same spirit of flight.

11

The biggest piece of advice I can offer to anyone thinking about building or restoring is to make sure that you have a supportive spouse. Otherwise, you are destined to fail.

DEFENDER RENEWED

BUILT BY AERONCA in May 1942, this particular L-3B was given Army Air Forces serial No. 42-36229 and stationed in Pittsburg, Kansas, where it was used to train new cadets. Sometime in late 1943 or early 1944, it was mothballed and put into storage. On March 27, 1945, Verlie W. Hedden of Mankato, Kansas, became the first civilian owner. By the time Darrell acquired the L-3, it had more than 2,675 hours on the airframe.

“The airplane had been civilianized at some point,” Darrell said. “Someone took all the greenhouse glass out and covered the back with fabric. I had to replace all the framework for the glass and build all-new glass. The early ones on the back looked kind of sucked in as it wraps around the fuselage, and they kind of flared that out. So, I kind of pieced together the information that I had, and what I thought looked good.”

“I WAS ALWAYS UNDER THE IMPRESSION THAT LEARNING TO FLY WAS NOT ONLY A HARD THING TO DO, BUT IT WAS VERY EXPENSIVE AS WELL. I ALWAYS FIGURED I WOULD NEVER BE ABLE TO ATTAIN MY DREAM. BUT THAT ALL CHANGED WHEN I ANSWERED A SIMPLE AD.”

— DARRELL KUHN

Although Darrell installed new longerons, he found the rest of the airframe to be in decent shape. Moving to the wings, Darrell started with the right wing because he wanted to put in an auxiliary 8.5-gallon gas tank.

“I thought that was going to be an FAA challenge,” he said. “I actually started with the right wing, and I wanted that hurdle overcome to make sure that I could get that gas tank in along with an 85-hp engine upgrade. It turned out to be a nonissue.”

Darrell made all the pieces for both wings at one time. But he only assembled the right wing first, just because it’s easier to store ribs than a whole wing. He even went so far as to leave all the pieces unassembled for the left wing until he was ready to cover the wings.



Darrell cranks the L-3 around for a “high-speed” photo pass. These types of aircraft were designed for low and slow observation work.

Below: The L-16, which was produced after the L-3, offered a cowled engine compartment and slightly higher horsepower.



“I like to be able to bolt the wings on right after I cover them,” Darrell said. “It’s hard to store wings without dinging them up, so I like to have the rest of the airplane done. Kind of my way of thinking.”

For covering, Darrell chose the Stits Poly Fiber process mainly because it’s all he’s ever used.

“I’m happy with it,” he said. “I know the numbers, I know the products, I know how they work and how they react, and I think I’m just going to stay that way. I think there’s a lot of good covering processes out there now, but it’s kind of like Aeroncas; you learn something, and you tend to lean toward that.”

For a paint scheme, Darrell stayed true to the original looks and went with the standard olive drab and gray underside. However, he had to deviate just a little to get it period correct.

“Actually, Poly Fiber doesn’t make an olive drab that I liked,” he said. “I went through a lot of trouble trying to figure out what color to make it. You can drive yourself nuts with that. I liked Randolph’s olive drab, so the finished look is Randolph color in Poly-Tone. Because my airplane was built in May of 1942, it actually came out of the factory with the old insignia — the round circle with the star, with the red ball in the middle. It stayed that way for about one month, as I understand it. Sometime in June of ’42, the directive from Washington came down to eliminate all

those red balls because of the conflict with Japan and the confusion with the rising sun.”

With the wings and fuselage complete, Darrell began his search for an 85-hp engine to power the Defender.

“Well, I bought another project mainly for the engine,” he said. “It was a C-85-12. I had no intentions of putting a starter on it initially, but I found an STC to put the Sky-Tec starter on it. I had to get a field approval for the 12-volt system for an Odyssey battery and the 12-volt wiring, but that was it. I’ve hand-propped everything I’ve ever owned basically my whole life, so it never really bothered me, but I kind of like pushing the button to start it. That’s kind of nice.”

Darrell selected a McCauley propeller with a 42-inch pitch. He thinks it’s still a little bit flat, but it runs well. Original Shinn brakes hold the Defender in place during run-up, and Darrell replaced the shoes and linings.

AERONCA L-16 AND L-3 COMPARISON SPECS

AERONCA L-3

LENGTH: 21 FEET, 10 INCHES
WINGSPAN: 35 FEET
HEIGHT: 9 FEET, 1 INCH
WING AREA: 169 SQUARE FEET

GROSS WEIGHT: 1,260 POUNDS
EMPTY WEIGHT: 835 POUNDS
SEATS: 2

POWERPLANT MAKE & MODEL:
CONTINENTAL A-65-8 (RESTORED WITH C-85-12)
HORSEPOWER: 65 (RESTORED ENGINE — 85)
CRUISE SPEED: 79 MPH
MAXIMUM SPEED: 87 MPH
RANGE: 220 MILES
SERVICE CEILING: 10,000 FEET
RATE OF CLIMB: 400 FPM
POWER LOADING: 14.8 POUNDS/HP
WING LOADING: 7.5 POUNDS/SQUARE FOOT

AERONCA L-16A

LENGTH: 21 FEET, 6 INCHES
WINGSPAN: 35 FEET
HEIGHT: 7 FEET
WING AREA: 170 SQUARE FEET

GROSS WEIGHT: 1,450 POUNDS
EMPTY WEIGHT: 890 POUNDS
SEATS: 2

POWERPLANT MAKE & MODEL:
CONTINENTAL O-190-1 (C-85)
HORSEPOWER: 85
CRUISE SPEED: 100 MPH
MAXIMUM SPEED: 110 MPH
RANGE: 345 MILES
SERVICE CEILING: 14,500 FEET
RATE OF CLIMB: 800 FPM
POWER LOADING: 17 POUNDS/HP
WING LOADING: 8.5 POUNDS/SQUARE FOOT

“MOST OF THEM ARE VERY AFFORDABLE, EASY TO RESTORE OR MAINTAIN, AND MANY OF THEM MEET THE LSA [LIGHT-SPORT AIRCRAFT] REQUIREMENTS. THAT FACT ALONE MAY HELP YOU REALIZE THAT YOUR DREAM IS NOT ONLY INEXPENSIVE BUT EASILY OBTAINABLE AS WELL. IF YOU WANT TO GET INTO WARBIRDS, IT’S PROBABLY THE CHEAPEST WAY YOU CAN.”

— DARRELL KUHN

“Somebody had glued the linings in, which was pretty common years ago,” he said. “They were originally riveted in. The first replacement, it’s really easy to glue them with epoxy and clamp them in. It’s a real easy fix the first time around, but to get the linings out again someday is not that easy. You basically have to put them in a lathe and get it perfect, and cut the lining out down to the glue and rivet new linings in. The shoes were in bad shape. Fortunately, I could buy everything that I needed yet for the brakes.”

When it came to the interior, Darrell wasn’t happy with the panel. He knew it wasn’t original and didn’t like the fact that you had to put the three main instruments in from the back, which left the blocked frame part of it showing.

“That isn’t so bad, except for the tachometer,” he said. “If you put the instruments in from the back side, the only way to ever remove them is to take the header tank out, which means draining all the gas and removing the header tank because they won’t physically come out the back side of the panel. There’s not room. So, I designed a bezel, an overlay, to hang the big three instruments on the top. You can remove those out the front, and you still don’t have the ugly part of them out. It’s not original. I like it better, and it serves a purpose.”

When it came to the cowling, Darrell referred to it as a mess. He really wanted to make a new one.

Right: Simple and basic was the name of the game with the L-3, and really, what more do you need to enjoy an inexpensive way of flying?



Although difficult to tell, the L-16 was restored 20 years ago by Darrell.



“Unfortunately, I’m still not that talented with the wheel,” he said. “I spent seven weeks welding, grinding, and pounding on the cowling and making part of it. I was able to make the flat pieces and so on, between the cowling and the eyebrows. But the eyebrows were a mess, too. I really was going to throw them away, and I was going to make Cub eyebrows.”

Though Cub eyebrows are relatively simple, Darrell is stubborn.

“I thought, ‘Yeah, I’ll see what I can do with these,’” he said. “I started patching and pounding — and I think they turned out pretty good.”

For the exhaust, Darrell settled on a Cub-style exhaust. He found that it fits, works well, and sounds good, so it satisfied his needs.

Darrell said people asked him two main questions: How many hours did it take, and how much did it cost?

“I don’t know the answer to either one,” he said. “I have all the receipts in a box but never took the time to add them up — maybe someday. As for the time spent, it’s like asking someone how many hours they spent on vacation. I never kept track and just enjoyed the process while I was doing it. Another thing I cannot stress enough to people who are interested in getting their pilot’s license

is to take a long hard look at the abundance of antique/classic/warbird airplanes that are out there in both flying condition or waiting for someone to restore them. Most of them are very

affordable, easy to restore or maintain, and many of them meet the LSA [light-sport aircraft] requirements. That fact alone may help you realize that your dream is not only inexpensive but easily obtainable as well. If you want to get into warbirds, it’s probably the cheapest way you can. It’s for somebody on a budget, which I don’t know anybody that isn’t on a budget in my world, so if you want to get into the warbird circles, it’s probably one of the easiest ways to do it.”

Darrell noted that most of the previous owners of these airplanes have passed away.

“It just kind of makes me think that we don’t really own them,” he said. “We just take care of them for the next generation, and hopefully they’ll appreciate them someday.” *EAA*

Jim Busha, EAA Lifetime 119684, is an avid pilot and long-time contributor to EAA publications. He is Vice President of Publications, Marketing, and Membership and editor of *Warbirds* and *Vintage Airplane* magazines, and the owner of a 1943 Stinson L-5.

Below: Never one to sit still and enjoy his accomplishments, Darrell already has several projects in the pipeline to choose from, including this blue Champ and yellow Chief.



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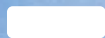


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SMOOTH





SAILING

"I THINK RECORDS ARE cool because it's you against yourself," Paulo Iscold, EAA 589488, said. "It's kind of a way to set some goals and push yourself a little bit."

Paulo's latest creation, the sailplane Nixus, which means "pushing forward" in Latin, certainly pushes the aviation envelope forward. Nixus has a 92-foot wingspan, a 53.3-to-1 aspect ratio, and electric fly-by-wire ailerons and flaps.

Paulo has been designing and building airplanes for more than two decades, first as an engineering student and then with his engineering students. His designs and builds include the CEA-309 Mehari aerobatic airplane (see the May 2010 issue of *Sport Aerobatics* magazine); the CEA-308, which broke four speed records in December 2010 (see the April 2011 issue of *Sport Aerobatics* magazine); and the four-cylinder Anequim raceplane, which broke five speed records in 2015.

As team tactician for Red Bull Air Racer Kirby Chambliss, Paulo optimized flight paths for the fastest lines, leading Kirby to first place finishes (see “The Competitive Edge” in the December 2017 issue of *EAA Sport Aviation* magazine). Paulo has also worked on other aircraft projects, including the NASA X-57 electric aircraft. He is the 2016 recipient of the Dr. August Raspert Memorial Award, which recognizes individuals who have made outstanding contributions to the advancement of light aircraft design.

ARM TWISTING

FOR YEARS, Brazilian businessman Sergio Andrade, the Fédération Aéronautique Internationale 1,000-kilometer triangle record holder, had been twisting Paulo’s arm to design a glider for him.

“He was trying to convince me that gliders are awesome and that I should spend time on gliders,” Paulo said. “I told him I don’t want to.”

After the Anequim project wrapped up, Sergio finally convinced Paulo to fly with him in his sleek, fast, 87-foot wingspan ASH 30 glider. This was Paulo’s first time flying an open class glider. It was great for the first hour.

Flaps on open class gliders use a completely different approach compared to flaps on airplanes, which are used mainly for takeoff and landing. To optimize the wing for a particular flight condition and maintain minimum drag, flaps must be continuously adjusted throughout the flight. Any movement of the stick requires a movement of a flap.

“It’s like when you rub your hand on your stomach and you tap your head at the same time,” Paulo said.

During cross-country flight, especially in proximity to other gliders during a competition, the combination of judging weather, terrain, and airfield locations creates tremendous workload.

“It becomes really, really overwhelming, and the workload inside the glider is huge,” Paulo said.



TWO INTERESTING THINGS

PAULO HAD AN IDEA that a fly-by-wire (FBW) solution for the flap/aileron system on the sailplane would have a twofold benefit of guaranteed optimal airfoil performance and reduced pilot workload. However, due to prohibitive cost, FBW systems are typically not used in aircraft smaller than business jets. Creating an FBW system feasible for a general aviation aircraft would require the pairing of off-the-shelf equipment with advanced computing technology.

For increased efficiency and speed, the wing would require a high wing loading and aspect ratio, and the chord would need to be significantly shorter than the ASH 30 wing. The resulting thinner wing would need an incredibly strong spar to handle the bending load and stiff skins to prevent flutter.

Paulo is always interested in learning new things.

“With this glider, I can do stuff that I never did in my life,” he said. “We’re going to have to use this high-performance prepreg material that I don’t know how to do. And the automatic fly-by-wire system is unique on gliders, and even for light aviation.”

In November 2016, Paulo came to the United States with a green card on a leave of absence from his position as a professor of aeronautics at Universidade Federal de Minas Gerais in Brazil. Sponsored by Sergio and working out of his friend Craig Catto’s propeller shop in Jackson, California, Paulo embarked upon the Nixus project. His quest was to build the world’s fastest glider and demonstrate how technological advancements may be incorporated into light aircraft.



Paulo preparing the glider for a test flight. "The devil lies in the details and that is my last chance to catch something," he said. "It's a huge responsibility."



Paulo installing one of the wireless devices he developed to measure aeroelastic vibration.

WING DESIGN

THE FIRST STEP was to design custom wings that would be mounted on the fuselage of an ASH 30. Paulo enlisted world-class experts to provide assistance. Sailplane aerodynamicist Loek Boermans, a professor at Delft University of Technology in the Netherlands, and Dagfinn Gangsaas, a leader in fly-by-wire systems and former Boeing and Lockheed Martin engineer, both provided valuable support for the Nixus project.

In a back and forth iterative process, Loek worked in conjunction with Paulo to create a new set of airfoils called DUPI (Delft University – Paulo Iscold). The professor also contributed to planform and winglet designs. The main objective of the planform was to achieve optimum lift distribution (minimum induced drag) for all possible angles of attack and flap configurations.

STRUCTURAL DESIGN

FOR THE STRUCTURAL DESIGN, Paulo focused on spar position and skin layout to avoid bending-torsion coupling of the wing. The wing would need to deflect 7 feet in straight and level flight and up to 21 feet at the 5.3g maximum load factor. To guarantee optimal efficiency, an engineering solution solving for twist was paramount.

For transporting, the wing was divided into panels. Two inboard panels with forked spars join inside the fuselage, and two outboard panels with a single spar connect halfway down the mid-span of the wing. A chordwise pin transfers the load from the outboard panel to the inboard panel.

The use of ultra-high-modulus carbon fiber for the skin was required to guarantee a stiff wing with a high flutter speed (which determines aircraft maximum speed). Paulo chose an MGS wet-layup system with Hexcel HM63 non-crimped carbon fiber. The Nixus project was the first time Hexcel provided this type of fiber on a non-crimped fabric.

Since the spar caps had to be more than 1 inch thick and 7 inches wide, a wet system was unfeasible. A prepreg system was a good fabrication choice but required an autoclave. Paulo spent three months designing and constructing a custom autoclave. He used the Patz composite prepreg system in conjunction with Hexcel IM7 fibers to construct the spar caps.



The infamous static load test with the wing at 4gs and 16 feet of deflection prior to failure.



Wing skin mold.



FBW SYSTEM DESIGN

COMMERCIAL OFF-THE-SHELF parts were used for the majority of the electronics for the FBW system, with some custom components produced in-house. A critical aspect of the system design was the identification of possible failure modes and the creation of strategies to overcome asymmetrical conditions.

The system is composed of three flight computers, nodes, and servos powered by two 40-watt-hour lithium-iron batteries that provide power for 20 hours of flight. Each of the three asynchronous flight computers has independent sensors, and communication takes place on a triple bus.

Nodes are computers that sit on top of the servos and communicate via high frequency with each servo. Nodes receive information from the three flight computers and perform a voting procedure to verify the integrity of information that is then transferred to the servo.

Since node-to-servo communication takes place at a high frequency, faults such as over temperature, over torque, over load, wrong position, or communication failure are quickly identified and immediately inform the computer. The computer is programmed to respond with commands to the opposite side of the wing to adjust the position to compensate for and overcome asymmetry.

Each control surface uses two synchronized servos (six flaps per side, 24 servos total). The use of two servos per surface has the advantages of servo redundancy and position measurement redundancy, along with the reduction of torque, load, and temperature. An in-cockpit display monitors servo temperatures and can identify failures.



Spar cap length comparison to 6-foot, 6-inch Paulo.

NOT DONE YET

PAULO WAS EAGER to finish up with fabrication and get flying after two long years of design and building. At the same time the build phase of the Nixus project was wrapping up, changes were happening in Paulo's personal life. At the end of his two-year sabbatical from the university in Brazil, he decided not to return. He accepted an offer from California Polytechnic State University in San Luis Obispo, California, as an associate professor of aerospace engineering. He disassembled his workshop at Catto Propellers in Jackson, bought a new house, and moved his family to Southern California in June 2018.

A few days later, Paulo made the five-hour trek back to Jackson to conduct structural load testing, the final step before flight testing. Enormous wings that deflect 21 feet under load limit made typical experimental load testing impossible. Paulo designed a system that placed the wing at a 45-degree angle and then applied load by placing water drums on the inclined plane.

Initially, the wing withstood the load and a jubilant Paulo celebrated with Sergio over the phone. A few seconds later, a loud bang reverberated as the wing snapped. The connection between the outboard and inboard panels had failed. A famous sailplane designer had claimed at the beginning of the Nixus project that what Paulo was attempting to achieve was impossible. Paulo was devastated to think that perhaps he had been right. With no workshop to fix it in, Paulo returned home with a broken wing and a heavy heart.



NIXUS SPECIFICATIONS

LENGTH: 30 FEET, 6 INCHES
WINGSPAN: 91 FEET, 10 INCHES
WING AREA: 158.3 SQUARE FEET
ASPECT RATIO: 53.3

MAXIMUM GROSS WEIGHT: 2,100 POUNDS
EMPTY WEIGHT: 1,650 POUNDS

MAXIMUM WING LOADING: 13.3 POUNDS/SQUARE FOOT

V_{NE} : 161 KNOTS
 V_{SO} : 48 KNOTS

AVIONICS: LXNAV LX BASIC AVIONICS PACKAGE

MATERIALS

- > SPAR CAPS: PATZ COMPOSITE PREPREG SYSTEM WITH HEXCEL IM7 CARBON FIBER
- > SKIN: MGS WET-LAYUP SYSTEM WITH HEXCEL HM63 NON-CRIMPED CARBON FIBER

REBUILD IT AND THEY WILL COME

AFTER REVIEWING HIS design, Paulo found the problem. The design was correct; the failure resulted from an error transferring the design to the CAD drawing. The carbon fiber blocks transferring the load for the forked versus single spars are different lengths. Paulo had copied and pasted the shorter length block for both spars and didn't catch his mistake. The fabrication was based on the incorrect CAD drawing.

PAULO HAD AN IDEA THAT A FLY-BY-WIRE SOLUTION FOR THE FLAP/AILERON SYSTEM ON THE SAILPLANE WOULD HAVE A TWOFOLD BENEFIT OF GUARANTEED OPTIMAL AIRFOIL PERFORMANCE AND REDUCED PILOT WORKLOAD.

Paulo's family, friends, and colleagues rallied to encourage him not to give up and rushed to help him fix the wing. With his new position at Cal Poly, there was no space available for this type of work, which needed to be finished over the summer before classes started.

Repairs included rebuilding the left outboard panel due to the shear web failure and cracks inside the unidirectional caps, as well as the skin on the inboard panel. The right wing that also was fabricated with the incorrect data would need to be almost entirely rebuilt.

At San Luis County Regional Airport (KSBP), Paulo's friends Ryan Malherbe and Nick Jenkins found a T-hangar where Paulo could fix the wing.

"Imagine a 92-foot wing inside a T-hangar," he said. "This was a nightmare. But that was what was available."

Then the students showed up.



LEARN BY DOING

MEMBERS OF THE Cal Poly Akaflieg had been following updates on the Nixus project Facebook page with tremendous interest. Common in Germany, Akaflieg are student engineer clubs dedicated to designing and flying gliders. When they learned that Paulo might come to Cal Poly to instruct, they were elated.

“A lot of us sat in on his hiring committee, and we’re just like, ‘Hire this man. Give this guy a job,’” Akaflieg President Zach Yamauchi said. “We were really excited when we heard that he’d be teaching here and actually bringing that project.”

Zach was introduced to gliders in his freshman year and earned his private glider certificate less than a year later.

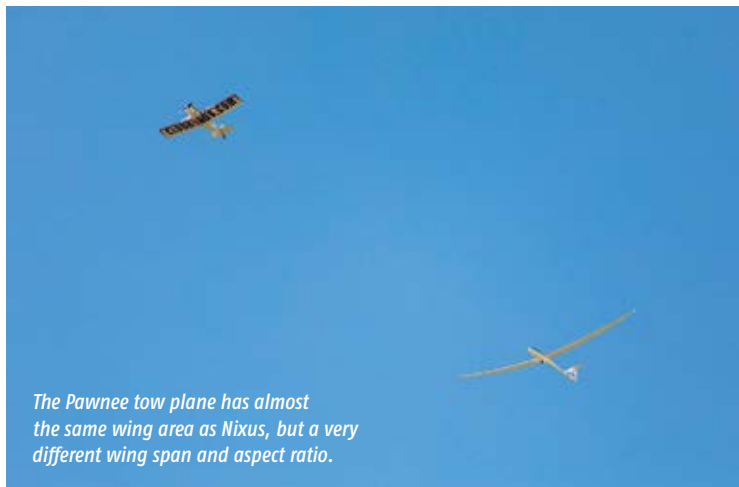
“This was the best thing possible; where I could be a student and learn to fly at the same time,” he said.

One of the reasons Cal Poly was attractive to Paulo was its “Learn by Doing” motto.

“It’s really important for me to use aviation to inspire people and teach them how to work,” he said.

All of his previous aircraft projects had included students. The disastrous wing failure turned out to be a golden opportunity for students to get hands-on building experience.

Up to 20 students regularly showed up at the hangar on weekends to help. They learned composite construction, rigging, connecting control surfaces, avionics, and the electric fly-by-wire system. Less than five months after the failed structure test, Paulo returned to Jackson in December and successfully loaded both wings. Flight testing could finally commence.



The Pawnee tow plane has almost the same wing area as Nixus, but a very different wing span and aspect ratio.

TEST FLIGHTS

AUTHORIZATION FOR NIXUS FAA Phase I flight testing included two crew members (some of the FBW system testing required eyes on the cockpit computer) and two test sites. First flights were slated to take place at Castle Airport (KMER) in Merced, California, chosen for its 11,802-foot runway. Later test flights would take place 100 miles northeast on the opposite side of the Sierra Nevada at Minden, Nevada, a region famous for soaring.

Celebrated sailplane pilot Jim Payne, a former Air Force test pilot and current chief pilot for the Airbus Perlan Project, would pilot Nixus. For the first flights, a three-day campaign was scheduled, and Paulo’s students were thrilled to participate.

“I don’t know of another university that currently has students on actual manned aircraft flight testing,” Zach said. “That was such an amazing opportunity.”

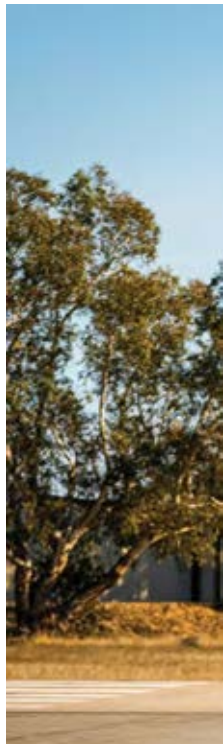
The first day was devoted to the assembly, final weight and balance, fly-by-wire configuration, and familiarization with failure modes and cockpit setup. The second day was dedicated to high-speed taxi testing with a car tow. The third day was reserved for the first flight.

By March 4, 2019, Nixus was ready to fly. “We were all so excited, and I think Dr. Iscold more so than anybody else,” Zach said. “That plane is his baby. He has spent so much time and years of his life working on it.”

All eyes were glued on Jim as he took off in the late morning.

“The wings did a little wobble, and then they started generating lift,” Zach said. “They came up to this incredible arc like an upside down rainbow. It’s something that you have to see with your own eyes to appreciate because pictures don’t do it justice. How small and thin and narrow that wing is, and then how long it is; it was incredible to watch. It was definitely an emotional time for everybody. I think for Dr. Iscold especially.”

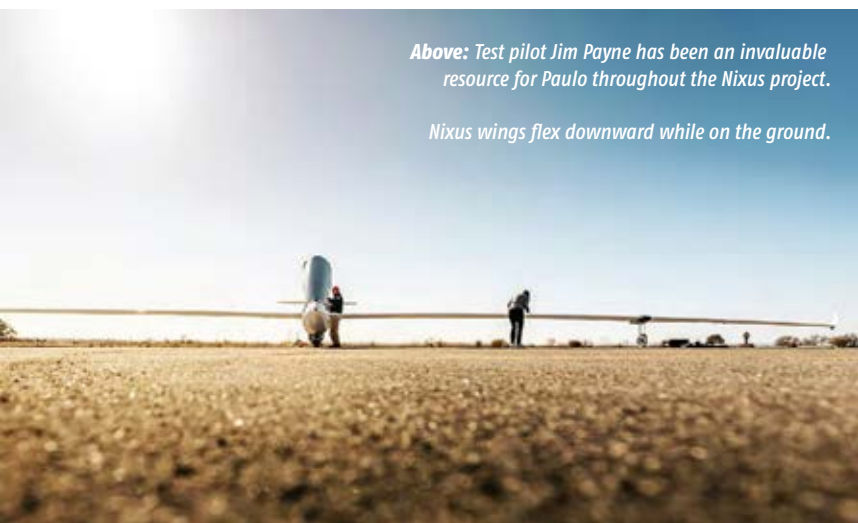
The fly-by-wire system worked beautifully and provided excellent handling characteristics. During the air brake test, an asymmetrical retraction occurred when a pushrod buckled under high wing bending. This possibility was one of the predicted failure modes, and Jim used the previously defined emergency procedure for an uneventful landing.





Above: Test pilot Jim Payne has been an invaluable resource for Paulo throughout the Nixus project.

Nixus wings flex downward while on the ground.



Nixus landing at Paso Robles after flutter flight testing. Normal deflection of the wing at 1g is 7 feet.



Following the first flight, the air brake system was fixed and modified. Subsequent flights tested various failure modes of the FBW system, and they all avoided asymmetrical situations. During complete shutdown, two-thirds of the roll rate was lost, but the mechanical backup aileron was sufficient to control the glider.

Ground vibrational testing confirmed the structural model used to predict flutter and determined a top speed of 300 kph. Since open class gliders typically fly at 270 kph, Nixus can potentially break speed records by a margin of 30 kph.

“We always aim for records,” Paulo said. “American records, world records — whatever record is available, we’re going to try to break it.”

For the final Phase I test flight, Sergio accompanied Jim as crew. The man who made the Nixus project possible flew his sailplane for the first time.

“FLY-BY-WIRE HAS THE POTENTIAL TO EXPAND THE POSSIBILITIES IN GENERAL AVIATION BY INCREASING AIRPLANE EFFICIENCY, EASE OF FLIGHT, AND SAFETY.”

—PAULO ISCOLD

THINKING AND DREAMING

ENVELOPE EXPANSION TESTING took place at Paso Robles Municipal Airport (KPRB) in January 2020, with Jim flying faster and pulling more g’s. Nixus, now flown for about 40 hours, will serve as a laboratory to further develop FBW technology in general aviation. Currently, the FBW system connects the control surface to the stick and flap handle, but automatic control will be explored in future phases of the project.

“Despite its detractors, it’s undeniable that this technology will gain importance in the near future, especially with the recent increase in initiatives to develop personal air vehicles,” Paulo said. “Fly-by-wire has the potential to expand the possibilities in general aviation by increasing airplane efficiency, ease of flight, and safety.”

Paulo’s favorite quote is by the “father of the 747,” Joe Sutter. Joe said, “The best airplane is merely the expression of human thinking and dreaming. People are always the story.”

Early in his engineering career, Paulo learned that failure is not an option, but he has never been able to fulfill this statement.

“I always had failures, although I always did my best to avoid them,” he said. “The Nixus failure was my biggest one.”

He has discovered that failures are not an end but a deviation.

“I learned that the only way to fail is by not doing,” Paulo said. “And since not doing is not an option for me, it wasn’t an option to stay failed. It is not about whether you failed; it is about getting back up.”

Paulo is still not sure if the sailplane designer who doubted he was capable was right or not.

“Maybe I wasn’t really capable,” he said. “But there is only one way to learn, and it is by doing!” *EAA*

Beth E. Stanton majored in English because it involved the least amount of math. She finds it hilarious that now she is a pilot and writes stories about airplanes and technical stuff.



**VOLUNTEERS
AT WORK**

Anything *and* Everything

**VOLUNTEERS CONTRIBUTE AT AIRVENTURE
IN UNEXPECTED WAYS**



BY SAM OLESON

WITHOUT THE DEDICATION OF APPROXIMATELY 6,000 EAA VOLUNTEERS DURING EAA AIRVENTURE OSHKOSH, THE SHOW WOULD NOT GO ON. Just about every task you can imagine has volunteers involved in some way. There are some volunteer jobs that are a little more unusual than others, whether it's because only a select few do it, a special skill is required to perform it, or it's simply a job that you may have no idea is the responsibility of a volunteer.

Inspiring With the 'Kiddie Hawk'

BILL MARCY, EAA 54844, is a World War II veteran, an aeronautical engineer, and part of a team that originally worked to develop the space shuttle. Despite that résumé, one of his proudest accomplishments over the past two decades is his volunteer service at EAA AirVenture Oshkosh — specifically what he does at KidVenture.

Bill, who has been an EAA volunteer for 42 years, has focused much of his efforts since the 1990s on inspiring youth to pursue aviation with his “Kiddie Hawk” — a miniature cockpit simulator that he built himself.

“At Young Eagles events, I noticed younger brothers and sisters that were too young to be Young Eagles,” he said. “I had been thinking about some sort of backyard toy for my kids for upwards of 30 years, so I finally worked out an idea, built a model, and it worked.”

It ended up as the Kiddie Hawk, a simulator that helps entertain the little brothers and sisters who are too small for Young Eagles.

“It’s a pretty neat simulator,” Bill said.

Bill originally showcased his simulator in the Vintage area but moved it down to KidVenture when that came about in the late 1990s. It has been there ever since, giving youths a taste of what an airplane cockpit is like.

“First, I explain to them that this is a control stick that controls what the airplane does,” he said. “When they pull back on the stick, the nose goes up. The airplane moves in the direction that stick moves. I let them find that out for themselves. Mostly I just explain to them what they’re doing and what’s happening. One of the important things to me [that] I remember from my very first flight in an airplane — suddenly the world stopped moving, and that still impresses me. I try to impress on the kids that when they’re up in the air and they look down, it looks like they’re hardly moving, just the way they are right now in the Kiddie Hawk.”

While of course Bill comes back to Oshkosh year after year for the airplanes and the camaraderie, his main priority is inspiring kids to learn about aviation and getting that initial spark that could lead to them becoming pilots themselves.

“I gave up flying my airplane here so I could bring the Kiddie Hawk,” he said. “Yes, I could sit around shooting the breeze with old friends all day for six days, but that’s kind of a waste of time. It’s better to be passing on the enthusiasm.”

Capturing AirVenture

A LONGTIME MEMBER of EAA's volunteer photography team during AirVenture, Craig Vander Kolk, EAA 467917, is part of a critical unit that captures the airplanes and events at Oshkosh for EAA's social media accounts and various publications, *EAA Sport Aviation* included. He joined the photography team in 1997 as an inexperienced photographer but has seen his skills develop over the past two-plus decades.

"I started off just as an amateur," Craig said. "I did have my own studio for three or four years. Mostly portrait, stuff like that. But I really liked aviation photography and nature photography."

When asked what draws him to Oshkosh, Craig said there is a little bit of everything.

"You'll see a lot of different experience levels," he said. "And what I found refreshing in the last three or four years, we brought in a lot of new young photographers who haven't been to Oshkosh that are excited about seeing what I've been looking at for 20 years."

He said the younger photographers have given him a new perspective, even though he's photographing some of the same things year after year.

"It was really refreshing to see young people come in and kind of take an excited new look at it," he said. "And they've inspired me to look at things a little differently the last couple of years."

Craig returns to Oshkosh year after year because he enjoys airplanes and aviation photography, but he admitted it is nice to see his name mentioned in different publications.

"It's always fun to see your name on the credit on the photo," he said. "It does give you a sense of fulfillment. It's the warm fuzzy [feeling]. It's not the goal that you come here for. It's just the warm fuzzy byproduct of it. It's nice to see your work used, appreciated. We all have a different style when we take images, and when I'm shooting, I shoot what catches my eye and I find that that is what a lot of times is ending up being published. That is a reward in itself. It's a fun thing to do. But like I said, it's not the goal. It's a byproduct of contributing."



The Soundtrack of AirVenture

ELTON EISELE, EAA 216273, has been involved as a volunteer with EAA for 36 years, helping out with everything from departure briefings during AirVenture to fixing up Volkswagens to general volunteering at EAA headquarters. One of the more uncommon duties he has as a volunteer is organizing and directing the AirVenture Concert Band each year.

The concert band, which has performed at 12 AirVenture events since it was formed, consists of about 80 musicians who are given music prior to Oshkosh and are expected to learn it by the time the end of July rolls around. Since its inception, more than 500 people have performed with the band.

As a former high school band director, Elton was inspired to start the AirVenture Concert Band after discussions with a number of musicians at the air show who thought it would be a great opportunity to bring their passion for aviation and music together.

“I just thought it would be really neat,” Elton said. “I would run into people that were in music and they’d say, ‘Wow, we’ve got to have a band.’ ... Then I met somebody that used to play piccolo in the Sousa Band, and he was here, and so I said, ‘Let’s get this thing going.’ So, we got things going, and it’s been a pretty strong element [of AirVenture].”

As far as the type of music the concert band plays, it varies year to year. There’s usually aviation-themed selections, and the band will typically perform the national anthem prior to the daily air show once during the week.

“There’s really several pieces of music that we play every year,” he said. “We’ve always played *Those Magnificent Men in Their Flying Machines*, and we’ve also had four pieces of music written for the band. *Experimental Aircraft March* is one of them. *This Is My Country*, *Sousa Spectacular*, *Eternal Father*, *Strong to Save*, *Swoop to America* — this goes through all the armed forces things with that at the end — and then *March Grandioso*. A lot of these things we’ve done before, and it helps the band because a lot of the people already know their music. We’ve done *Air Force One*, we’ve done *Apollo 13* [and] *The Great Waldo Pepper*. So, I put them on a rotating basis type of a thing.”



A Lifelong Connection

GENE CONRAD, EAA 404051, more or less grew up at Wittman Regional Airport. Gene's dad was the former airport director at Wittman, and despite moving around the country since then, Gene has missed only one EAA fly-in convention in his life, in 1988. Currently, Gene is the airport director at Lakeland Linder International Airport in Lakeland, Florida.

However, during the week of AirVenture, you can find Gene using his airport directorial skills in a different manner — as a longtime volunteer with EAA. AirVenture 2019 was Gene's 32nd year of volunteering, and he was serving as the air show operations ground chairman, helping coordinate aircraft movements on Boeing Plaza during each air show.

Gene's passion for and skill within the aviation industry is undeniable, but like many longtime AirVenture volunteers, what brings him to Oshkosh each year isn't necessarily the airplanes.

"It's just like Paul Poberezny always said; it's about the airplanes, but really at the end of the day we're here for the people," Gene said. "There's something about coming back to this airport and being here on this specific ground out here every year. It just rejuvenates me for the year. I wouldn't be anywhere else. I've always told anybody I've ever worked for at other airports that if I couldn't come here, they wouldn't allow me to, then I'm quitting. That's just how important it is to me. My family grew up out of this event. I have a son now, and he comes here every year with me. So, this is our homecoming every year."



Beautifying Oshkosh

HAVE YOU EVER SAT BACK, admired the scenery at AirVenture, and noticed the immaculate flower beds across the grounds? A group of volunteers help to keep those flowers alive and well during the summer months so they look pristine by the time the convention starts up.

Marybeth Jackson is an Oshkosh resident and has been volunteering and helping to lead the team of EAA volunteers working with flowers for 36 years.

"I've always loved gardening," Marybeth said. "When the museum opened, and even before then, they needed people to work in the flowers. We start in May, planting, and we have a lot of the stuff back here [at the workshop]. Then we take it out on the airport closer to the convention. I like the camaraderie, and I've met so many wonderful people out here."

Keeping the flowers looking good is an intensive process during the warm months, but one the volunteers relish taking part in.

"We have to plant them," Tracey Potter, another volunteer, said. "We have to weed them. Karen [Gilgenbach] is the head gardener out here. She's a paid employee, and she's wonderful to work with. The color combinations, she lets us all say what we think we would like for the next year. We get so many compliments from all people all over the world saying how beautiful the flowers are. And they always say these are probably the most photographed flowers in the world."



A View From Above

IF YOU'VE EVER taken a ride over the AirVenture grounds in a Bell 47 helicopter, your pilot was — you guessed it — a volunteer. The Bell 47 helicopter tours are run by volunteers, both in the air and on the ground.

Chris Anderson, EAA Lifetime 136049, along with his brothers, has been involved with helicopter operations at AirVenture since he was a kid. He helped wash and load the helicopters before eventually coming on as a pilot, following in his father's footsteps. As it often does, volunteering came full circle for Chris, as his family is now volunteering with many of the duties performed on the ground.

"Initially, the helicopter program was just used for traffic, crowd control, search and rescue, and anything that [EAA founder] Paul [Poberezny] wanted," Chris said. "We were up there by flightline ops back when it was directly north of the Warbirds activity. Somewhere in the late '80s or early '90s, it switched to, 'Hey, let's start doing some rides.' So Dad; Jim Freeman, who is still part of the crew; Marshall Crandall, who oversees the pilot's side of it; and one other individual started doing rides."

They started with one helicopter, and it quickly grew from there, Chris said.

"Dad had to step down because he got hired by the FAA, and they wouldn't let him continue to do the ride aspects of it," he said.

When their dad retired, Chris and his brother Nick came on as pilots and their brother Matt picked up on maintenance full-time.

Meanwhile, Keith Huebner, EAA Lifetime 1088338, has been volunteering with helicopter operations for 10 years. He was initially invited by Chris to become a volunteer.

"I came up the first year for three days, put some time in, and the next year I came for five days, and the third year I came for the whole event," Keith said.

His kids and wife also started coming up in the third year.

"[My son] Joe was, well, 10 years ago he was 3, so they came up and we have pictures out on the flightline of him in a baby basket," he said. "The two younger ones were both born since we've been here, and they come up on Wednesday every week now. We've added a couple other families that I hang out with. The part I like about this group and aviation, in general, is one invitation becomes hundreds of people. It multiplies quickly when you reach out to people you volunteer with as well."

Like many segments of EAA volunteers, the helicopter crew is a tight-knit bunch, and what brings them back every year is the camaraderie they have with each other. But make no mistake, taking up people — and especially kids — who've never ridden in a helicopter before is something that brings a smile to their face.

"When you've been flying as long as I have, some of that newness wears off, if you will," Chris said. "But seeing the kids get in there and saying, 'Look at this, look at that' when we're flying around this pattern — the enthusiasm and the excitement is pretty cool to see."



Lending a *Helping Hand*

IF YOU'VE EVER flown into Oshkosh and blown a tire or sprung an oil leak, there's a decent chance you've met Jim Smith, EAA Lifetime 13439.

Jim has been volunteering with EAA since the days of the Rockford, Illinois, fly-ins (1962 to be exact) — all of it with Emergency Aircraft Repair. If your airplane needs a minor repair to get home, Jim and his team of volunteers are the ones you visit.

Jim said the volunteer team may do 250 or so “operations” throughout the week.

“Somebody has a flat tire or somebody has a stuck valve in an engine or an oil leak, needs a new battery, we help loan them tools to do that,” he said.

Emergency Aircraft Repair is run by EAA Chapter 75 members. Jim said he truly enjoys the experience of not only assisting an organization he's passionate about but also helping individual people in need.

“I enjoy helping people,” he said. “The people in the aviation arena are a whole lot different than people in other arenas. The cleanliness, the helpfulness, that type of thing. You don't see that in other venues. I enjoy helping people. We make friends. I've got other folks in this repair barn from all over the country. I go home with a good-pounding heart. It's neat to do.”





Answering the Call

IF THERE'S AN ODD job that needs to be done in Camp Scholler or anywhere else on the AirVenture grounds, you can count on the folks from EAA Chapters 439 and 132 to get on it as soon as they can. Steve Gerencser, EAA 373792; Sam Pavel, EAA 493483; and Cindy Martin, EAA 288433, are three of about 40 volunteers whose jobs are doing basically anything and everything in the weeks leading up to and during the week of AirVenture.

Steve, Sam, and Cindy have each been volunteering with EAA for at least 24 years and are among the most experienced members of the Chapter 439/132 volunteer group that includes folks from all over the United States, from California to Florida.

“Everybody’s friendly and we have a lot of fun, but we get a lot of work done,” Steve said. “I feel like at the end of the show, you look back and think, we really got something done. To get that many people from so many different walks of life and just, we just all come together and it’s really crazy sometimes, but it’s a lot of fun.”

Among the specific duties the Chapter 439/132 volunteer group does is set up every umbrella at every dining area, arrange picnic tables throughout the grounds, put up all the banners that are in the different parking lots, and set up picket fencing, among dozens of other various jobs. Then there are the odd jobs that just seem to pop up. If there’s a storm and a tree falls down, you know who to call to get it taken care of. Then there was the time they rushed down to the flightline after a storm at 5:30 a.m. to find an overturned portable toilet with a man still trapped inside.

“He came out blue,” Cindy said with a laugh. “God bless him. He said, ‘Well, at least it’s still raining.’”





Welcome to Camp Scholler

HAVE YOU CAMPED in Camp Scholler in the past decade? If the answer to that question is “yes,” there’s a good chance you’re familiar with Paul Quenzler, EAA 531218. As a member of the camper registration volunteer team for the past 10 years or so, Paul is far away from the air show action, and airplanes in general, for large portions of AirVenture. But he doesn’t need to be working directly with airplanes to enjoy what he does as a volunteer with EAA. Like many volunteers, it’s the friends he’s made over the years that keep him coming back.

“The people, the people I work with, people we meet (is what I enjoy),” Paul said. “You renew friendships every year, ‘Hey, how you been, what you been doing?’ ... Everybody is just pretty pleasant, it’s a pleasant place to be. It’s a clean place. I tell people, there’s a couple hundred-thousand people here, and you’re hard-pressed to find a piece of litter on the ground.”

With thousands of campers driving through the main registration area during the days leading up to and during AirVenture, Paul’s No. 1 priority is safety, and then getting people through quickly.

“Keeping things safe is No. 1,” he said. “There are big and small vehicles of all types coming through. There are people walking around, and the last thing we want is for some sort of an accident to happen. We have a strict rule: You don’t walk behind somebody who’s parked because somebody’s going to put it in reverse. You watch for people doing things they shouldn’t be doing. People come in, they’re tired. I’ve driven over here back in the day, we would drive 14 hours in one day. I’d get up at 4 in the morning and get here at 6 in the afternoon; you’re whipped. And you can see it on their faces; they come in, and the biggest thing I like to do at the point where I do the greeting is, ‘Hey, you’re here. Smile a little. Change the mode, change your mode. You’re now here.’”

While safety is obviously No. 1, No. 2 is keeping some semblance of order.

“We have a method,” Paul said. “We have, like, six parking lanes, and you fill up one all the way up and then you go up the next one. You don’t helter-skelter them because as the people who are going to get done first, they’re the ones in the first lane. And [as] it clears out, then we’ve just got to keep it organized. But safety is the big thing.”

Serving the Masses

ONE OF THE MOST popular locations to grab a bite to eat for breakfast at AirVenture is undoubtedly the Tall Pines Café near the Fun Fly Zone on the southern end of the grounds. Rich, EAA 859443, and Sue Luke have been volunteering at Tall Pines Café for six years. They arrive before AirVenture to clean up the facility and serve food each morning during the week. Sue serves eggs, Rich serves sausage.

While Tall Pines Café is only open for a few hours each morning, up to 800 people are served during that period of time. In 2018, a total of 4,327 people were served breakfast during the entire week of AirVenture. With 25-30 volunteers working at the café each morning, it takes a great amount of coordination to make sure everything goes off as smoothly as possible.

“It doesn’t get hectic, it gets busy,” Sue said. “And [the reason] I don’t think it gets hectic is because we’ve all been doing things for a while, and everybody knows what’s needed. We have people that backfill, and that’s really all they do. They watch to see when the ketchup is low or the syrup is low. And I think we love it so because it isn’t crazy and it is a smooth operation. The people are fabulous that are in here. Everybody works together so well.”

This is only a small sample of the innumerable ways that volunteers contribute each year at AirVenture to make the event an unforgettable experience. Next time you see a volunteer helping out at AirVenture, make sure to say thank you! **EAA**

Sam Oleson, EAA 1244731, is EAA’s social media coordinator, contributing primarily to EAA’s digital publications and social media platforms, and loves learning the history behind different types of aircraft. E-mail Sam at soleson@eaa.org.



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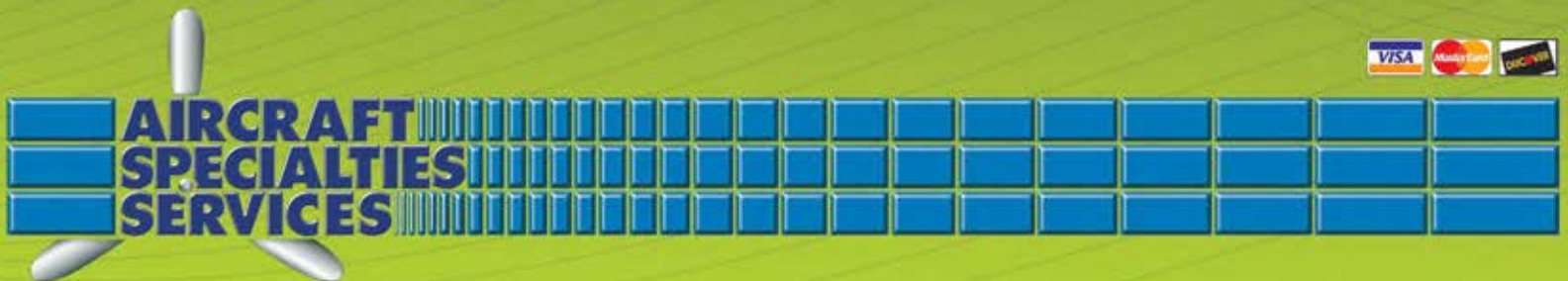


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EXPERIMENTER
FEATURE

BORN

Over a Pint

**BOB POOLE AND HIS SUPERMARINE
MK26B SPITFIRE REPLICA**



BY HAL BRYAN

BOB POOLE, EAA 1305992, of Ballinafad, Ontario, Canada, decided to visit a pub one day while visiting the English village where his sister lives. He ended up sitting next to a retired gentleman who was an avid World War II aircraft enthusiast. Little did he know how their conversation would stick with him in the future.



A

fter a bit of a chat, Bob's new friend showed him a photo of what he thought was an original WWII-era Spitfire.

"It was an article from one of the newspapers, and it was [actually] this Supermarine aircraft kit," he said.

The kit, originally built in Australia but now in Texas, is a roughly 90 percent scale replica of the venerable Royal Air Force fighter. In 1994, the company introduced the MK25, a 75 percent scale replica. It then bumped it up to 80 percent for the two-seat MK26 before developing the largest version, the MK26B.

While they were talking, the gentleman asked Bob if he had ever considered doing something like that.

"And I said, 'Well, no, I haven't, actually, but it sounds like quite a nice project that we could probably do,'" Bob said. "And that was it. We just chatted a little bit, and I thought no more about it."

He thought no more about it — until he returned home to Canada and got to talking with his son, Rob.

"I said, 'How about we buy one of these kits. It would give you great experience to put that aircraft together yourself,'" Bob said.

His son agreed, and the aviation spark was officially ignited.

THE ENGINEER'S APPRENTICE

"I WAS ALWAYS very interested in aviation, ever since being a young lad," Bob said. "I used to draw airplanes and think [about] airplanes and buy books on airplanes. ... I felt it was always in my blood."

While Bob didn't come from an aviation family, he credits his father for igniting the initial interest.

"I think probably the thing that made me so keen was that my father used to take me to a lot of air shows when I was small," he said. "My dad took me on a flight. He didn't fly the aircraft, but we went on an old de Havilland Rapide, and that kind of excited me considerably."

His passion for aviation grew from there. When the opportunity arose, he chose aviation as a profession.

That opportunity came early on.

"My career started in England in 1964 when I started an aeronautical engineering apprenticeship ... in Coventry, England, at Sir W.G. Armstrong Whitworth Aircraft," Bob said. "That was a four-year apprenticeship, which entailed every aspect of aircraft manufacturing with college and practical hands-on experience. A typical ... old English apprenticeship."

Bob worked as an aeronautical engineer for the next 11 years, becoming a Hawker Siddeley employee when the parent company retired the Armstrong Whitworth name. During his time there, he worked on refurbishing Blackburn Buccaneers for the Swiss air force and did extensive work on the Folland Gnats of the Red Arrows, the RAF demonstration squadron.

But there's one airplane that he remembers even more fondly. It's arguably the Cold War equivalent of the Spitfire in terms of quintessential Britishness.

"The mainstay of the company back then was the Vulcan," he said. "[It] still is my favorite aircraft, actually. We worked a lot of major overhauls on that aircraft, made modifications. ... We had up to 13 aircraft at a time into our facility there; it was quite a large facility."

The Vulcan — originally designed by Avro but subsumed into the Hawker Siddeley Group — was a large, surprisingly maneuverable strategic bomber with a 111-foot wingspan. So, yes, a facility that could house 13 of them would have to be quite large indeed.

WEST TO CANADA

AFTER MORE THAN a decade, Bob could tell it was time to make a change. 1975 was a bad time for aviation in England, and multiple places were closing. Even Hawker Siddeley Aviation was shutting down quite a few of its facilities, Bob said.

"I could kind of see the writing on the wall that it didn't look good for me, so I decided to make the move to Canada," he said. "My ambition was to work with an airline rather than a manufacturing facility. A little bit more exciting I guess, the thought of working on those 747s and that sort of thing. That was the excitement of it."

After stints at de Havilland Canada and Orenda Engines, Bob got his wish and started working for Canadian Pacific Air Lines (CP Air). Five years later, it was time for another change. He started at the new company on May 26, 1976, and was laid off on May 26, 1981.

"I was handed my five-year pin in one hand and pink slip in the other hand," he said.

For someone like Bob, doors close and open like this all the time. He landed on his feet at a charter company working on L-1011s and stretched DC-8s. He did that for several years before moving on to a position with a company that did mobile repairs. He began traveling the world working on damaged aircraft.

"I only did that for maybe about 12 months, and then I was told by everybody I worked with ... that I should start my own business," he said.

He did just that and founded Aerostructural Inc. in 1994. Based at the Region of Waterloo International Airport (YKF) in Woolwich, Ontario, Aerostructural repairs aircraft structures, dabbling in composites and welding but focusing mainly on aluminum.

"As soon as we made the company safe and sound, we became Transport Canada-approved, along with the FAA and EASA," he said. "And it just took off from there."

After more than 50 years in the industry, Bob is finally slowing down — at least on paper.

"My son runs the company now, so I can take it easy and just go in now and again and make a nuisance of myself," he said.



SPECIFICATIONS

AIRCRAFT MAKE & MODEL:

Supermarine MK26B Spitfire Replica

CERTIFICATION: Experimental amateur-built

LENGTH: 24 feet

WINGSPAN: 27 feet, 8 inches

HEIGHT: 7 feet, 1 inch

MAXIMUM GROSS WEIGHT: 1,985 pounds

FUEL CAPACITY: 39.5 gallons

SEATS: 1-2

POWERPLANT MAKE & MODEL:

Isuzu 6VE1 V-6

HORSEPOWER: 282

PROPELLER: MTV-23B, three-blade, 84-inch

MAX CRUISE SPEED/FUEL CONSUMPTION:

195 mph, 14 gph

V_{NE} : 220 mph

V_{SO} : 52-55 mph



BORN
Over a Pint

BUILDING A BEAUTY

IT TOOK A COUPLE of years, but that fateful conversation in the pub really stuck with him.

“I’ve always loved the World War II aircraft,” he said. “[The replica] looked like a nice little project. ... The nice thing about this kit was it was all aluminum. Of course, working with aluminum, we thought that would be a great way to go about it. We had the know-how advantage, if you like, to build the aircraft without too much trouble.”

Bob ordered the kit, and he and his son got started on it in 2009.

“The aircraft kit arrived in the back of a truck in a big box, two large crates,” he said. “We offloaded it and gradually started pulling stuff out, bit by bit, on the hangar floor. ... The build books were very, very good. They were excellent. The drawings were good, mostly hand-drawn drawings, I might add.”

They started on the fuselage first, inverted, which Bob said made it easier to attach the wings later.

Once the fuselage was done, they built the wings. Bob said it was a gradual process, and they put the wings together bit by bit.

“It took a long time, but we were in no rush,” he said. “We didn’t do it all in one go. It took us quite a while to put together, but that was only because we were busy doing money projects.”

Given his background, and his son’s expertise, not to mention the duo’s access to their company’s facility and tooling, the build was pretty straightforward.

“As far as putting the aircraft together, everything went fairly smoothly,” he said. “We didn’t seem to have too many problems at all. It was a good learning experience.”

Throughout the build, Bob and Rob essentially stuck with the plans, making only minor modifications. Changes included beefing up the hydraulic brakes and running a hose from the chin cowl up through the engine compartment to improve cabin and engine cooling.

Speaking of engines, Bob’s faux fighter is powered by a 282-hp Isuzu V-6, with dual overhead cams and two high-pressure electric fuel pumps.

“[It’s a] very efficient engine,” he said. “You can get them with a V-8, but the V-8 is a little too much power for this.”

So, this Canadian resident’s Australian-designed, Texas-built replica of an iconic British airplane is powered by a Japanese engine. The engine swings an MTV-23B composite prop via a Supermarine propeller speed reduction unit geared at 1.86-to-1.

“It’s a beautiful German-born propeller, which is a little ironic really,” he said.

The prop is controlled by an engine control unit connected to a MoTeC SDL3 race car computer, one of the only things on the mostly analog panel that doesn’t look at least reasonably period correct.

“That gives us all the parameters we need — the oil, fuel pressures and temperatures, etc., etc.,” he said. “You can log the history of the motor. With that, you just plug in the laptop and away you go.”

The rest of the panel is a basic six-pack with the addition of a g-meter not too far from a placard that reads “aerobatic manoeuvres prohibited.” That restriction can only be lifted after testing by Transport Canada even though the airframe is rated for +6g’s/-4g’s. A couple of Trig units cover comm and transponder needs, including ADS-B Out. The gear and flaps are both electrically actuated, and the gear legs can be operated independently, though there’s no real need for that except during ground tests.

The centerpiece of the cockpit is a classic Spitfire-style spade grip that, combined with the view of those gorgeous elliptical wings through the Malcolm hood canopy, nicely completes the illusion.

That said, it would be unfair to continually think of the airplane as “nearly a Spitfire.” Yes, it does a credible job of reproducing so much of what made the original one of the most beautiful airplanes ever built, but cosmetics aside, it also happens to be a fast, fun, and maneuverable sport airplane in its own right.

SO, THIS CANADIAN RESIDENT’S AUSTRALIAN-DESIGNED TEXAS-BUILT REPLICA OF AN ICONIC BRITISH AIRPLANE IS POWERED BY A JAPANESE ENGINE.

FLYING LIKE THE FEW

IN SPITE OF HIS extensive aviation background, in some ways, Bob is early in his aviation journey. After a lifetime of working on and building airplanes, Bob has just a few hours of dual instruction under his belt.

“I know I’ve been in the industry, but I’ve never had the opportunity to,” he said. “I’d always been so busy that I’d never really thought about the flying aspect until about maybe 10 years ago.”

So, on August 24, 2014, after five years and about 1,250 hours of building, when the time came for the airplane’s first flight, Bob turned to a friend of his, an Australian 777 captain who flew for Air Canada.

“He said it flew like a dream,” Bob said. “No problem at all. ... It was just an absolute feeling of elation when we saw that aircraft take off. ... It was just so exciting.”

These days, Bob’s Spitfire is flown regularly by another friend, Don Whitton, a longtime pilot who has worked as an air traffic controller for the past 26 years. Don had about 55 hours in the MK26B at the time of writing this article and described a typical flight in some detail.



The custom manifold and exhaust stacks lend authenticity to Bob's replica.

BORN

Over a Pint



“Startup is basically turning on the battery, ignition, MoTeC display, then fuel pumps, then pushing the single starter button,” Don said. “In about 3 seconds she is up and running — the beauty of electronic ignition.”

While the wheelbase is narrow, the gear has a bit of toe-in to help stabilize things during the taxi. Being a taildragger, visibility is naturally limited, so Don taxis with the canopy and door open, S-turning as required.

“Run-up checks the independent electrical system and ignition timing sensor redundancy,” he said. “The prop is cycled to ensure the unit is working, and each pump is checked separately. The minimum required to run is at least one electric pump and the ignition system, which can operate from the battery alone for a period of time to get on the ground.”

Takeoffs, performed clean with flaps up, are straightforward but still require attention.

“The aircraft tracks nicely, but you have to keep your feet busy,” he said. “Power is applied smoothly with an awareness that the prop redline is met before the engine redline.”

The tail lifts off in about 200 feet, followed by the rest of the airplane in about 700 feet, once it reaches about 90 mph.

“I’ve been comfortable in as much as 12 knots [of] crosswind, but with the short longitudinal arm and small rudder, anything beyond that will result in a loss of rudder travel and associated weather-cocking,” he said.

Once he’s established a positive rate of climb, Don retracts the gear, sets the toggle switches to “up,” then pulls back on the dual gear levers to activate the motors, requiring a swapping of hands on the stick, not unlike the original. The retraction takes about 12 seconds, with one lagging behind the other, again, like the original airplane.

Power is set to 25 squared, which gives a 1,200 fpm climb at about 140 mph. The airplane likes to cruise with the prop set at 2000 rpm, which gives about 160 mph.

“But she can do much better if pushed,” he said. “ V_{NE} is 220 mph.”

He described the airplane as responsive in all axes but always wanting a little attention.

“In cruise flight, she does require a hand on the controls most of the time,” he said. “Because of lack of washout and engine and vertical stabilizer offset, P-factor and slipstream has its effect.”

Stalls are fairly routine but bring a noticeable wing drop when it breaks at about 65 mph clean, or 55 mph dirty.

When it’s time to come down, that Isuzu engine shows one of its advantages.

“Because she is liquid-cooled, just pull the power back and point the nose down,” Don said. “She likes to descend hot, but once you bring the prop up and level, she will nicely settle into a circuit speed of around 120 mph. The gear can come out below 125 mph.”

If there are any issues with the gear, release handles allow them to free-fall into position. The flaps can start coming down when the airspeed is less than 100 mph. They’re controlled by a toggle. Don generally applies them in three-second increments, each of which brings another third of their total travel.

“Full flaps isn’t for the faint of heart, because the descent rate is incredible,” he said. “I rarely use it.”

Don looks for 90 mph on final and flares to a level attitude, waiting for the mains to touch in a wheel landing.

“Best to let the tail settle on her own and use rudder to track as much as possible,” he said. “Once the tail settles, the visibility is gone out the window.”

The typical landing roll is about 1,500 feet.

“This airplane is a time machine of sorts,” he said. “It is loud, responsive, and requires more than basic skills to fly. But the most memorable thing to me is looking out the window at that elliptical RAF camouflage wing and transporting yourself back in time — flying over the farmland, approaching the cliffs of

Dover and the English Channel beyond, awaiting the enemy fighters, and preparing yourself for the battle of freedom.”

“THE AIRPLANE IS A TIME MACHINE OF SORTS.”

— DON WHITTON

ALTERNATE HISTORY

THAT TIME MACHINE might never have come to pass, how-

ever, if Bob had made a different choice when he was younger. You see, he almost didn’t take that engineering apprenticeship back in 1964.

“When I left school ... I also passed the qualification stages for art college in England,” he said. “My dad, being a sort of staid Englishman, said, ‘There’s no way you’re going to be an art major in college. You’re going to have to learn a trade somehow.’”

Bob has painted as a hobby for years. Occasionally, he sells his highly regarded work via the Canadian Aerospace Artists Association, so it’s safe to say that he’s found an admirable balance. As beautiful as his paintings are, his real masterpiece (so far, anyway) is the one that can be seen wheeling through the sky over Ontario in joyous tribute to the RAF pilots who fought so valiantly in their Spitfires so many decades ago.

“My dad was right,” he said. “It’s been a great career, a wonderful 55-year career for me, really, in the industry. And I’ve never been out of work, always been able to find work. Whereas if I’d become an artist, I probably would have starved to death by now.” **EAA**

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



From the Malcolm hood canopy to the iconic spade grip, the cockpit goes a long way toward providing the immersive Spitfire experience.





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THE 2020 RAFFLE AIRCRAFT



The Great 
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**YOUR
AIRPLANE
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THE GREAT EAA AIRCRAFT RAFFLE



BY JIM BUSH

The Great 
**Aircraft
Raffle**



This raffle aircraft — a PA-18 replica — is from-the-ground-up customized in a spectacular 50 Years in Oshkosh theme and paint scheme. And the best part? You can win because only 4,000 raffle tickets will be sold, making your odds exponentially better than EAA's previous sweepstakes format. The winner can also elect a cash prize of \$25,000 in lieu of the aircraft.

Raffle tickets are available for purchase at the EAA Aviation Museum in Oshkosh, and on the AirVenture 2020 grounds through 3 p.m. on Monday, July 20. Tickets are \$100 each. The drawing will be held at 5:30 p.m. on Monday, July 20 on Boeing Plaza.

This stunning aircraft is feature-packed and will be valued at \$150,000. When you make a raffle ticket purchase, you're supporting EAA programs that educate, engage, empower, and inspire the aviators and enthusiasts of tomorrow.

For more about the EAA Aircraft Raffle, including the official rules, see www.EAA.org/aircraftaffle. To learn more about how the airplane was built, see "The Great EAA Aircraft Raffle" in the October 2019 issue.

PROPELLER

Custom-crafted wood Sensenich prop with unique Oshkosh 50th markings.



WHY A RAFFLE?

THOSE PARTICIPATING in the EAA aircraft sweepstakes program consistently over the past several years have probably noticed that we have made several changes to this popular program over the past two years. Most significantly, we went to electronic submission of entries in 2018 and changed the sweepstakes to a raffle in 2019.

So, why the changes? First and foremost, EAA must be a good steward of member resources. Over the years, the cost of the program kept rising due to the number of sweepstakes entrants — topping out at more than 400,000. Because it was a sweepstakes, any person could enter and many non-EAA members did. Also, less than 1 percent of entrants made a voluntary contribution as part of their sweepstakes entry to support EAA's education and outreach programs. As the number of contributions fell and entrants went up, nearly 50 percent of every dollar taken in through the sweepstakes program was for its administration. This situation was not acceptable. This is especially true for a program that was conceived and operated for several decades to provide vital support for EAA programming.

The new raffle format provides several advantages. First, entries are limited to 4,000. This creates remarkably better odds to win the airplane rather than the old sweepstakes program that had more than 400,000 entries. Second, the required \$100 raffle ticket fee guarantees that we will generate sufficient revenue to support EAA's growing educational and outreach programs. These programs include KidVenture, Young Eagles, and museum education programs such as Space Day and Winter Flight Fest. These aviation-infused STEM (science, technology, engineering, and math) programs engage more than 42,000 youths per year.

While tradition at EAA is important, being a good steward of our members' dues and philanthropic resources is even more important. If you have any questions or concerns about the raffle or want to purchase a ticket, please contact Ken Strmiska, EAA Aviation Foundation vice president for philanthropy and donor stewardship, at kstrmiska@eaa.org.

AVIONICS

Classic meets modern as the timeless Cub lines combine with the latest high-tech avionics from Garmin installed in a SteinAir panel.



POWERPLANT

100-hp O-200, overhauled by Don's Dream Machines.



COVERING

The airplane is covered with the Airtex Coatings system, and painted in striking, one-of-a-kind Oshkosh 50th markings created by Scheme Designers.



THE GOOD, THE BAD, AND THE BEAUTIFUL

The Wade brothers, Ron and Don, two award-winning aircraft builders and restorers, have generously donated this one-of-a-kind airplane to support EAA's programs.



The Great 
**Aircraft
Raffle**

SPECIFICATIONS

AIRCRAFT MAKE & MODEL: Patriot Aircraft LLC PA-18R

CERTIFICATION: Light-sport aircraft

LENGTH: 21 feet, 2 inches

WINGSPAN: 36 feet, 8 inches

HEIGHT: 7 feet

MAXIMUM GROSS WEIGHT: 1,320 pounds

EMPTY WEIGHT: 850 pounds

FUEL CAPACITY: 18 gallons (single, left tank)

SEATS: 2 (tandem style)

POWERPLANT MAKE & MODEL: O-200, overhauled by

Don's Dream Machines

HORSEPOWER: 100 hp

PROPELLER: Sensenich custom wood

CRUISE SPEED/FUEL CONSUMPTION: 95 mph/4.5 gallons per hour

EQUIPPED FOR: Day/Night VFR

CONTACT: Patriot Aircraft LLC

205-230-5787

patriotaircraftllc@yahoo.com

50TH ANNIVERSARY

Every detail of the airplane commemorates the 50th consecutive Oshkosh fly-in, including the N-number.

SEATS

The plush custom seats came courtesy of Oregon Aero while Hooker Harnesses will keep the new owner safe and secure.

THE PATRIOT AIRCRAFT FAMILY

Just some of the skilled and dedicated team responsible for building the airplane from the ground up. Located in Bessemer, Alabama, Patriot Aircraft is a family operation, from Ron and Don all the way down to future pilot Walter.





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Eau Claire, WI • June 12-14

Lunken Airport Days

Cincinnati, OH • September 5-7

AOPA Fly-In

Rochester, NY • September 11-12

Fort Worth Alliance Air Show

Fort Worth, TX • October 16-18

Visit EAA.org/Tour for more information.



JULY

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Douglas A-1 Skyraiders in front of Stinson
Crew: 1
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Length: 38 feet, 10 inches
Wingspan: 50 feet
Armament: 100 20 mm cannons; 15 external pylons for up to 8,000 pounds of bombs, rockets, and munitions

STUDENT
JULY 20 - 26



*Free admission for youth 18 and under has been generously supported in part by  **BOEING**



Once altitude permits, I like to turn 45 degrees left or right of centerline so that in case of an engine failure it is a shorter turn back to the runway. Leveling off at 2,000–3,000 feet above the airport is a safe altitude and will allow for enough power to break in the engine (except for high-altitude airports).

First Flights

Make sure you and your airplane are ready

BY VIC SYRACUSE



I AM GOING TO break from maintenance this month and spend a little time on a critical part of keeping the fun factor alive — first flights. After all, we typically build and fly the airplane for a while before we have to do any maintenance.

We spend a fair amount of time in the EAA safety committee meetings discussing the accident rate for experimental aircraft. The data show we have made huge progress in the last 10 years. However, we are still not on par with general aviation as a whole, and the first 8-10 hours seem to be the highest contributors to the accident rate. Having made a bit more than three dozen first flights myself, I thought I'd share with you some best practices that should help reduce the risks.

There's no doubt that many of us tell our friends and family that we really aren't flying experimental aircraft. They are just amateur-built aircraft. In fact, some of the more popular and proven kits on the

market today border on assembly projects, with everything included except the battery and paint. So, it's not really a stretch to say we aren't flying experimental aircraft. I pretty much agree with that frame of thought after the Phase I test flying is complete, and then I still tell everyone to not trust their aircraft until it has flown at least 100 hours.

Why? Even though the kits are pretty complete, there is still a lot of room for customization, especially in the area of avionics and interiors. There's also room for mistakes during the building process — dare I say loose jam nuts and lack of proper travel on engine controls? So, most definitely the first flight should be categorized as experimental.

A best practice I have always used is to think about how your airplane might be different from the prototype or other flying aircraft.

There's a lot going on during the first flight, especially during the initial climb. Most likely, it's the first time the engine has been under full power for that length of time. Once you are off the ground, there is the opportunity for a whole host of other distractions, and they will come at you pretty fast. This is especially true with some of the lighter and higher-powered aircraft, such as the RVs. If you haven't taken the time to practice by doing some "chair flying" and simulating some of the distractions, there's a good chance that your reaction could be wrong, and even fatal. In the 12 years I have been a designated airworthiness representative, I have seen a real change in this area when certificating new airplanes. Early on, it seemed as though the vast majority of builders couldn't wait until I left so they could reassemble the airplane and go fly it. In the last few years I have seen a greater majority ask for help by using the Additional Pilot Program, making use of the *EAA Flight Test Manual*, and even getting transition training. I do remind all of

them that it is no longer a project. It is now an airplane and needs to be treated as such.

So, what can you do to help with preparation? Well, take the time to make a list of everything that might be working for the first time and consider various failure scenarios and how you should react. Have the discipline to create a "Before Takeoff" checklist — and use it! It could save your life.

Let's walk through some examples. No doubt by

now you have been playing with the control system on the ground. Once those controls get airflow over them, they are going to feel different. How should you react if the pitch trim seems too heavy at rotation, or perhaps is even reversed? Yes, it happened to me on one early test flight. I really thought I had checked the trim operation. Sure enough, I started trimming for more nose-up on



Every builder should procure a copy of the EAA Flight Test Manual prior to the first flight and use it for Phase I testing. The data that you will collect will be invaluable in putting together a pilot's operating handbook for your aircraft, along with drastically increasing the safety factor during the test program.

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Left: This is the time for the final checklist and a quick review of the Emergency Action Checklist. I make it a habit to have everything in the cockpit prepped prior to engine start, especially with a new engine, so that ground time is minimal. Coordination with ATC at towered fields is a must prior to engine start.

takeoff, and the stick force continued to increase in the opposite direction than I was expecting. My reaction — STOP using trim and fly the aircraft. I also reduced power to make certain it was a controllable out-of-trim scenario. Once I got some altitude, I verified it was reversed.

The next thing you might feel right after takeoff if you haven't balanced your tires is some shaking in the airframe as the tires slow down. It doesn't usually last long, but it can be a distraction. Right about this time is when an unlatched door or canopy will come open. You did use that checklist, right? I lost a friend last year to this scenario. The passenger door on his RV-10 came open right after takeoff.

Speaking of checklists, many other facets of flying, such as airline and military, have what are called "Emergency Action Checklists." They have to be committed to memory and demonstrated before you even get to fly the aircraft. There's a reason for them. Some things do require immediate action — such as engine fire, smoke in the cockpit, etc. — but the most paramount thing is to *fly* the aircraft. Know before you begin your takeoff roll those items for which you will *abort* the takeoff if runway permits; if not, then know the correct action to take. Practice these scenarios sitting in the cockpit until they become second nature. You should be able to activate all controls blindfolded, such as turning the fuel off, cycling ignitions, opening air vents, using the fire extinguisher, etc. Think about having smoke in the cockpit that is burning your eyes and nose at the same time.

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So, what can you do to help with preparation? Well, take the time to make a list of everything that might be working for the first time and consider various failure scenarios and how you should react.

With all of the electronics in our cockpits, it is super easy to get distracted by noncritical items, and that is a primary reason why I am a firm believer in the Additional Pilot Program (assuming you use someone who is familiar with your airplane and perhaps even an instructor). I have witnessed how builder pilots react on first flights when alarms start going off because they are so primed for a potential problem. Every alarm that I have seen so far has been due to limits not being set correctly in the configuration or simple things such as an alternator failure that don't require any immediate action. In one case, the pilot noticed the stick force was increasing as we leveled off from climb, and the trim was no longer functioning. The proper action is to reduce speed or continue the climb, so as to relieve the stick force. That worked, and we realized that the trim

didn't work above a certain speed. Since it was the first flight, and breaking in the engine is an important part of the first flight, we just adjusted the trim while we were slow for what we thought it should be at a faster airspeed. That worked great, and of course, we knew it worked for slower speeds, so trimming for approach and landing was no problem.

A best practice I have always used is to think about how your airplane might be different from the prototype or other flying aircraft. This approach saved my life one day when it came time to make the



Many electronic flight instrument systems allow the creation of a checklist customized to your airplane. Strict adherence to the checklist will minimize the risk during the stress of a first flight.

first flight of my Prescott Pusher. Mine was the first customer-built aircraft to fly. I realized that the factory test pilot was about 30 pounds heavier than I was. So, I placed a 25-pound bag of lead shot in the seat next to me. When the aircraft broke ground for the first time and I had the yoke all the way forward and the nose pitch was still increasing, I realized I had a CG problem. I grabbed that bag of lead and threw it up underneath the co-pilot's rudder pedals, and it dramatically made a difference! I am lucky to be here to share that experience with you.

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CHECKPOINTS

Right: At this point in the rotation, you should start to recognize an out-of-trim or CG problem. Hopefully, you have enough runway to abort the takeoff. Aborts should be deliberate and practiced. Don't forget the brakes are new and may not be thoroughly broken in yet, meaning stopping distance could be longer than expected.

Another best practice I would encourage you to do is to make that first flight without a lot of fanfare. It will take the pressure off you to meet a schedule. Plus, on the off chance there is an incident or accident, you really don't need a bunch of people to see it. Have only the necessary people present, and make sure to inform those who are there what to do in case of an accident. When I do test flights at towered fields, I always place a call to the tower to let controllers know it is a first flight and to ask when is the best time for them to accommodate it. By the way, I am against having chase planes on first flights. I know it's done in other facets of aviation, but most of them are professionals and familiar with formation flights and the added risks of being in close proximity to other aircraft. In our amateur-built world, it is not a best practice.

The last thing I will recommend is that the cowling should come off after the first flight and everything should be inspected closely. Of course, you used a torque seal indicator on all of the nuts and fittings, so you should be able to quickly identify any loose fittings.



Now it's time to go have more fun! Use the *EAA Flight Test Manual*, and the rest of the flights in Phase I should be controlled testing. *EAA*

Vic Syracuse, EAA Lifetime 180848 and chair of EAA's Homebuilt Advisory Council, is a commercial pilot and A&P/IA, DAR, and EAA flight advisor and technical counselor. He has built 11 aircraft and has logged more than 9,500 hours in 72 different types. Vic also founded Base Leg Aviation and volunteers as a Young Eagles pilot and an Angel Flight pilot.

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The First 20 Seconds

How a hang glider led to a lifetime in aviation

BY RICK LARSEN, EAA VICE PRESIDENT OF PROGRAMS, CHAPTERS, EDUCATION, MUSEUM, AND AIRVENTURE FEATURES AND ATTRACTIONS



I CAN HONESTLY SAY that I can't remember a time when I was not interested in airplanes and aviation. When I grew up, we lived in the Chicago area, about 3 or 4 miles north of O'Hare. On Friday nights, I can remember my mom and dad putting lawn chairs in the car and driving over to the airport to watch airplanes. Cars would be lined up and down Mannheim Road with other people

doing the same thing. I remember so vividly, back when jets were still fairly new, just sitting there watching all of those airliners take off and land.

My dad and my older brother had the bug, too. Building plastic models and then flying control line airplanes was a regular thing around our house. In 1970, when I was 13, my dad and I flew our first RC model, a simple tri-gear trainer by Sterling Models called the Royal Coachman. I've been building and flying RC models nonstop ever since. To this day, that original Royal Coachman hangs in my office at EAA in Oshkosh, Wisconsin.

Not long after I got my start in RC flying, I was looking at one of my dad's magazines, either *Popular Mechanics* or *Popular Science*, and I read the first article that I'd ever seen about hang gliding. This was about 1971, in the early stages of modern hang gliding out in California. My initial thought was, "I could go do that!" I was amazed at the idea that flying suddenly seemed achievable, even as a young teenager. Here's this guy with this simple contraption made

from bamboo, Visqueen, and a lot of duct tape, and he's flying. My buddy Scott Tittle and I read every article we could find and talked about almost nothing else for the next couple of years. We just knew that this was something we were going to get into. We assumed at first that we'd have to make a trek out to California to give it a try — the flat suburbs of Chicago obviously weren't conducive to hang glider flying, especially when compared to the mountains out west.



Luckily for us, a couple of local entrepreneurs didn't agree. A business called Apollo Skysails opened up right across the street from our high school. I have no idea how we managed to convince our parents that it was okay, but we did. Scott and I started training with Apollo Skysails right away. There were about 20 of us in the class, both men and women of just about all ages. The first few lessons didn't involve any flying, just a lot of time holding the glider, learning to keep it neutral based on the wind, and how to run with it.

Once we were comfortable handling the glider, the class headed over to Fox River Grove, a small town about 40 miles northwest of Chicago. Fox River Grove was — and is — home to the Norge Ski Club that was founded in 1905 and consists of a series of ski jumps that are used in annual competitions. The highest jump is built on a structure that's more than 200 feet tall that leads to a landing hill that itself rises about 150 feet or so from the surrounding terrain.

It was no mountain, but, as it turned out, it was enough.

It took about 20 minutes to lug 50 pounds of glider up the hill. After the inevitable false starts and bungled attempts where I wound up sliding down the hill on my chest and face, everything clicked. I took two or three steps and suddenly I was flying. Thanks to the 4-to-1 glide ratio of that early Rogallo wing, the hill that seemed to take forever to get up only took about 20 seconds to get down, but I didn't care. I was a sophomore in high school, and my flying "machine" was something I carried on my back. It was pure magic — an absolutely amazing feeling — and it was the same on every flight.

Scott and I bought a used Chandelle hang glider, and we spent our high school weekends driving from Chicago around the bottom of Lake Michigan over to Warren Dunes State Park, just across the border between Indiana and Michigan. The highest dune, Tower Hill, rises about 240 feet above the beach, which, combined with the breeze off the lake, made for pretty good gliding conditions. On a typical day, we'd each get in six or eight flights, trading off with both of us carrying the glider back to the top. It was about a 20-minute hike each time, but the sand made it more challenging where it seemed like we'd slide back down a step for every two we made forward. Most of the flights were still under a minute, just following the contour of the dune. Once in a while, when the breeze was right, we'd make it up to 75 or even 100 feet high and get a little taste of what soaring would be like.



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Even the shortest flights were absolutely worth it. Neither of us ever had a single complaint about the time and effort it took to get from the bottom back to the top, as long as we got those seconds of pure magic of stepping into the sky and floating gently down to the beach over the tops of the dunes. Scott and I flew all through high school and got together on weekends home from college before life and careers took us in different directions geographically.

I went to Embry-Riddle and got my bachelor's degree in aeronautical studies and my master's in business administration in aviation. I'd dabbled in engineering as a freshman and, after a year of physics and calculus, vowed I'd never do that again. My first job after I graduated was with Douglas Aircraft, and it was, you guessed it, in engineering. I spent a couple of years there as a reliability and safety engineer. Then I got hired by Midway Airlines in its maintenance department. After four or five years, I moved over to the marketing department and spent

It was pure magic — an absolutely amazing feeling — and it was the same on every flight.

the next 25 years in that role, first for Midway and then as vice president of marketing at ATA Airlines. After that, I came to EAA, also as the marketing vice president.

Even though I was immersed in aviation professionally that entire time, I didn't do much flying myself. The hang glider stayed in storage at Scott's house, and I scratched the aviation itch by building and flying RC models. I'd go to EAA AirVenture Oshkosh every year with our youngest daughter, Erica, who now flies for Delta. We'd hang out by the ultralight field and watch and dream and come home with a big bag of brochures. Finally, in 1999, my wife, Pat, turned to me and said, "Will you just go do it?" I spent some time talking to Carla

Larsh, EAA 245755, who spent many years as the chair of our Ultralight & Light-Sport Aircraft Council. She and her husband were operating a small airport in Indiana, focused on ultralights, and she helped me line up an instructor and some hangar space. I bought a Quicksilver MX kit, having known the Quicksilver name from the early days of Eipper Formance and hang gliding, and built it over the winter. Then, after about five hours of dual in a two-seater, I soloed in my MX.

I absolutely loved flying the Quicksilver and put about 200 hours on it over the next few years. Other than the sound of the engine, and lack of hiking uphill, the Quicksilver captured a lot of the same feelings of those early

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days in the hang glider. It's that same, wide-open experience, that direct connection to the wind and the elements, and that same magic of flight, all thanks to a remarkably simple machine. I loved nothing better than to hop in it after work and get up and around shooting landings until sunset. A typical log-book entry back then shows nine landings in less than an hour of flying.

The Quicksilver eventually gave way to my J-3, an airplane that by comparison is a bit more complicated but still keeps me connected to the simple and pure end of the flying spectrum. I'm still a low-and-slow pilot, and still love to get up after work with the door open and see how many landings I can get in before the sun goes down.

When I look at the world of ultralights today, I see nothing but excitement and possibility. Hang gliders have evolved a lot since my early days, and paragliding has come into its own in a big way. Powered paragliders and parachutes are making the magic of flight more accessible and attainable than ever, and

more traditional ultralights are seeing a lot of renewed interest as well.

Hang gliders and ultralights changed my life. They took the idea of flying and changed it from a distant — if persistent — dream into a simple and wonderfully fulfilling reality. If you've never flown, it's easier and more affordable than you think. And if you're a high-speed, A-to-B kind of pilot, you owe it to yourself to take some time to explore the perfect simplicity of the lighter side of flying.

In case you're wondering, Scott and I are still friends. We kept that original hang glider for something like 30 years until we agreed to donate it to the EAA Aviation Museum. After everything that simple kite did for me when I was a kid, it sure feels good knowing that it's still a part of my life. *EAA*

Rick Larsen, EAA Lifetime 9006212, is EAA's vice president of programs, chapters, education, museum, and AirVenture features and attractions. When he's not at work or building and flying RC models, you can find him shooting touch-and-goes in his 1939 Piper J-3 around sunset.



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Hardly a high-tech tool, the lowly shop vacuum can be pressed into doing on-the-job janitorial services at the source of the mess.

Shop Vacuum as a Tool

Keeping things clean as you go

BY BUDD DAVISSON



IT'S INTERESTING HOW MANY tools we use without realizing we're using them. They're just part of what we do in the shop. Take the lowly shop vacuum for instance. Yes, it's basically an electric broom for cleaning up. Not terribly exotic!

However, recently, as I was setting up my home-made, vise-mounted routing table, I realized I often use my shop vacuum as more than a cleaning tool.

I sometimes use its ability to suck dust as a "prevent-a-mess" tool.

First, let me put this "prevent-a-mess" concept in context. That context is my less-than-spacious and basically messy shop. It's the back half of a narrow four-car garage (two cars wide, two deep). The back half of the shop is jammed with most of the tools you'd need to work wood or steel for virtually any purpose — welding, sawing, sanding, you name it. It is literally 20 pounds of tools in a 5-pound bag with enough room left over to accommodate a fuselage or a car. However, it's never a good idea to be working steel and wood in the same space. Plus, all of that "stuff" both collects dust and makes dust. Lots of it!

Router Table

Routers, as mounted in a DIY router table, may very well be the king of the workshop mess makers. They do their jobs incredibly well. However, their cutting action generates not only copious shavings but also a small tornado that spreads them around. Clamping the shop vacuum's nozzle close to the scene of the action doesn't let even a little mess escape.



Some tools — notably sanders, routers, and saws — are designed specifically to make messes. They reduce valuable materials like steel and wood to tiny particles that are guaranteed to seek places to land you can't easily get at to clean. So, try to catch them before they go where you don't want them to go. A good way to keep the dust collection and the attendant shop-cleaning problems to a minimum is to try to catch dust at the source. You can use the shop vacuum to grab the dust as it is being made.

There are some sophisticated dust collection systems in which a central vacuum is piped to each tool that makes dust. However, my approach is to keep it simple and keep it cheap. Besides, most of us use the dust-producing machines only occasionally so we need to catch dust once in a while, not constantly.

Enter the shop vacuum. Especially, the flat nozzle, which probably has a name but no one knows what it is. (*The consensus among popular manufacturers is "utility nozzle."* — Ed.) It focuses all of the unit's vacuum-producing horsepower into a narrow area. In so doing, it causes a pretty substantial wind some distance from the nozzle's nose that pulls anything remotely light into it. If sawdust or metal grindings are even in the general vicinity, they are immediately sucked into the belly of the noisy beast.

Generally, I use a gigantic spring clamp and/or a combination of wood scrap to fasten the little sucker (an intentional play on words) close to where the cutting, grinding, and sanding is taking place. Zero complexity is involved. Take a look at the photos. Rube Goldberg would be proud of the concepts. *EAA*



Bench Sander

A small, 4-by-36 sander is handy, easy to move around to where it's needed, and spits waste out in a predictable direction. A small piece of scrap 1-by-2 is clamped to the sander base to give a place to clamp the vacuum nozzle.



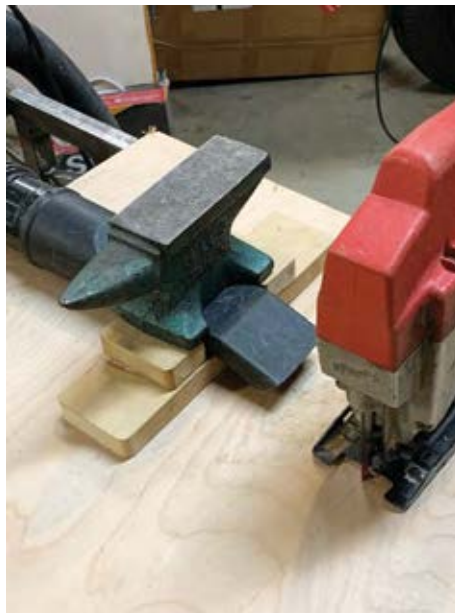
Stationary Sander

A 6-by-48 stationary sander is one of the most-used tools in the shop, but it makes a terrific mess spitting sawdust or steel grinding dust out its exhaust port. PVC wastewater plumbing to the rescue! A few minutes at Acme Hardware and everything needed to plumb the trusty shop vacuum into place was in hand. By the way, don't follow wood sanding with steel grinding without cleaning the unit unless you like the smell and fear generated by smoldering sawdust. Ask me how I know.



Band Saw

A little 12-inch Craftsman band saw came to fill the place of my massive 20-inch Walker Turner when moving west. The Walker Turner wouldn't fit in this workshop, and I no longer have a need to rip railroad ties. The baby saw was in use for probably five years before I discovered that it had an exhaust port sized to fit the shop vacuum hose. It's a 30-second hookup and a real lifesaver.



Jigsaw

When cutting anything with a jigsaw, the sawdust jitter-bugs in all directions, so the vacuum nozzle is positioned where it's needed. A rudimentary cradle helps hold it. Yes, the miniature anvil is a little dramatic, but the weight is necessary to control the hose.

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GPS ANTENNA COVER

BY MIKE BUSCH, EAA 87836

GPS ANTENNAS, along with other popular flat avionics antennas, display the caution “Do Not Paint” molded into the top of their white plastic cover. Depending on the aircraft design and construction, you may find that the only antenna mounting option is to position the antenna on your instrument panel glare shield inside the cabin.

When mounted in this location, the white antenna case can reflect sunlight onto your windshield creating a blind spot or distraction for the pilot. This issue can be addressed using a black cloth headset ear-phone cover. The elastic around the edge of the cover will hug the antenna and keep the cover in place. The dark color of the cover will eliminate reflective glare on the windshield and eliminate the distraction.



LUBRICATING HARD TO ACCESS POINTS

BY JACK SCHNURR, EAA 203879

WHEN PERFORMING MY CONDITION inspection this year, I got to the lubrication part (which I always dread because of the mess) and decided that there had to be a better way to do it.

I use LPS 2 multipurpose lubricant for most places, which usually results in



a lot of overspray from the spray can. To avoid the overspray mess, I ordered a lubricating kit from Amazon, but you can find similar items at a variety of retailers. The kit consists of a collection of squeeze bottles and needle tips of assorted sizes. The spray can is dispensed into the bottle, which is then fitted with one of the dispensing tips. The appropriate tip can be placed so a small amount of lube can be squeezed out exactly where you want it with no overspray.

This worked very well. I recommend it!



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HOMEMADE WORK LIGHTS

BY BRIAN LEE, EAA LIFETIME 149802

WHEN WORKING IN THE hangar or shop, it always helps to have a well-lit work area. In the dark of winter here in the north, the two small bulbs in the municipal airport hangar I'm using just don't cut it, and working with a flashlight in my teeth is just no fun anymore.

The local tool supply store recently had a sale that offered a solution to my lighting issue. On sale were 4-foot LED tubes and furniture dollies. Not a combination that would seem to go together. However, using these items along with some scrap material, I devised a way to get more light where I need it.

I built two fixtures, one high and one low. The high one provides light over the shoulder and can pivot around the center of the tubes for versatility. The low one works for applications where you need light down low, such as when working on landing gear or under the aircraft. Depending on where you need the extra light, this low fixture can be used either vertically or laid on its back.

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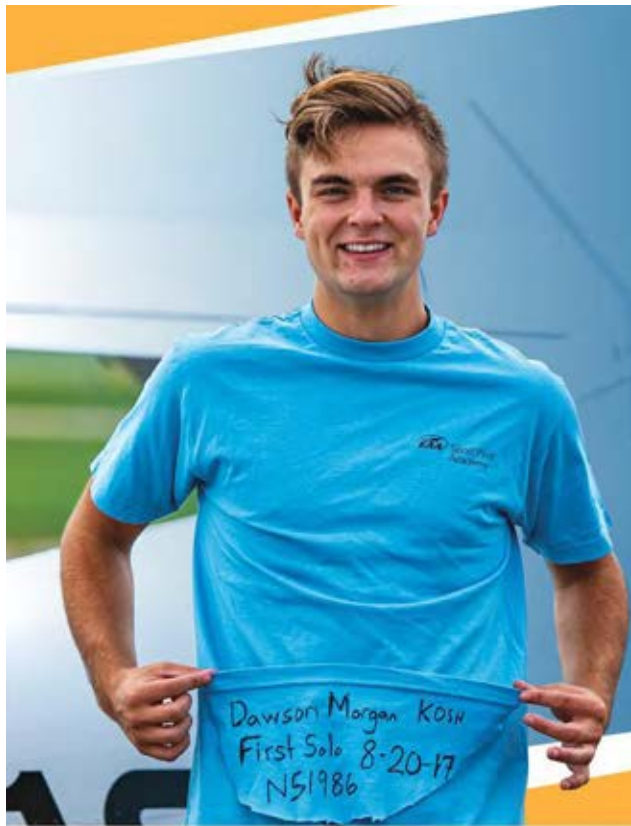
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Four-Place Rocket Ship

Massachusetts Van's Aircraft RV-10

AFTER I RETIRED IN 2011, I moved to the Falmouth Airpark, transitioned to sport pilot, and built an RV-12. However, when BasicMed came along, I was no longer restricted to light-sport aircraft, so my partner, Sherry, and I started on the RV-10. The empennage kit arrived in February 2017. Working mostly in our basement, that subkit was essentially completed by September 2017, and we decided to save time with a quick-build fuselage and wings.

I found that the flush solid rivets on the skins of the -10 were more difficult than the pulled rivets on the -12. That's the price to pay for

speed. Doing the pulled rivets on the -12 was a one-man job, but the solid rivets on the -10 required Sherry's help. When it came to a major event such as mounting the wings or engine, a couple of phone calls recruited more than enough helping hands in no time.

Our wings and initial fuselage work came on quickly, and we soon mated our tail cone to the front fuselage. However, the fiberglass canopy, door, and cowling work seemed to go slower and required more perseverance

to keep working during the cold New England winter weather. The old saying "try to do something every day" helped me to keep at it.

We decided to order all Garmin avionics (G3X, G5, GTN 750, etc.), a Tosten military-style grip, and a brand new Lycoming Thunderbolt IO-540 with a Hartzell VP prop. SteinAir helped us with the control panel layout and fabrication, but Sherry did all of the wiring herself. This started with the front fuselage cover and control panel on our dining room table during the winter months of 2017 and early 2018 while I was out in our unheated garage shaping the fiberglass canopy.



AIRCRAFT SUBMISSIONS

Share your craftsmanship with *EAA Sport Aviation* readers worldwide! Send us a photo and description of your project and we'll consider using it in "What Our Members Are Building/Restoring." Please include your name, address, and EAA number. We reserve the right to edit descriptions.

Web: www.EAA.org/submissions

Mail: EAA Publications, Aircraft Projects,
P.O. Box 3086, Oshkosh, WI 54903-3086

Email: editorial@eaa.org

We delayed the order of the expensive GTN 750 GPS/nav/comm until the aircraft was mainly complete because of its shorter warranty and in case it became obsolete. SteinAir kindly lent us a rack unit so that we could do the metalwork and wiring for this in advance.

The canopy, windows, and doors were fitted to the wingless fuselage on a wheeled table. The engine was mounted with the fuselage still on the table. Soon after that, the undercarriage and wheels were installed and the table was removed.

I ordered the Airflow Performance fuel servo and a single experimental six-cylinder electronic ignition. This nonstandard setup required special mounting brackets supplied by Airflow Performance and different length fuel hoses, but I was able to use the original Van's supplied control cables.

By February 2019, we had nearly run out of jobs to do, but the electronic ignition had still not arrived. So, we changed at this late stage to Electroair (EA) ignition. This came with a six-cylinder coil pack, which I mounted on the firewall. I removed the ignition key switch from the control panel and cut a large hole for the EA ignition switch panel.



After weighing the completed aircraft, I calculated that with me flying solo, the CG would be very near the forward limit, so I put in more than 100 pounds of stones in the baggage compartment.

The aircraft was signed off, and the first flight was in April 2019. It flew like a rocket on its first flight. In a small community like ours, you have no secrets. The word gets out, and people converge on the “Shack” (our airpark community building) to monitor the radio and track the flight on their computers or smartphones. The ADS-B worked the first time, so everybody could get a log of the first flight!

The first flight issues list included one partially blocked fuel injector, one or two avionics wiring problems, some G3X software setup changes, nonreading fuel gauges, and a need for a small trim tab on the rudder. All of these issues were fixed over the first few flights.

In the 40-hour Phase I test flying while running in the engine, I had high CHTs in the climb at full power. However, with reduced power, I could stay in the green and still get a rapid climb, even in the very hot summer weather. Now that it's winter and the engine has run in, the overheating problems have gone away.

The old saying “try to do something every day” helped me to keep at it.

I saw from online sites that the fuel gauge problem is common on RVs. It turned out that there was an open circuit between the flange on the fuel level sender and the wing tank rib it was screwed to. The

instructions say to dip the screws in Proseal and not tighten them tightly so as not to squeeze out the Proseal behind the sender flange. I had forgotten to go back a week later to tighten the screws after the sealant had hardened. A quick retightening of one or two screws restored the fuel level readings on the G3Xs.

We completed the 40 hours and then flew a practice cross-country to New Jersey and back before EAA AirVenture Oshkosh. Along with several neighbors, all in various forms of transport, we made it in one day (IFR) from the East Coast to Oshkosh, Wisconsin. A huge thanks to many friends and neighbors for their help and advice on the project. We have a truly remarkable four-seat IFR and night-equipped 200-mph rocket ship.

Richard Dupée, EAA 551203; East Falmouth, Massachusetts
Email: rdupee@gmail.com



PENNSYLVANIA TAYLOR AIRCRAFT E-2 CUB

AFTER 44 YEARS IN storage, my E-2 flew again on June 12, 2019. This 1935 E-2 Cub, NC15009 (serial No. 174), is one of only 24 remaining from the 353 Cubs that were built in Bradford, Pennsylvania, by the Taylor Aircraft Co. This aircraft has passed through many owners over the years, accumulating 1,630 hours by August 1959. Most of that time was with the Washington, D.C., Soaring Club, and so it has been repaired many times, training pilots after World War II.

With a pilot and passenger on board, the E-2 will struggle to reach 300 feet AGL a mile off the end of the runway and will then cruise at 55 mph. The E-2 is powered by a 37-hp Continental A-40 engine with a single mag. As a low-cost trainer, the E-2 was certified with just four instruments, no airspeed indicator, no compass, no

brakes, no carburetor heat, and a tail skid. The open-cockpit, parasol design provided a true seat-of-the-pants experience for new pilots, especially in the cooler weather. This low-cost design, priced at \$1,425 in 1935, was exceptionally popular with flying schools across the country.

Enhancements to the E-2, which led to the separation of Piper and Taylor, resulted in the J-2 Cub. The J-2 was further modified with larger engines and an increased gross weight, which became the famous yellow J-3.

Mark W. Stewart, EAA 412692; Erie, Pennsylvania
Email: stewartmw@aol.com

MISSOURI WAG-AERO WAG-A-BOND

I RECEIVED THE WAG-A-BOND plans in September 2009 and began fabricating the ribs right away. It took 10 years to complete, which included some of the normal life delays along the way. It's powered by a Lycoming O-235 with a Sensenich metal prop, which is a fantastic climb and cruise combination. I installed mostly steam gauges but added a Garmin G5 for a bit of technology. I covered and painted it using the Poly Fiber system, which was an easy process to master. I received the airworthiness certificate in August 2019 and did the first flight in September, almost 10 years to the date of gluing up the first rib. It was a challenging yet enjoyable build. Not for the faint of heart, but educational and rewarding.



I would like to thank my father, Jerry Wood, who helped and supported every step of the way; my master A&P mechanic, Tom Dahlmann, who did an excellent job of overhauling the engine and provided sound technical advice along the way; and Jim Davis, who helped inspire me to push hard and complete the project. Lastly, I would like to thank my family for all the support for this crazy project over the years and not minding hanging out in the hangar or lending a helping hand when I needed it. Look for me at EAA AirVenture Oshkosh in 2020!

Steven Wood, EAA 1004117; St. Louis, Missouri
Email: sw317@hotmail.com

OHIO VAN'S AIRCRAFT RV-12

I'VE DREAMED OF OWNING an airplane since I got my private in 1992. In 2012, I did the Van's Aircraft factory tour and took a flight in an RV-12, which was amazing. After consulting with my family, we agreed and decided to take the plunge.

Over a period of five years, I built the RV-12 in my garage and then moved it to a hangar at Warren County Airport (I68) to finish. I progressed as quickly as I could afford to buy each kit. The final inspiration came when I had the opportunity to participate in the 2018 One Week Wonder and watch that airplane go from a kit to ready to fly in a week.

My RV-12 has a single Dynon SV-HDX1100, autopilot, ADS-B In/Out, and an interior by Flightline Interiors. Kendall Horst and the



team at Lancaster Aero did a fine job painting it, and I'm super pleased with the results.

I was fortunate to find a fellow RV-12 builder, Joe Marconi, in town. Help from him, the VansAirforce.net forum, Van's support team, and fellow builder logs helped me throughout the process. Special thanks to my wife and family for their support. On December 4, 2018, N418MJ and I made the first flight. Just seven months later, I made my first flight to EAA AirVenture Oshkosh in an airplane that I built. Dreams do come true.

Mark W. Johnson, EAA 1091805; Liberty Township, Ohio
Email: mwjohn63@gmail.com

UTAH BEARHAWK

AFTER COMPLETING AN RV-7, I found a quick-build four-place Bearhawk kit that had been passed around among four builders with limited completion. Having never done fabric work, I attended an EAA fabric workshop, used the Poly Fiber workbook, watched YouTube videos, and garnered insights from those who had done it to finish the fuselage and cover all the control surfaces. I learned a lot and had fun along the way. Using a friend's paint booth, I applied the yellow and silver followed by the vinyl stripes.

Power is supplied by a 260-hp Lycoming O-540 engine turning a Hartzell 84-inch propeller. It has a Vetterman exhaust system with two mufflers. The panel houses a single Garmin G3X electronic flight instrument system, a Garmin 696 GPS, a Garmin GTR 200

radio, and an Icom 200 radio. ADS-B Out is through a Garmin GTX 23 ES and Garmin GPS 20A. My ADS-B In is through a ForeFlight Sentry receiver connected to an iPad via Bluetooth.

It took me seven years to build with the first flight in August 2019. Even with the quick build kit, it takes a solid commitment with a fair amount of fabrication and parts chasing, especially if you are customizing to your requirements.

It's not as fast as my RV-7, but it's more capable of hauling me, my wife, and more camping gear than we'll need into and out of most backcountry airstrips. *EAA*

Terry Small, EAA 1148321; Vernal, Utah
Email: n864tk@hotmail.com





Honor those who loved aviation.

Commemorate your loved one with a personalized plaque on the Memorial Wall for this year's dedication ceremony at EAA AirVenture Oshkosh 2020.



The Memorial Wall expansion is now underway. Learn how you can honor the memory of those gone west or add a stone on behalf of your EAA chapter at EAA.org/MemorialWall.

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Gone West

Not alone into the sunset but into the company of friends who have gone before them.

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Robert Bowron (EAA 459872), Pelham

ARKANSAS

Neal Wood (EAA 111571), Conway

CALIFORNIA

Steven Andelin (EAA 255962), Newport Beach

Antonia David (EAA 1262278), Oxnard

Howard Gunn (EAA 785532), Vacaville

David Howells (EAA 151077), Camarillo

Robin Nichols (EAA 295246), Chico

James Penticoff (EAA 643252), Crescent City

Steven Thompson (EAA 1100451), San Diego

COLORADO

Russell Emick (EAA 484392), Brighton

Lothar Klingmuller (EAA 40149), Louisville

Thomas Lawson (EAA 788722), Golden

FLORIDA

Lincoln Dexter (EAA 132102), North Fort Myers

Kelly Hardwick (EAA 605848), Bartow

Thomas Hollarn (EAA 275757), Shalimar

Bonnie Powell (EAA 1074073), Port Orange

Dennis Powell (EAA 1074072), Port Orange

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Tom Boyer (EAA 515946), Boise

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Robert O'Malley (EAA 21852), Nampa

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Joseph Allen (EAA 148441), Canal Winchester

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James Koser (EAA 326915), Almena

Dale Kussrow (EAA 278151), Ripon

John Mickelson (EAA 281056), New Berlin

Joe Rounce (EAA 69769), Shell Lake

Nicholas Schultz (EAA 1252690), Cedarburg

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FINLAND

Sami Salkola (EAA 580934), Kirkkonummi, Uusimaa

GERMANY

Alexander Blumenfeld (EAA 581695), Duesseldorf,

North Rhine-Westphalia

Peter Raab (EAA 167856), Kelsterbach, Hesse



CONGRATULATIONS TO OUR NEW GOLD LEVEL CHAPTERS!

CONGRATULATIONS TO THE FOLLOWING EAA chapters that have received the 2019 Gold Level Award. Each chapter recognized as a Gold Level Chapter in 2019 has

displayed outstanding commitment to EAA by growing grassroots participation in aviation, as well as a desire to improve their chapter by using EAA-provided resources.

EAA Chapter 100; Dodge Center, Minnesota
EAA Chapter 148; Galion, Ohio
EAA Chapter 179; Albuquerque, New Mexico
EAA Chapter 74; Orlando, Florida
EAA Chapter 897; Juneau, Wisconsin
EAA Chapter 1; Riverside, California
EAA Chapter 288; Daytona Beach, Florida
EAA Chapter 838; Racine, Wisconsin
EAA Chapter 102; Bigfork, Montana
EAA Chapter 1067; Naples, Florida
EAA Chapter 1093; Midland, Michigan
EAA Chapter 110; Louisville, Kentucky
EAA Chapter 1129; Fairbanks, Alaska
EAA Chapter 1240; Sebring, Florida
EAA Chapter 1298; Brooksville, Florida
EAA Chapter 13; Ray, Michigan
EAA Chapter 1361; Reno, Nevada
EAA Chapter 145; Jenison, Michigan
EAA Chapter 1494; Morristown, Tennessee
EAA Chapter 1612; Goldsby, Oklahoma
EAA Chapter 19; Lubbock, Texas

EAA Chapter 2; Fort Wayne, Indiana
EAA Chapter 22; Rockford, Illinois
EAA Chapter 23; Salt Lake City, Utah
EAA Chapter 237; Blaine, Minnesota
EAA Chapter 24; Yukon, Oklahoma
EAA Chapter 272; Superior, Wisconsin
EAA Chapter 292; Independence, Oregon
EAA Chapter 309; Catawba, North Carolina
EAA Chapter 320; Watertown, Wisconsin
EAA Chapter 34; Arlington, Texas
EAA Chapter 35; San Antonio, Texas
EAA Chapter 468; Williamson, Georgia
EAA Chapter 5; Middlefield, Ohio
EAA Chapter 509; Eau Claire, Wisconsin
EAA Chapter 579; Sugar Grove, Illinois
EAA Chapter 582; Millbury, Ohio
EAA Chapter 59; McGregor, Texas
EAA Chapter 690; Lawrenceville, Georgia
EAA Chapter 704; Sparta, Michigan
EAA Chapter 75; Moline, Illinois
EAA Chapter 84; Snohomish, Washington

EAA Chapter 857; Butler, Pennsylvania
EAA Chapter 91; Lee's Summit, Missouri
EAA Chapter 96; Compton, California
EAA Chapter 976; Carrollton, Georgia
EAA Chapter 99; Vero Beach, Florida
EAA Vintage Chapter 25; Sacramento, California
EAA Chapter 103; Nampa, Idaho
EAA Chapter 67; Noblesville, Indiana
EAA Chapter 113; Canton, Michigan
EAA Chapter 1218; Willow Springs, Missouri
EAA Chapter 1267; Granby, Colorado
EAA Chapter 1541; Lincoln, California
EAA Chapter 186; Manassas, Virginia
EAA Chapter 216; Williamstown, New Jersey
EAA Chapter 252; Oshkosh, Wisconsin
EAA Chapter 430; Sequim, Washington
EAA Chapter 613; Swanton, Vermont
EAA Chapter 846; Wadsworth, Ohio
EAA Chapter 92; Irvine, California
EAA Chapter 974; Fairfield, Ohio

Throughout 2019 EAA monitored various chapter activities such as Young Eagles flights, EAA IMC and VMC Clubs, technical counselor support, pancake breakfasts, chapter leadership development, etc. The chapters that showed a high level of engagement in each of these activities were recognized via the Chapter Recognition program.

EAA developed the Chapter Recognition program in 2018 as a way to celebrate the impact individual EAA chapters have on the local aviation community. EAA uses 10 criteria to gauge chapter activity, impact, and

improvement. At the end of the calendar year, chapters are recognized for reaching certain levels of activity and engagement. Chapters that score 7 out of 10 are recognized as Bronze, 8 out of 10 are Silver, and any chapters scoring at least 9 out of 10 are recognized as Gold Level. The chapters scoring within these levels are presented with a commemorative banner to hang at their local airport and are recognized on EAA's Find a Chapter webpage.

To learn more about this program, visit www.EAA.org/chapterrecognition.

A WELDER COMES TO WADSWORTH

BY PAUL LUTZ, EAA LIFETIME 518096

EAA CHAPTER 846, LOCATED in Wadsworth, Ohio, obtained 501(c)(3) tax status five years ago thanks to a member who led this initiative. Obtaining this status would lead to the next step in our chapter's growth.

We normally held our meetings in the FBO's conference room. We were appreciative, but we never felt like we had a home of our own. Our supplies were scattered among members' houses and hangars, and events were hard to plan due to the uncertainty of finding a facility to conduct our activities. We had a few items offered for donation but had to turn them down with no storage room. But the chapter's future was about to change.

Fortunately, we had a member who wanted to make a tax-deductible donation of his hangar to the chapter — what an amazing, generous offer. Our 501(c)(3) status paid off in a big way! The chapter now had its own hangar and, more importantly, a home. Our meetings moved to the hangar, picnics were planned, and an open house was held on the annual Airport Day. Our chapter fly-outs had a meeting place prior to departing, and it's not unusual to have five or more airplanes at the hangar before takeoff. Some come early to have coffee and tell stories before we leave.

When EAA had an article in its online newsletter about donating Lincoln Electric welders to deserving chapters, we knew this would be a great addition for the hangar. We now had a place to store it and to hold welding classes. Another member and I wrote an essay on how the chapter would use the welder for education and have it available for our members to use on their projects. We were thrilled to be selected as one of the chapters awarded a welder.

Chapter 846 has been using our TIG welder over the last couple of years. One of our members is a professional welder and offered to hold welding classes for chapter members. Our new welder is a combo TIG and arc welding machine, so we started by learning arc welding. Weekly classes were held over a two-month period. These culminated with building a heavy-duty welding table and a

wing rotator that a member used to cover his Cub wings. Both of these tools are now available for members to use for their projects.



Recently, we finished our eight-week TIG welding class. We still need a lot of practice, but we had a great time learning mild steel and aluminum welding. In addition, we already have a few practice projects that we will be working on.

We all really enjoyed learning how to weld. Everyone had a great time, and the camaraderie amongst the members certainly showcases the true EAA spirit. A huge thank you, once again, to EAA and Lincoln Electric for donating these great welding machines.

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 www.EAA.org/chapters.

EAA Chapter 1644
Oneida, Tennessee
Les Williams
lesd52@gmail.com

EAA Chapter 1645
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Daniel Shultz
dshultz@blackfoot.net



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THE INITIAL SPARK

BY JAMES "FRANKIE'S DAD" FREMONT, EAA 1294619

LIKE SO MANY TODDLERS, my son, Frankie Fremont, EAA 1294621, was enamored with airplanes. He had a good-sized model of Bud Anderson's P-51, *Old Crow*, and a fleet of die-cast airliners that often covered the living room coffee table. He flew them one by one from his makeshift airport to various other locations throughout the house.

As he got older, other favorite pastimes began to emerge, such as going to the established airplane-watching areas near our hometown airport in North Las Vegas (KVGTT). Frankie would make his way out to the fuel pumps and politely ask pilots if he could sit in their airplanes while they refueled.

When Frankie was 14, we learned that he'd be eligible to truly begin training in gliders. The disappointing part was that the only glider club near Las Vegas was booked solid. As a result, the best option became a glider port in Southern California, which involved a drive of nearly four hours each way. As we observed Frankie get off to a good start with some natural stick-and-rudder skills, we were also impressed with his ability to roll with the situation of all those long drives and still keep his schoolwork up to date despite all of the



traveling. At this point, it seemed decided. This young man was so all-in on getting his private pilot certificate in a glider that, as parents, we needed to be supportive and do whatever we could to facilitate that dream. Shortly thereafter, on November 24, 2018, Frankie soloed for the first time, and things were getting ready to really "take off."

That Christmas, we gifted him a prepaid orientation flight with a local FBO that offered helicopter tours and flight training in both rotary and fixed-wing aircraft. Frankie wanted to experience the controls of a helicopter since it looked so different from the gliders.

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Not long after that, the whole family started joking that if he has that much aptitude with a rotary-wing aircraft, maybe Frankie should try to solo a helicopter, solo a Cessna, and get his private pilot certificate in the glider on his 16th birthday — all at the same time.

The amazing part of all this became how Frankie was now planning and orchestrating how the schedule could all be worked out, disproving any ideas that he was being pushed to accomplish this by his parents. Every day was bringing another challenge, and Frankie was the one now providing solutions. His endurance was far outlasting the adults' and he was now the one providing encouragement. As parents, we started realizing that if he actually pulled this all off, his life may actually be changed for the better, with the pure belief that anything is possible if you dedicate yourself to it completely.

So, the day finally arrived — January 23, 2020, Frankie's 16th birthday. Within a 24-hour span, two extremely proud parents watched a now 16-year-old take a helicopter through four patterns, a Cessna through three patterns, and a glider through his first



checkride — all successfully. Consequently, I have no hesitation in saying that my best “father moment” was witnessing the handshake Frankie had with the FAA-designated pilot examiner — no question. *EAA*



For the full version of this story about a remarkable young pilot, see the link at

www.EAA.org/extras.

WELCOME, NEW LIFETIME MEMBERS

CALIFORNIA

Travis Almuti (EAA 859854), Campbell

COLORADO

Russell Bell (EAA 390337), Palisade
Greg Brandes (EAA 80363), Arvada

FLORIDA

Patty Wagstaff (EAA 200806), St. Augustine

GEORGIA

Daniel Schoning (EAA 1039927), Lawrenceville

NEW YORK

James Marks (EAA 1229266), Valatie
James Tomaszewski (EAA 590427), Southold

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Shannon Moon (EAA 307452), Catawba

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Debbie Holmes (EAA 861524), Rosenberg
Steve Holmes (EAA 861523), Rosenberg

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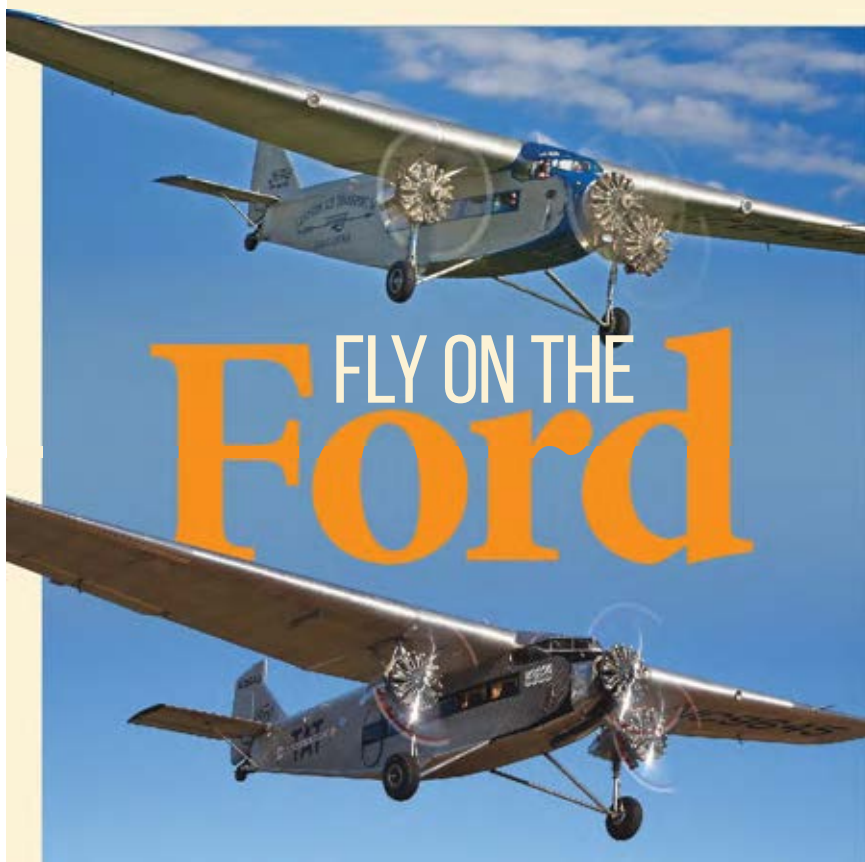
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VOLUNTEER SPOTLIGHT

STEVE OWEN

STEVE OWEN, EAA 382581, first attended EAA Oshkosh in 1982 after he happened to read about the event in an aviation magazine while he still lived in the United Kingdom. Ten years later, Steve moved to Oshkosh, got married, and began volunteering with EAA. Although not a pilot, Steve loves all kinds of aviation and is firmly dedicated to supporting EAA and its mission through his volunteer efforts.

Since Steve began volunteering with EAA in 1992, he's helped in numerous arenas, including during Young Eagles rallies and local chapter pancake breakfasts. However, flightline operations, specifically the North 40, during EAA AirVenture Oshkosh has primarily been his volunteer home.

“I enjoy it, I’ve made a lot of friends all over the country, all over the world. It’s the people. That’s why.”

“I went to the volunteer center, volunteered at a couple of places [during EAA Oshkosh],” Steve said. “I ended up one day on flightline operations on the North 40 with Jim Casper, the late Will Schaick, and a couple of other people. The rest, as they say, is history. I volunteered pre-convention, during convention, [and] after convention since 1992. I became co-chairman in 2007 or 2008. I took the responsibility of setting up pre-convention. ... I basically guide everybody in getting ready for convention – markers, fencing, all that stuff.”

While it was the air show and fly-in that brought Steve across the Atlantic Ocean to Oshkosh, Wisconsin, in the early 1980s, it's been the people he volunteers with that's kept him so involved with EAA since moving to the United States.

“People and fun are the two words I would say [for why I volunteer],” he said. “That’s the easiest answer I can give. I enjoy it, I’ve made a lot of friends all over the country, all over the world. It’s the people. That’s why. My boss laughs at me because I take 40 hours of vacation to spend 120 hours out there [volunteering].” *EAA*

THANK YOU, VOLUNTEERS

Volunteers make EAA AirVenture Oshkosh – and just about everything else EAA does – possible. This space in *EAA Sport Aviation* is dedicated to thanking and shining the spotlight on volunteers from the community. Sadly, it cannot capture all of the thousands of volunteers who give so much to the community every year. So, next time you see a volunteer at AirVenture or elsewhere, however they are pitching in to make EAA better, be sure to thank them for it. It's the least we can do.

Do you know a volunteer you'd like to nominate for Volunteer Spotlight? Visit www.eaa.org/submissions.



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