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Vol.60 No.8 | August 2011

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Nomex Misnomers

It's not about the "look"

PILOTS HAVE A WELL-DEVELOPED gene pool that provides some with extraordinary insight and understanding of practically everything. You name the subject, and if there is a pilot in the conversation, opinions and conjecture will emerge faster than a politician's handshake.

This ability serves us quite well as we wile away the hours and days between flights. The behavior is particularly acute when at an airport surrounded by fellow pilots and aviators, especially if they are younger or less experienced. And if it's raining outside, hold on to your smartphones because the sheer genius of pilots seemingly accelerates.

Such was the case recently when I diverted to Bloomington, Illinois, to wait out stormy weather while on an IFR flight from St. Louis to OSH. We parked my T-6 just moments before the real rain started and ran for the comfort of the FBO. Once inside we slipped off our Nomex flight suits and gloves, hung them on the coat rack to dry, and parked ourselves in the comfy chairs of the darkened pilots lounge, leaving the door open for just enough light to do e-mails.

A few minutes later, we overheard some pilots talking in the lobby about the two "geniuses" who just landed. The conversation went something like this: "What are they doing flying *that* airplane in this weather?" "Ha ha, they must think they are pretty cool dudes wearing those ridiculous things." Much laughter. "Yeah, what a bunch of showoffs!"

My back seater and I were grinning at each other, enjoying our mutual amusement as the subject of such a conversation as well as being unseen ears. I thought, "This is just too rich an opportunity to pass up." I told him to sit tight and enjoy the next few minutes as I popped out of my recliner.

The pilots naturally assumed the big guy who just walked to the water cooler must have been in the restroom. Regardless, they didn't connect the dots. I struck up the normal, "Where are you heading today and what are you flying?" conversation and in short order ascertained three very low-timers including a student and a CFI. Just as I suspected, pilots. And it was raining.

Unable to contain my good-natured sense of humor and adventure, I asked them if they had seen those guys in the T-6. The answer came swiftly. "Oh yeah, and you should have seen what they were wearing too!" So I feigned ignorance as they extolled their opinions of why some pilots wear flight suits. And there it was for all to see—the collective certainty of inexperience and misunderstanding, times three.

So I shared with my fellow aviators what my old friends who owned warbirds told me about Nomex flight suits and why they wear them. It's not about the "cool" factor. Ever wear one on a hot day sitting under a glass canopy behind the firewall of an R-1340? The word "cool" never crosses your mind. What does come to mind are the years of survivable airplane mishaps in which proper personal safety gear played a starring role.

For example, during a fly-in, a Kitfox lost control after a "high speed" pass, crashing into a taxiing BT-13. The Kitfox's left wing sliced through the canopy just aft of the Vultee pilot's head and burst into flames, killing the Kitfox pilot instantly. As everyone nearby watched, the dazed and struggling BT pilot extracted himself from the burning wreckage and was dragged to safety by bystanders. His injuries? Minor burns to exposed flesh, a headache, and wobbly knees. His safety gear—a split-open hard helmet, charred Nomex flight suit, gloves, and a never-used parachute.

If you think that such safety gear is only for "Warbirdia showoffs," you may want to think about how *you* manage your flight risks. Nomex may not be for you, but do you fly wearing shorts and flip flops? What is the fabric of your clothing—any polyester or nylon?

How did the airport dialogue end? The student pilot noticed the flight suits hanging on the coat rack and remarked, "They must be at lunch; let's go check out their airplane." And that's exactly what we did.

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GRAHAM ORPHAN

"Classic Fighters is still in its infancy. ... It's a pretty neat marriage between different groups of equally crazy creative people."

FEATURES

For additional information on many of the topics in this issue visit *www.SportAviation.org.*

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A PUBLICATION OF THE EXPERIMENTAL AIRCRAFT ASSOCIATION

BOB CARLTON

"It is easy to see why, to an even greater extent than atmospheric flying, those who have been to space will always long to return."

DEPARTMENTS

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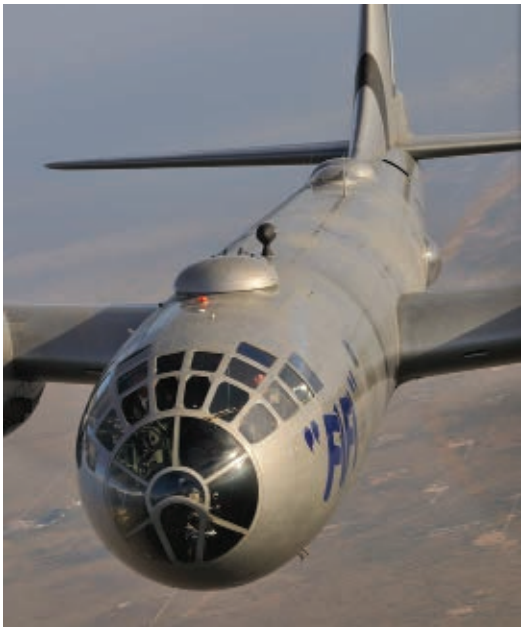

ON THE COVER

Up close and personal with "*FIFI*"—the Commemorative Air Force's B-29 Superfortress, the only B-29 currently flying. Photo by Scott Slocum.

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TOM POBEREZNY
COMMENTARY / POSITION REPORT

Never Standing Still

Sport Aviation evolves to meet members' needs

TWO YEARS AGO, WE INTRODUCED the Founders' Wing within the EAA AirVenture Museum. The purpose of this area is to preserve and showcase the history of EAA, focusing on the culture, standards, and programs that are essential to the success of this organization.

The original EAA office that was in the basement of our home in Hales Corners, Wisconsin, has been re-created. As you tour the Founders' Wing, you will see significant artifacts and learn about the people who had an impact on the EAA founders, my father and mother (Paul and Audrey), in the early days of EAA.

The first mailbox, first desk, the original typewriter, and early newsletters that were typed on plain white paper and duplicated on a mimeograph machine tell the story of a fledgling organization that ultimately changed the face of aviation. From those early days your monthly publication, *Experimenter*, first evolved into a wonderful magazine that focused on "how to" information for builders, designers, and restorers.

Over the years as EAA grew, so did the magazine. Ultimately it became *Sport Aviation*, becoming bigger with exciting photography and more information. The content expanded, reaching out to members who are warbird and aerobatics enthusiasts, as well as those who enjoy homebuilts and vintage airplanes. As an organization grows, so do the demands and requirements for programs and benefits. One of the benefits of EAA membership is your monthly magazine. It needs to fit the mission of the organization and provide information that is entertaining, educational, and accurate.

Two years ago, we undertook a major redesign and expanded the focus of the magazine, developing a "new look," with additional columns and expanded content. The template for the stories in *Sport Aviation* is EAA AirVenture Oshkosh. "Oshkosh" has become aviation's premier event, reaching out to all aspects of the aviation community. As you walk the flightline, you will see homebuilts, warbirds, antiques, classics, ultralights, and numerous aerobatic airplanes. In addition, the North 40 is filled with factory-built aircraft, along with hundreds of exhibitors that bring you the latest in technology, aircraft repair, and airframe design.

Your publication should mirror what EAA has become as seen through the eyes of our annual event—Oshkosh. It should be visual, exciting, colorful, accurate, educational, and enjoyable. It should interest anyone who has an interest in or passion for flight.

We have expanded our stable of writers to include some of the best in the aviation business. A few weeks ago, your editorial staff and contributing writers met in Oshkosh. I was proud to see such a talented group working on your behalf, developing story ideas that will be of interest to you. The goal is to make *EAA Sport Aviation* magazine even more of a "must read" publication. Your editorial team and EAA leadership accept this challenge. You will continue to see enhanced content, outstanding photography, and expanded information that appeals to the diverse and passionate EAA membership.

Membership in EAA is valuable for many outstanding reasons. Your feedback shows that the magazine ranks at or near the top of the benefits list for each member. I am confident that through the leadership of EAA staff, the engagement of some of the finest aviation writers in the world, as well as outstanding photographers, this magazine will continue to meet your expectations and enhance the value of your EAA membership. EAA

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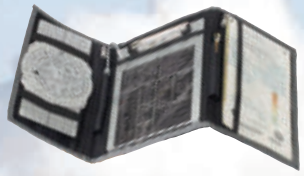

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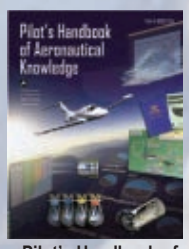

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Losing Our GPS Signal?

EAA fights to ensure satellite navigation stays safe and available

ARE WE FACING A CHOICE BETWEEN safe aviation navigation and wireless broadband Internet availability? That's one potential scenario in the continuing high-level controversy over the use of GPS satellite frequencies and a proposed ground-based nationwide network of Internet transmitters.

Federal entities, including Congress and the FCC, are now involved in a debate that could greatly impact GPS navigation, which is now commonplace for many, including aviators, hikers, boaters, and motorists.

EAA is involved in the issue as a member of the Save Our GPS Coalition (*www.SaveOurGPS.org*) for some very important reasons. First, GPS has become a mainstay of modern navigation for 75 percent of all aviators. While other piloting skills remain important, today's airborne GPS equipment offers greater accuracy and reliability than ever before.

Second, GPS has made nearly 10,000 new instrument approaches available, many at airports that previously had no access during instrument conditions. Third, GPS is the major component of the FAA's future air traffic management system, including ADS-B. Without a consistent and reliable GPS signal nationwide, the ability to implement the NextGen system would be severely hampered.

"While EAA's primary focus is aviation use, it's enlightening to see the broad alliance that is part of the Save Our GPS Coalition," said Doug Macnair, EAA's vice president of government relations. "As part of the coalition, EAA has been able to bring our concerns before a large number of congressional members who in turn also share our reservations about the LightSquared proposal and its effect on everything from law-enforcement capabilities to national security."

A report released in early July by the United States GPS Industry Council, which co-chaired FCC's technical working group on the issue, noted the LightSquared broadband communications system caused significant GPS interference across every sector and application area. The high-power LightSquared signals overwhelmed the lower-powered GPS signals.

"In the end, the laws of physics won out," noted Charles Trimble of the industry council. "There is no single, simple solution that can eliminate interference for all classes of GPS receivers in the near term."

LightSquared countered that older GPS models would be most affected and that the GPS industry is to blame in major part for not supplying the proper shielding technology—a claim rejected by the industry.

The FCC comment period on this matter closes July 30. Visit *www.SportAviation.org* for a link to the comment document and EAA's briefing paper on this subject.

EAA HELPS GATHER SENATE SUPPORT FOR BARR

Congressional GA Caucus proves value once again

EAA AND OTHER GA ORGANIZATIONS found bipartisan support in Washington when asking U.S. senators to sign a letter expressing concern over the Department of Transportation's (DOT) plan to dismantle the Block Aircraft Registration Request (BARR) program and invade the privacy of thousands of aircraft owners.

The June 29 letter to DOT Secretary Ray LaHood included the signatures of 26 senators—more than one-quarter of the entire body—who questioned the plan to end the BARR program, which allows pilots to block public display of their flight information but still sends it to appropriate law enforcement and security agencies.

"For reasons of individual security, privacy, and business competitiveness, this program is essential," noted the letter from the senators, led by Pat Roberts (R-Kansas) and Mark Begich (D-Alaska). The senators also noted that the BARR program is part of the discussions of the FAA reauthorization bill before a House-Senate conference committee, and the DOT is premature to implement such a decision while the issue is still before Congress.

"These types of situations again emphasize why EAA has worked so hard to help foster the GA Caucus in both the House and Senate," Macnair said. "The caucus provides information to lawmakers in rapid fashion, allowing them to take appropriate action that protects EAA members and other aviators."

AOPA and NBAA have filed a legal challenge to the DOT plan. EAA is supporting their effort with an *amicus curiae* (friend of the court) brief.

EAA PARTNERS WITH NTSB

Comprehensive study of amateur-built aircraft underway

SAFETY, PARTICULARLY IN EXPERIMENTAL amateur-built (E-AB) aircraft, is one of EAA's highest priorities, and we continue to partner with government and industry to improve the safety record. EAA is supporting a project launched by the NTSB to study accidents involving E-AB aircraft to evaluate the safety of this growing and innovative segment of aviation. The study will look at a range of issues, including builder assistance programs, transition training for pilot-builders, flight test and certification requirements, maintenance of E-AB aircraft, and the performance and failures of systems, structures, and powerplants.

The NTSB is sending postcard invitations to E-AB operators, encouraging participation in the anonymous online survey. EAA members who own and operate E-AB aircraft may take the survey by visiting *www.EAA.org/AB-Survey*. The completed safety study is expected to be published by the fall of 2012.

PILOT'S BILL OF RIGHTS INTRODUCED IN SENATE

EAA supports measure co-sponsored by 23 senators

A BIPARTISAN GROUP OF U.S. senators are co-sponsoring legislation called the "Pilot's Bill of Rights." The measure is supported by EAA, which joined with AOPA to supply information for the text used in the bill.

"It is always our goal to keep pilots flying and to lower barriers to aviation, whether they are regulatory, legislative or economic," said Rod Hightower, EAA president/CEO. "EAA supports any legislative actions that enhance pilots' opportunities for legal due process in FAA enforcement cases."

Among the bill's provisions:

• The FAA must grant the pilot all relevant evidence 30 days prior to a decision to proceed with an enforcement action.

• Clarifies statutory deference as it relates to NTSB reviews of FAA actions that diminish the appeals process.

• Allows for an option for federal district court review of appeals of FAA actions.

• Requires a NOTAM Improvement Program, requiring simplification and central archival of NOTAMs.

• Makes flight service station communications available to all pilots.

• Includes a review of the FAA's medical certification process and forms.

The bill's co-sponsors include Sen. James Inhofe (R-Oklahoma), the primary author of the bill, as well as Senators Mark Begich (D-Alaska) and Mike Johanns (R-Nebraska), co-chairs of the Senate GA Caucus.

THE FINAL WORD

THE IMPORTANCE OF AIRPORTS

New classification system proposed

By Sean Elliott, EAA Vice President, Industry & Regulatory Affairs

AIRPORTS ARE COMPLEX AND VITAL components of aviation and certainly key to a healthy transportation infrastructure. The welcoming atmosphere that many airports project is paramount to the future health of aviation as a whole. Understanding the importance of airports as well as their diversity is something all of us should undertake and help spread the good word.

I recently attended an airport system workshop in Washington, D.C., hosted by the newly appointed FAA Associate Administrator for Airports Christa Fornarotto and key FAA Airports staff members. The purpose of the one-day meeting was to introduce a new airport classification system that will better explain the relevance of all types of airports across the country. In addition to the current three levels of classification—primary, reliever, and GA—Fornarotto's team proposes to expand the system to five groups of airport types. Each classification will explain what the public's benefit is from these airports and how they fit in an overall national airport system. The proposed system will ultimately provide a better explanation of the value that all airports bring to their communities. It will give us a new tool to help express the good things that local airports, regardless of size and complexity, mean to everyone.

EAA Vice President of Government Relations Doug Macnair and I had a great meeting with Christa and her staff after the workshop to discuss EAA's relevant airport issues such as through-the-fence access. The dialogue was both healthy and engaging. EAA and FAA are clearly on the right path of working together to solve airport issues and ensure that vibrant airports with great community participation are a significant part of the future of aviation.

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Liberty Belle *was destroyed by fire after an emergency landing in an Illinois cornfield.*

B-17 *Liberty Belle* Destroyed

Onboard fire causes emergency landing, irreparable damage

THE B-17 *LIBERTY BELLE* OWNED by the Liberty Foundation was forced to make an emergency landing in a field southeast of the Aurora, Illinois, Municipal Airport June 13 when an in-flight fire occurred shortly after takeoff. All seven people on board the non-revenue flight escaped the aircraft, but the airplane was destroyed when it became engulfed in flames.

Ray Fowler, Liberty Foundation chief pilot, reported that Cullen Underwood, who was flying chase in his T-6, spotted a flame in the left wing. The B-17 made an emergency landing one minute, 40 seconds after Cullen reported the fire to the crew. What doomed the airframe was the fact that emergency firefighting equipment could not get to the airplane immediately as the ground was too soft from recent rains to support its weight.

The NTSB and FAA were quickly on the scene and are closely working with the Liberty Foundation to aid in the investigation.

Our hearts go out to the Liberty Foundation, as we at EAA know very well the time, money, and dedication that goes into restoring a B-17 and flying it on national tours. We're especially relieved everyone was able to get out safely.

For more information and direct links to all Flightline stories, visit *www.SportAviation.org*.

RECORD CLAIMED IN NEVADA SAILPLANE FLIGHT

SAILPLANE PILOT GORDON BOETTGER, of Minden, Nevada, broke his own Northern Hemisphere soaring record on May 31 by flying a total distance of 1,401 miles in his Kestrel sailplane in 13 hours, 17 minutes. He and Hugh Bennett set the previous distance record of 1,367 miles on April 20. The flight was keyed by strong winds as high as 80 mph along his route on the east slope of the Sierra Nevada. Boettger reached an altitude of 28,400 feet MSL and speeds as fast as 165 mph, with an average speed of 110 mph. At times, his climb rate was 1,000 fpm.

TERRAFUGIA ADJUSTS TRANSITION DELIVERY SCHEDULE

TERRAFUGIA INC. DELAYED THE DELIVERY date for its Transition roadable aircraft citing third-party supplier and production design challenges. The company says it remains committed to the aircraft development program and expects the first customer delivery in late 2012. In the past year Terrafugia has been constructing two Transition production prototype vehicles while tooling up its production process. The company says it still plans to show one of the two production prototypes at EAA AirVenture Oshkosh 2011, but that vehicle will not be ready to fly at the show.

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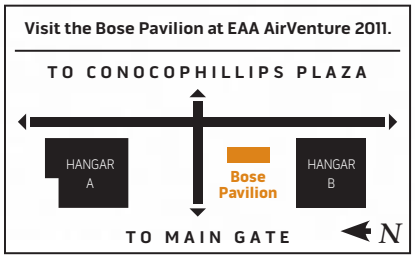

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ELECTRIC CRI-CRI BREAKS OWN WORLD ELECTRIC SPEED RECORD

HUGUES DUVAL BROKE HIS OWN world speed record for an electric aircraft, flying his electric Cri-Cri MC15E *E-Cristaline* to a speed of 152.7 knots (282 kph) at the Paris Air Show on June 25. Duval's previous record—also in *E-Cristaline*—was 141 knots, set in September 2010 at the Pontoise (France) Air Show. The Cri-Cri is generally considered the world's smallest twin-engine airplane type, and *E-Cristaline* is powered by two 25-hp Electravia electric motors getting their go-juice from a pair of lithium-polymer Kokam batteries, turning two E-PROPS propellers. Electravia claims a 46 percent drag reduction over conventional powerplants thanks to extensive aerodynamic work on the fairings. This reduction equates to a 30 percent speed increase.

CIRRUS AIRCRAFT, CAIGA COMPLETE MERGER

CIRRUS AIRCRAFT AND CHINA AVIATION INDUSTRY GENERAL AIRCRAFT CO. LTD. (CAIGA) announced that the two companies have completed their merger that was announced in February 2011. Brent Wouters, Cirrus president and CEO, said the merger will benefit Cirrus and its customers and allows the company to expedite its aircraft development programs, such as the Cirrus Vision SF50 jet program. Wouters also said that he expects the merger to deliver benefits in terms of jobs and job growth in the United States.

ICON SECURES $25 MILLION IN FINANCING

ICON AIRCRAFT SECURED A $25 million round of equity funding that will sustain the company through the completion of its ongoing engineering development program, manufacturing setup, and the beginning of production of its A5 amphibious light-sport aircraft. Financing was led by U.S. and U.K. venture investors Satyen Patel and Bart Becht, with additional participation from Eric Schmidt, chairman of Google; Phil Condit, former chairman/CEO of Boeing; and undisclosed Silicon Valley venture capitalists. Meanwhile, ICON continues A5 flight testing with the focus on finalizing the company's newly designed spin-resistant wing, as well as refining directional stability.

BRIEFLY NOTED...

// SpaceShipTwo, *VSS Enterprise*, completed two successful glide flights within 24 hours. Both flights saw early morning takeoffs for *VSS Enterprise*, in mated configuration with the WhiteKnightTwo carrier aircraft, followed by high-altitude releases at around 52,000 feet and glides back to smooth touchdowns on the Mojave Air and Space Port runway. Virgin Galactic says this was the quickest turnaround time yet between *VSS Enterprise* solo flights, reinforcing the transformational ability of the company's spaceflight program to undertake daily flights to space.

// Belite Aircraft announced that it cut aircraft kit prices by $3,000. Now, complete kits are available for $8,000. To reduce the costs of the kits, the company said it moved many parts to in-house fabrication. A four-axis CNC machine and a three-axis CNC router allowed Belite to re-engineer parts as well, replacing more-expensive, less-precise welded steel components. Belite Aircraft kits are available as a complete homebuilt kit and qualify as amateur-built aircraft or as FAR Part 103 ultralight aircraft.

// Wicks Aircraft Supply has teamed with Phenix Industries, a plumbing fixture company, to expand the company's list of fluid-control products for homebuilders. Wicks will be offering flexible metal hoses, hose ends, filters, bulkhead fittings, hydraulic brake fittings, dry sump components, and special fittings. The fittings can be tightened without wrenches to avoid leaks and to prevent vibration-loosened hose connections.

// An updated version of Cessna's unique flight information and planning application for the Apple iPad is now available for all single-engine aircraft manufactured by Cessna. Cessna iFlite 3 allows pilots to instantly access up-to-the-minute weather images, plan routes, and have access to dual-screen moving maps. IFlite 3 also includes the ability to view Cessna pilot operating handbooks, calculate aircraft weight and balance, and calculate takeoff and landing performance numbers.

// The 2011-12 edition of the Aircraft Electronics Association's *Pilot's Guide to Avionics* will be offered for free at EAA AirVenture Oshkosh, July 25-31, in Oshkosh, Wisconsin. For the past nine years, the AEA has published this guide that includes a consumer directory, educational articles, and timely information about the avionics industry. The back portion of the guide is a directory of AEA member-certified repair stations and associate members. The free guide will be available at AEA's AirVenture booth, No. 2035/36, Hangar B.

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www.hondajet.com/eaa2011

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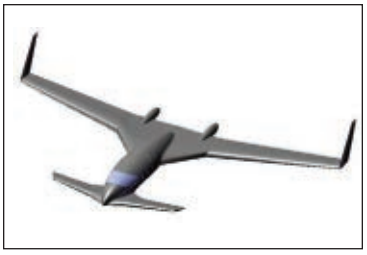
Transparent Travel

Airbus unveils the airliner of the future

AIRBUS RECENTLY UNVEILED ITS "2050 Concept Cabin," an airliner designed to give passengers panoramic views of the passing sky. The aircraft features "intelligent" cabin walls that could become transparent and regulate the air temperature in the cabin. Airbus says the airliner would eliminate regulated class divisions in favor of personalized zones that would offer relaxation, interactivity, and working spaces. With onboard options like holographic videos, a virtual golf driving range, and massages while looking out through a transparent upper fuselage, this flying experience seems much more than 40 years away.

AEROINNOVATIONS highlights developments that have potential to impact the future of aviation. EAA does not necessarily endorse the ideas, products, services, or views stated. For more information and direct links to all the AeroInnovations stories, visit *www.SportAviation.org*.



EXTREME CAPACITORS EXTEND ELECTRIC FLIGHT

THE EXTREME CAPACITORS, AS described in the 2011 CAFE Electric Aircraft Symposium, incorporate a unique lightweight form of carbon nanotubes. These light but powerful energy sources can last through 1 million deep cycles and can be charged in minutes. They are proposed for use in the Electric Eagle, an air taxi concept designed for 300 mph and a 500-mile range.

AUSTRALIAN HOVERBIKE PUSHES POSSIBILITIES

A HOVERBIKE PROTOTYPE IS being designed in Australia for use in cattle mustering, search and rescue, aerial surveying, firefighting, and more. The prototype is powered by a 1,100-cc flat-twin four-stroke with one camshaft, four valves per cylinder, a central balancer shaft, and two Tasmanian Oak propellers. The hoverbike weighs 240 pounds, with maximum speed estimated at 175 mph.

120 MINUTES FROM NEW YORK TO PARIS

THE 20-SEAT MACH 3.5 supersonic jet HyperMach SonicStar will be powered by an engine with a five-stage turbine using superconducting turbine-ring generator technology. Passengers who can afford a seat on the recently announced SonicStar would be able to get from New York to Paris in less than two hours and from New York to Sydney, Australia, in only five hours.

ELECTRO-THERMAL SYSTEM ZAPS WING LEADING-EDGE ICE

THE ELECTRO-THERMAL ICE PROTECTION SYSTEM (EIPS) developed by Bombardier Aerospace demonstrated the effectiveness of this new electric-powered ice protection system for wing leading edges during recent test flights. The EIPS technology eliminates bleed-air ducting for icing prevention and saves energy.

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THE CAF'S B-29

"FIFI"

RETURNS TO THE SKY!

BY JIM BUSHA

The four hybrid Curtiss-Wright R-3350-B29 radial engines are coaxed to life soft and slow. Gray clouds of oily smoke spew from the oval-shaped, polished aluminum engine cowlings as the flight engineer awakens each one while pushing large ivory-colored levers forward and turning red switches on. A mini sandstorm erupts as the behemoth 16-foot 7-inch, four-bladed propellers begin to spin. While all four engines rumble to life, each one warming more than 65 gallons of oil, the intercom crackles with the voice of the flight engineer as he hands the reins of the big bomber over to the command pilot.

"OIL TEMPERATURES LOOK GOOD, CHECKLIST IS COMPLETE, WE'RE GOOD TO GO."

The aircraft commander, Paul Stojkov, EAA 143434, has the best view in the house. Sitting up high in the left seat surrounded by the aluminum framework and glass, he eases the 100,000-pound bomber into takeoff position, looks out across the 141-foot wingspan, and smiles to himself. Paul knows the silver-colored beauty named *"FIFI"* is the world's only flyable B-29 Superfortress, and he is the pilot in command.

B-29 DEVELOPMENT

Boeing produced nearly 4,000 Superfortresses between 1942 and 1946. Designed as a replacement for the B-17 and B-24, the "super bomber" could carry a 20,000-pound payload, had a range had a range of 5,800 miles, and a top speed of 365 mph. The B-29's technological advancements were far superior to other Allied aircraft of the era. The Superfortress was the first bomber to be fully pressurized—the crew could now ride in short-sleeve comfort and didn't have to worry about ice-cold temperatures at high altitudes, unlike those who flew B-17s and B-24s over Europe. The only portion of the bomber that wasn't pressurized was the bomb bay, so a 40-foot pressurized tunnel was installed that allowed crew members to get from the tail to the front of the aircraft.

Another first was a central firing control system. Instead of gunners exposing themselves in open windows or stuffed inside a small ball turret for up to eight hours, a

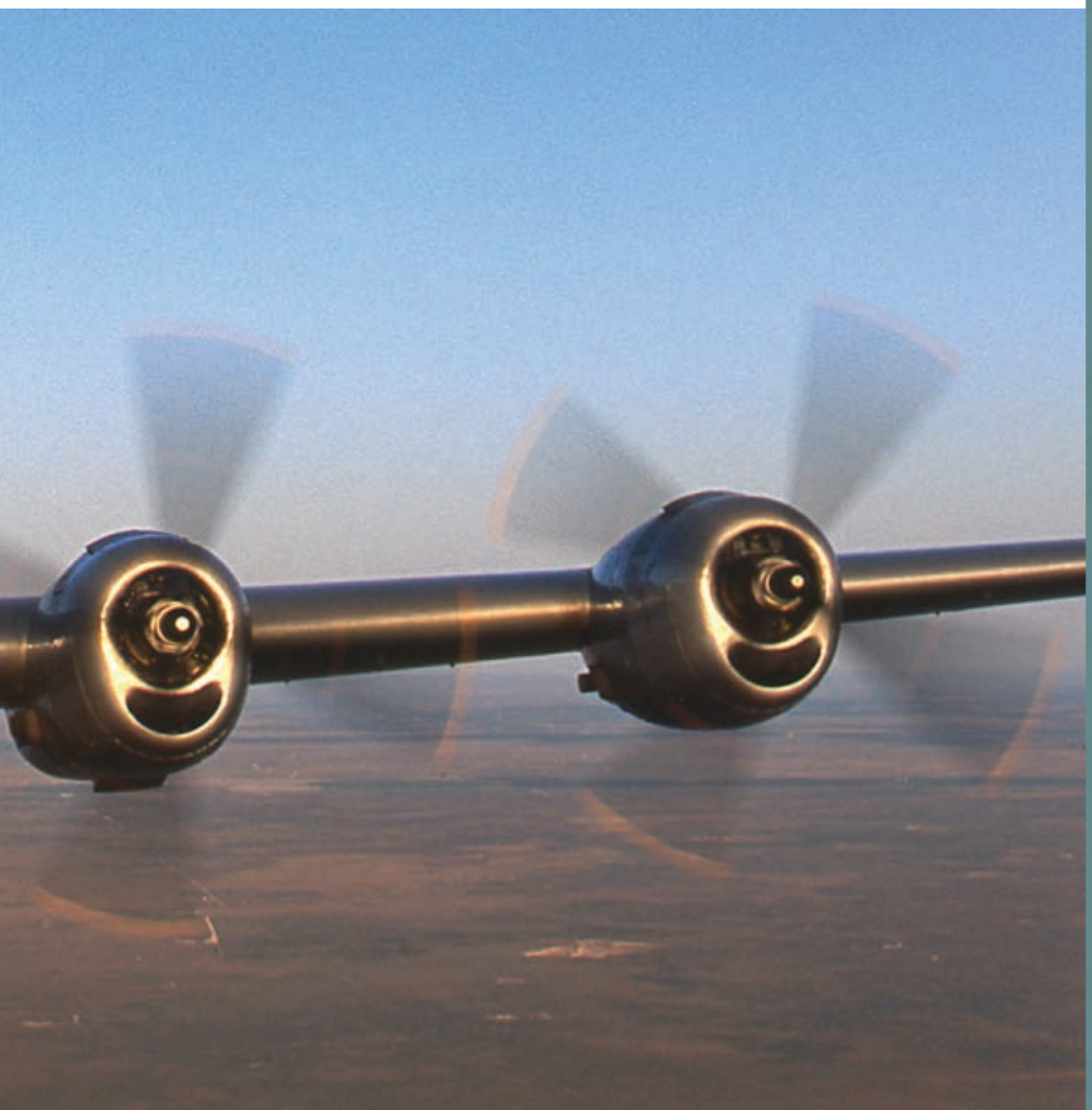
PHOTOGRAPHY BY **BILL CRUMP**

Superfortress gunner simply aimed his guns—fixed to a series of defensive turrets—through a periscope and then fired at his target.

But to the designers, the "cherry on top" of the whole project was the creation of a new engine design. Simply called the Curtiss-Wright R-3350 Cyclone, a 28-cylinder twin-row engine rated at 2,200 hp, this monster powerplant was touted as the answer to carry the big bomber and its deadly payload aloft at fighter-like speeds. Unfortunately, the twin row Curtiss-Wright powerhouse turned out to be a lemon. Engine overheating seemed to be the Achilles' heel of the B-29 early on with in-flight engine fires as common as fireworks on the Fourth of July.

"I don't think the engineers had all the bugs worked out on the Curtiss-Wright 3350s," said Chris Trobridge, public information officer for the B-24/B-29 Squadron of the Commemorative Air Force (CAF). "The pilots knew they only had a few minutes to extinguish an engine fire before it spread to a wing. More B-29s were lost in combat due to mechanical failure than by enemy fire. But with a war going on, and the need for long-range bombers in the Pacific, they really didn't have much choice and flew with the engines at hand."

Some of the early overheating issues were traced back to the superchargers, which were reworked on some of the later models. It also was found that the rate of climb had to be reduced significantly for the big, tightly cowled radial engines to remain cool. Inevitably the Superfortress worked through its teething problems during combat. Operating from bases in India, China, and off tiny specks of Pacific volcanic rock, the B-29s helped shorten the war flying



DID you KNOW?

1 **IN NOVEMBER OF 1945** a modified B-29 set a new world record by flying 7,916 miles nonstop in 35 hours from Guam to Washington, D.C. Its gross takeoff weight was more than 155,000 pounds.

2 **DURING WWII** and Korea specially modified SB-29 Super Dumbos carried a 29-foot lifeboat strapped to the underside of their bellies. These lifeboats, filled with food, survival gear, and warm clothes, could be parachuted to downed pilots at sea.

3 **DUE TO THE B-29'S** massive girth it was only natural that the Superfortress would be turned into a Supertanker. The KB-29 became a flying gas station that was capable of carrying more than 12,000 gallons of jet fuel in bomb bay fuel tanks. The fuel was offloaded to fuel-starved jet fighters via the Boeing-designed "flying boom" telescoping fuel pipe.

4 **ANOTHER FAMOUS** Superfortress was the EB-29 Mother Ship that became the aerial launching platform for Chuck Yeager and the Bell X-1, *Glamorous Glennis*, in which he broke the sound barrier in October of 1947.

5 **BOEING USED** its B-29 as the basis for a "double-decker" transport model called the C-97 Super Transport. The U.S. military loved it because they could stuff 134 troops, three 2-1/2 ton trucks, or two light tanks inside with room to spare.

6 **CURRENTLY ONE** other Boeing B-29 Superfortress is under restoration with high hopes of returning it to flying status. The B-29 *Doc*, like so many other aircraft under restoration, is in desperate need of monetary assistance. If you would like to see this proud warrior return to the sky, please visit *www.B-29Doc.com*.

Despite all the glass in the cockpit, pilot Paul Stojkov often looks like he's shadow boxing as he moves his head up and down and side to side to get a clear view around all the framework.

extremely long missions, in daylight and at night. At times almost 1,000 B-29s darkened the sky over Japan on a single mission.

But the most famous B-29s were two specially modified Superfortresses—*Enola Gay* and *Bockscar*—that didn't need an aerial armada, as they each dropped an atomic bomb. A few years later B-29s were called up for active duty over the MiG-filled skies of Korea. By the mid-1950s the jet age was in full swing, and the slow-moving B-29s were eventually put out to pasture and retired from service in the early 1960s. A handful of B-29s wound up in the deserts of California, where the Navy used them as target practice.

HISTORY OF *"FIFI"*

When the CAF originally began collecting aircraft used during World War II, it knew its collection would not be complete until it located a B-29 Superfortress. That day came to fruition in 1971 when a bunch of derelict-looking B-29s were spotted in the desert around the China Lake Naval Ordnance Test Station near Muroc Dry Lake, California.

"My father, Vic Agather, had spent a lot of good times and bad times with the B-29 during WWII," Neils Agather, executive officer of the CAF B-29 Squadron, said. Vic was in the Army Air Force and was part of a team tasked with fixing problems on already produced B-29s. They developed a kit to fix the engine issues, and he traveled overseas teaching crews what to do.

"He had a real soft spot for the Superfortress and was not only instrumental in acquiring one from China Lake by cutting through acres of bureaucratic red tape, he also funded most of the restoration," Neils, EAA 576005, said. This particular B-29, manufactured in July of 1945, languished in the desert, almost unscathed from 1956 until its rescue in 1971. "When the restoration was finally completed in October of 1974 the name *"FIFI"* was applied to the nose in honor of my mother, Josephine, who had been called Fifi since childhood. A large "A" also was applied to the tail in honor of my father's last name—and that is how *"FIFI"* got her name!" Neils said.

The CAF immediately put the big bomber to work and took it on tour across the country. Dubbed the "Queen of the Fleet" by the CAF, the Superfortress made air show appearance after appearance educating the public about the important role it played during WWII. Thankfully the CAF began to stockpile a variety of Curtiss-Wright 3350 model engines because time began to take its toll on the B-29. One engine caught fire in 2000 and another failed in 2004. Corrosion problems also were found in the spar caps and fuselage stringers.

By October of 2004 the decision was made to ground *"FIFI"* until the engines could be overhauled. The Superfortress returned to the sky in March of 2006, but this was short-lived when metal flecks were found in the engine oil. The engines still had problems. A month later, the B-29 was grounded indefinitely. If *"FIFI"* was ever going to safely fly again, the CAF knew it needed something short of a miracle. Its answer came in the form of a hybrid engine design.

ENGINE REWORK

The idea to combine parts from two different Curtiss-Wright engines came from the late Gary Austin, who was the crew chief for *"FIFI"* at the time. The CAF selected the reliable R-3350-95W engine as its core frame. This engine was initially produced for the AC-119 Stinger gunships used in Vietnam and was much more powerful than its predecessors. Unfortunately, the supercharger that was housed in the rear portion of the engine was too massive to fit inside the B-29's engine cowlings.

"We weren't about to give up with a 'little problem' like this," Chris said. "We ended up finding that the blower and body of the R-3350-26WD used on the Douglas Skyraider fit perfectly inside the engine cowling. In simple terms, we combined the cylinders, nose case, and innards from the -95 with the components of the -26WD and renamed the hybrid engine the R-3350-B29."

PHOTOGRAPHY BY **LYLE JASMA** AND **SCOTT SLOCUM**

Master warbird restorer Nelson Ezell of Texas was called in to modify the exhaust system, while Anderson Aeromotive of Idaho was tasked with building five of the hybrid engines for the CAF. While waiting for the engines, the right outer wing panel was pulled due to corrosion and sent to Carl Scholl of Aero Trader in California. With fresh stringers and new skin, the wing was put back together in like-factory-new fashion. The CAF believes combining the best aspects of the -95 and -26WD produced a powerhouse engine. The results of the engine modification, which included using carburetors instead of fuel injection, speak for themselves. Not only do the engines produce 1,000 hp more than the originals, but they also stay nice and cool during climb-out.

"At over $150,000 per engine, we at the CAF think it was money well spent," said Neils. "To put it in perspective, the old engines were getting so bad that we had to change at least one a year. We crossed our fingers and didn't know if we would get five, 50, or 500 hours out of it. Now we don't have any of the maintenance headaches we once had, and we think we can run these engines to their TBO. And right now that is the million dollar question because there are no other engines out there like the ones we now have on *"FIFI."* Our hope is to get 2,000 hours out of them."

ABOVE: *Installing the hybrid Curtiss-Wright 3350-B29 engine, which combined the cylinders, nose case, and innards from a R-3350-95, used on the AC-119 Stringer, and the blower and body of the R-3350-26W used on the Douglas Skyraider.*

RIGHT: *The flight engineer, stationed behind the copilot's seat, manages the engine controls like a "mad man" throwing levers and switches.*

Getting *"FIFI"* back into the air didn't happen overnight. Although it took countless volunteer man-hours to clean, repair, or replace the corroded areas of the Superfortress along with other herculean tasks like installing new exhausts and engines, the main ingredient missing from the project was money—and lots of it. In 2008, fellow Texas native and warbird collector Jim Cavanaugh, founder of the Cavanaugh Flight Museum in Addison, Texas, gave the B-29 project the final push it needed by pledging $1.2 million to get the Superfortress airborne. On August 5, 2010, the long waiting game was finally over as *"FIFI"* took to the sky with newfound power and grace. No one was more pleasantly surprised with the performance of the new engines than pilot Paul Stojkov.

FLYING A SUPERFORTRESS

Paul admits he is "warbird spoiled." He flies a variety of CAF aircraft including the SNJ-4, P-51C, B-24, and B-29. His favorite, of course, is the one he is piloting at the time. But when he speaks about the B-29, you get a sense that, secretly, the B-29 just might be his pride and joy.

"The B-29 is a very unique airplane," Paul said. "Although there are two pilots that sit up front, the engine, propellers, and mixture controls are primarily operated by the flight engineer, who sits facing backward right behind the copilot. There is some seriousness to the old adage that it's the engineer's airplane—he just lets the pilots fly it for him! Besides the 'mad man' at the engine controls throwing switches and levers, we also have scanners that sit looking out the fuselage blisters watching the engines. They are our eyes and ears back there telling us if a flap seems oily, whether the gear has extended or retracted properly, or there are flames coming from an engine. They are essential crew members in this airplane."

AIRCRAFT MAKE & MODEL: BOEING B-29A SUPERFORTRESS

Length: 99 feet
Wingspan: 141 feet, 2 inches
Height: 27 feet, 9 inches

Empty Weight: 74,500 pounds
Loaded weight: 120,000 pounds
Max takeoff weight: 133,500 pounds
Fuel Capacity: 5,000 gallons
Crew: 11

Powerplant Make & Model: Hybrid Curtiss-Wright R-3350-B29
Horsepower: 2,000 hp at 2400 rpm and 44 inches of manifold pressure
Propeller Make & Type: Hamilton Standard full-feathering, four-bladed, 16-foot 7-inch

V_H: 360 mph
V_S: 105 mph
V_X: 1,000-plus fpm rate of climb

Price: $605,360 (July 1945), roughly $8 million today

For more information: *www.CAFB29B24.org*

PHOTOGRAPHY COURTESY OF THE **CAF** AND BY **LYLE JASMA**

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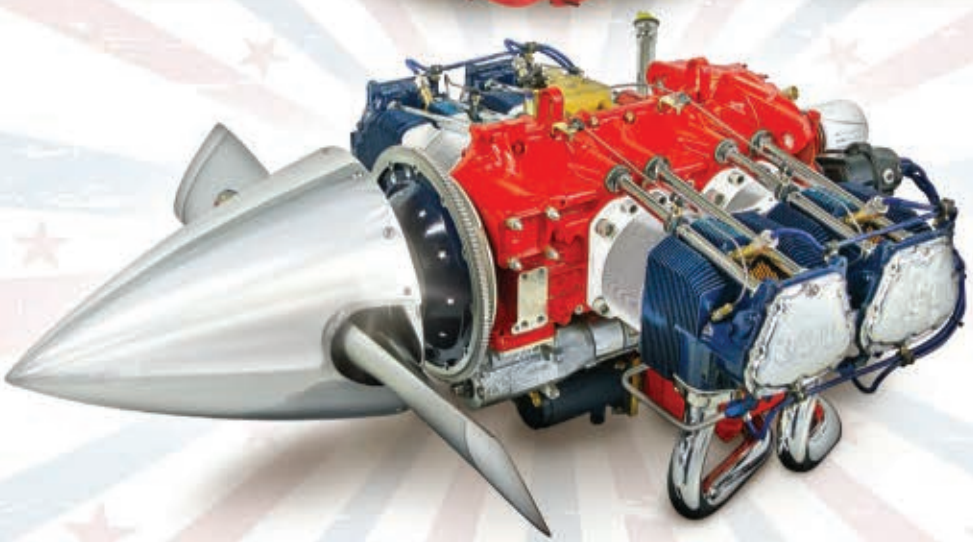

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The crew after the successful first flight with the new engines on August 5, 2010. From left: John Schauer, Donald Obreiter, Jim Jeffries, Charles Tilghman, Nelson Ezell, Rick Garvis, Dave Miller, and Paul Stojkov.

Most people think the pilot has a panoramic view of the world sitting behind that glass nose. Truth be told, with so many framework crosspieces in front of Paul, he is always looking from side to side or up and down to find a clear view. Inevitably Paul's copilot will make fun of him and tell Paul that he looks like he is shadow boxing! From start-up to shutdown, Paul uses almost all of his senses as he listens, feels, smells, and looks at how the Superfortress is responding to his inputs.

"From that first whiff of oil to the smell of the leather chair to the feel of the engines coming alive, the B-29 is surprisingly a very smooth airplane," Paul said. "There are no bone-jarring, teeth-cracking vibrations; it's more of a rumbling lullaby to me."

YOU CAN FLY IN "FIFI"

THE CAF OFFERS a B-29 historic flight experience as a crew member aboard *"FIFI"*. Depending on the seat you choose, you will have the opportunity to fly as a B-29 bombardier, tail gunner, side scanner, or right up near the action inside the cockpit looking over the pilot's shoulder. The flight lasts between 30 and 45 minutes. To learn more about the CAF and *"FIFI"*, visit *www.CAFB29B24.org*.

During most flights *"FIFI"* will carry about 3,000 gallons of fuel and burn 100 gallons per engine per hour in cruise. With these new engines, the B-29 only uses between 3 to 4 gallons of oil per engine per hour, which Paul thinks is very, very good.

"It's like night and day with these new engines. Our old takeoff procedure was to rotate, retract the gear quickly, and bring the flaps up while climbing out at 190 mph to keep the engines cool. Our rate of climb was sloth-like at 300 fpm," Paul said. "Now we climb out at 170 mph and are seeing 1,000-1,200 fpm rates of climb with the engines remaining cool. It is an incredible honor for me to be so privileged to be flying the last airworthy B-29 in the world. Words cannot express the feelings you get from sitting inside this graceful bomber." EAA

Jim Busha, EAA 119684, is an avid pilot and longtime contributor to EAA publications. He is the editor of *Warbirds* magazine and the owner of a 1943 Aeronca L-3. To learn more about the wonderful world of Warbirds please check out EAA Warbirds of America.

PHOTOGRAPHY BY **AUTUMN HICKS**

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OMAKA SHOW FEATURES

FLYING BACK IN TIME DOWN UNDER

RARE WORLD WAR I AND WORLD WAR II AIRPLANES

BY ROB FOX & JAMES KIGHTLY

PHOTOGRAPHY BY **ROB FOX**

EACH YEAR NEW RE-CREATIONS OF GREAT WAR AIRCRAFT HAVE APPEARED, SEVERAL—LIKE THE B.E.2C SERIES AND THE F.E.2—HAVE BROUGHT TYPES BACK FROM EXTINCTION IN FLYING CONDITION.

THE SWEET SMELL OF burning castor oil coalesced with the blipped roar of rotary engines. Thousands of eyes turned skyward as seven Fokker Dr.I Triplanes lifted in unison to contest the sky. Manfred von Richthofen's menacing Jasta 11 squadron was rapidly challenged by a horde of Allied machines—a Nieuport 11, Sopwith Camel, S.E.5a, Bristol F.2B, and Sopwith Triplane. As the battle raged for dominance of the air, Allied troops on the ground supported by two "Mother" tanks (similar to what was used in the climactic scene in *Indiana Jones and the Last Crusade*) engaged the Germans.

While it may have looked liked the Western Front in 1918, it was about as far from Europe

PHOTOGRAPHY BY **ROB FOX**

as you can get. This was the 2011 Classic Fighters Air Show at the Omaka Airfield on New Zealand's South Island. The self-described aviation-themed country carnival is one of the most theatrical shows anywhere in the world, with Hollywood-style sets, props, and re-enactors dressed in historically accurate costumes. In addition to the World War I aircraft and ground equipment, there was a World War II re-enactment with a slew of rare aircraft from the 1930s and 1940s and a full-scale V-2 rocket, as well as a classic car display, food festival, and live jazz.

KIWIS TAKE FLIGHT

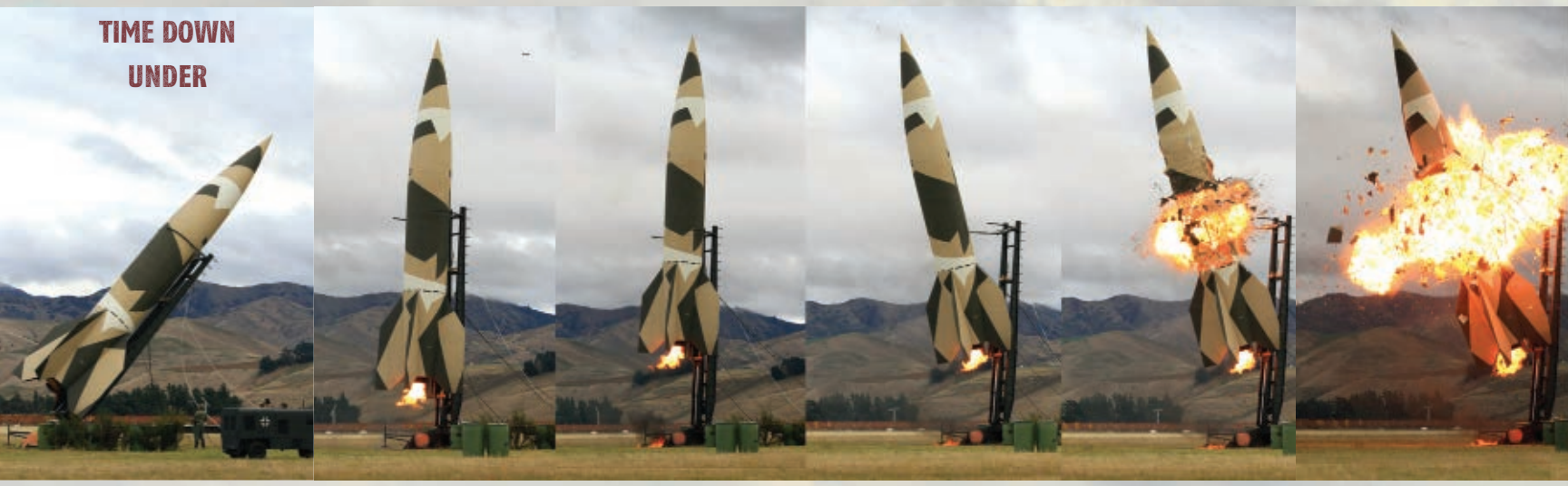
New Zealand is now firmly on the international map for air shows with global pulling power. Back in the 1990s, the great warbird show at Wanaka had established that the Kiwis could do it well, with people coming from all over the world to see the the spectacle in such an extraordinary venue. Historic aircraft were brought in, or restored, and often the only place to see something rare *fly*, was New Zealand. Held every other Easter weekend the alternate year is now filled with an even more varied show at Omaka Airfield in Blenheim.

When the Omaka show began in 2001, the goal was to raise funds for the proposed Aviation Heritage Centre museum, which opened in 2007. It houses the world's largest collection dedicated to Great War-era aircraft and memorabilia. Graham Orphan, EAA Lifetime 72299, chairman of the show, said, "The philosophy of the Omaka AHC is not to provide a 'warehouse full of machines' but rather a

PREVIOUS PAGE: *German fighters line up to do battle with the Allies over Omaka. The Albatros, Fokker D.VII and seven Dr.I Trplanes made up the formidable force.*

ABOVE: *The Bristol B.E.2c was used to intercept and destroy German Zeppelins, and was credited with downing six airships.*

FLYING BACK IN TIME DOWN UNDER



Baron von Richtofen leads the first element of Jasta 11 as the ground troops prepare to reposition.

'vehicle' which uses aircraft and memorabilia to tell the amazing human stories that came from the Great War in the air."

There are several galleries chock-full of original period artifacts and a selection of diorama displays showing full-size replica and original aircraft on airfields, or in a snowscape or in the trenches. These series of theatrical dioramas were the work of Weta Workshop, the special effects team used in many of the films directing by Sir Peter Jackson, EAA 1009200, such as the 2005 *King Kong* and the *Lord of the Rings* trilogy.

"From that first conversation, the group always put strong emphasis on theatrical displays ranging from highly involved military re-enactments to comedy routines," Graham said. "The physical structure and layout of the Omaka Airfield, within the natural amphitheater of the Wither Hills and the sun always behind the crowd, lends itself to providing the perfect sound stage with the public very close to aircraft and ground action."

Add to that a culinary experience offering everything from venison to escargot and lamb shanks, as well as the Marlborough region's wines, and you have a formula for success. A remarkable array of re-enactors dressed in period uniforms and showing various types of wartime equipment added a lot to the show's atmosphere and to the public's understanding of the soldiers' life.

As you'd expect, it takes a team and contributors to pull it together. Significant players with aircraft include the NZ Warbirds Association and The Vintage Aviator Ltd., both of which are contracted to supply aircraft, as are various owners of smaller collections and individual machines, Graham

PHOTOGRAPHY BY **ROB FOX** AND **GAVIN HADFIELD**

LEFT: *As the dreaded V-2 rocket was in the process of launching it was taken out by the strafing of Spitfires and P-40s.*

BELOW: *A sight no Allied pilot wanted to see when looking over his shoulder—a flight of seven Fokker DR.I Triplanes led by the Red Baron diving for an attack.*

said. Each show puts together a coherent theme, and set pieces, huge props (including a V-2 rocket this year), and the re-enactors make it a full-on event for the whole family.

NEW ZEALAND'S VINTAGE AVIATOR

One common denominator is the aircraft of The Vintage Aviator Ltd. (TVAL), based at Masterton, on the southern end of the North Island, across the Cook Strait from Omaka. It works closely with the 1914-18 Aviation Heritage Trust, which manages the Knights of the Sky exhibit.

"Complementing the static display of Great War aircraft," production manager and chief pilot Gene de Marco said, "TVAL operates a growing collection of [flying] Great War aircraft and enjoys showcasing these aircraft at the major air shows throughout New Zealand."

The 1914-18 Aviation Heritage Trust owns more than 30 aircraft, which are operated by TVAL. Each year new re-creations of Great War aircraft have appeared, several—like the B.E.2c series and the F.E.2—have brought types back from extinction in flying condition. Due to an emphasis on originality, a great deal is being relearned on how they were originally built and operated. That re-creation extends to manufacturing and running the first 100-hp Oberursel rotary engine built from scratch since WWI. (Intriguingly, and perhaps usefully for future projects, the Oberursel is a Gnome Monosoupape clone.) For TVAL, off-the-shelf modern engines are no longer enough. It is after the fidelity of re-creating—or in the case of the F.E's Beardmore engine, searching the world to find parts to enable a rebuilt, running, flying example.

Going back to the organizations, Graham explained how TVAL and Omaka have developed in parallel. "There has always been a strong interest in Great War aviation at Omaka. For the first show we wanted to throw a spotlight on this overlooked era and managed to bring together a handful of aircraft along with buildings and WWI vehicles that our props team created. The aircraft consisted of Sir Peter Jackson's Sopwith Camel, Stuart Tantrum's Fokker Triplane, American Ed Storo's Bristol fighter, and a Fokker D.VII built by the props team to bolster the numbers. There was also the Bellamy-built Pfalz D.III nearing completion on Restoration Row." (This aircraft had originally been made in the United Kingdom by Viv Bellamy for the 1966 movie *Blue Max*.) That air show was held over Easter 2001 and was a great success.

WORLD WAR I DOWN UNDER

The headlining act in 2011 was the return of the Richthofen Circus with no fewer

FLYING BACK IN TIME DOWN UNDER

LEFT: *The Vintage Aviator Limited finished the replica Albatros in time for new owner Kermit Weeks to participate in the air show. It is powered by an original 108-hp Mercedes D.IIIa engine.*

INSET: *Kermit Weeks, Peter Jackson, and Gene de Marco.*

"MY BIGGEST EPIPHANY IN THE [ALBATROS] IS WHEN YOU LOOK AT IT YOU GO, 'WOW, WHAT A SLEEK-LOOKING, SHARP, FAST-LOOKING AIRPLANE, LIKE A DOLPHIN THROUGH THE SKY.' THE REAL ADMISSION IS THAT IT'S NOT A FAST AIRPLANE."

—Kermit Weeks

seven Fokker Dr.I replicas. The last real Fokker Triplane was bombed in Berlin during World War II, but the type has been highly popular with replica builders since. The sight of these seven machines, painted in the bright colors of the original pilots who flew in the Red Baron's squadron, darting about the sky like lethal gnats provided a little window into WWI aerial combat, an impression not to be had anywhere but Down Under. With 14 in the air at one time, it was perhaps the greatest collection of World War I aircraft flying together since shortly after the Great War ended and Howard Hughes filmed *Hell's Angels*.

The Triplanes had to share the stage this year with a "new" Albatros D.Va built by TVAL and powered by an original 180-hp Mercedes engine. It was flown by its owner, Kermit Weeks, EAA 52310, who believes he has the largest private collection of original WWI airplanes with 12, not including reproductions like the Albatros.

"It's extremely unique," Kermit said of the Albatros. "My biggest epiphany in the airplane is when you look at it you go, 'Wow, what a sleek-looking, sharp, fast-looking airplane, like a dolphin through the sky.' The real admission is that it's not a fast airplane. I was probably cruising around at 85-90 mph. The top speed might be 115 mph. It's a classic airplane."

During the show Kermit took on fellow American Gene de Marco, adorned in a Royal Flying Corps uniform, who was in the cockpit of the Bentley rotary-powered Sopwith Camel. Gene had been with the Old Rhinebeck Aerodrome for years before joining TVAL.

"Kermit Weeks and I have been friends for a long time. It only seemed appropriate to invite him out here to New Zealand to see what we are doing at TVAL," Gene said. "During one of his visits I had the opportunity to introduce Kermit to Sir Peter Jackson, who at the time was preparing for the remake of the *Dam Busters* film. Knowing Kermit owns a Lancaster project, I thought it appropriate to bring these two friends together, and of course, they also both share an interest in World War I aviation. After several visits Kermit and I were discussing projects that we could work on together, and that led to Kermit's stash of WWI Mercedes engines—the same engine that powers the Albatros D.Va. Through a trade (TVAL encourages trading!) we found ourselves overhauling one of Kermit's Mercedes engines in order to install it in a TVAL-built Albatros D.Va."

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FLYING BACK IN TIME DOWN UNDER

John Lamont takes off in a P-40C, with the more bullet-like nose and smaller air scoop compared to the more widely known P-40E, owned by the Old Stick & Rudder Company and flown by Stu Goldspink.

WORLD WAR II RE-CREATED

During the WWII portion of the show, a rare Royal Air Force Miles Messenger brought in Prime Minister Winston Churchill to inspect the troops. On the German side of the lines, a Panzer IV tank protected a Nebelwerfer rocket launcher with a V-2 replica attached. A Focke-Wulf Fw 190 that just had some modifications and upgrades completed flew on Friday but had mechanical problems that kept it on the ground for the rest of the show.

Two Spitfires, including a rare, two-seat Spitfire Tr.IX finished in the colors of New Zealand ace Colin Gray, and a flight of P-40s, including a newly restored Curtiss P-40C, continually strafed the V-2. It wasn't until after the rocket's engine ignited and it was slowly rising from the launcher that the Allied aircraft hit their mark with the rocket exploding. The air show also featured a race among six Tiger Moths, as well as flight demonstrations by a PBY Catalina flying boat, a DC-3, and a BAC 167 Strikemaster jet, which hasn't flown in New Zealand airspace since it was retired in 1992.

EXPANDED FUTURE

Impressive as those achievements have been to date, the future is exciting, too. "TVAL will continue to re-create aircraft from this time period, and the 1914-18 Aviation Heritage Trust will endeavor to increase its collection of WWI aircraft," Gene said. "With this in mind, there should be no shortage of flyable aircraft to display at the various air shows throughout New Zealand."

Keith Skilling in the Old Stick & Rudder Company's FG-1D Corsair is about to surprise the enemy troops. The re-enactors are an integral element of the air show.

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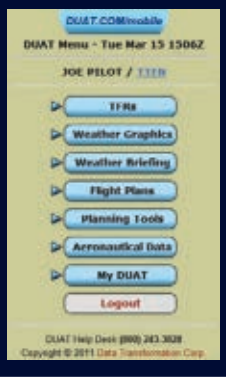

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Tim Sullivan in one of the Fokker Dr.I Triplanes. The "Dreidekker," although more advanced than the simple Sopwith Triplane, was not the fighter the Germans hoped it would be.

In addition to expanding its WWI collection, the museum plans to expand into other periods. "We believe we can do the same for the subsequent eras, and we also believe we have the creative teams on hand to do the job," Graham said.

With 33,000 square feet of display space within the two main halls, AHC has land set aside for another three display hangars of the same size. It is in the process of raising funds to get these additional halls built.

"Classic Fighters is still in its infancy. It has a youthful and enthusiastic team who are full of ideas," Graham said. "The creative people behind the many props seen this year, including the outrageous full-scale V-2 rocket, have many more ideas that they want to explore and already have drawings underway of a range of imaginative displays for Easter 2013. It's a pretty neat marriage between different groups of equally crazy creative people. The aircraft variety will continue to grow with numerous exciting machines from all eras anticipated in the future, including some international guest aircraft." EAA

Rob Fox is the editor of the Australian aviation history magazine *Flightpath* and an award winning photographer. **James Kighty** is a contributing editor to *Flightpath*. To see a photo gallery and get more information about the Omaka and Wanaka air shows, as well as The Vintage Aviator Ltd., visit *www.SportAviation.org*.

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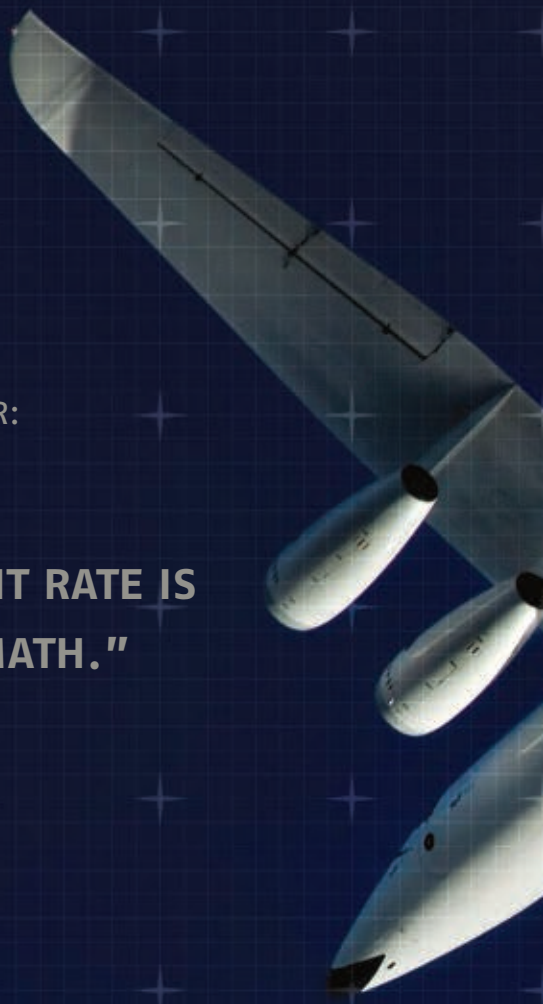

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Flying the World's Hottest Glider

THE SPACESHIPTWO SIMULATOR

BY BOB CARLTON

PHOTOGRAPHY BY **MARK GREENBERG**

Okay, so at this rate, we'll impact the desert in about a minute. Nothing to worry about, though; this is a nominal situation during re-entry in the world's hottest glider, the Scaled Composites SpaceShipTwo.

During EAA AirVenture Oshkosh 2009, I had the good fortune to be parked in the air show pits when Scaled Composites' WhiteKnightTwo (WK2) mother ship made its public debut. Operating under the Virgin Galactic flag, WK2 was designed to carry Scaled's six-passenger commercial spaceship to a release altitude of 40,000 feet, where the spacecraft begins its rocket-propelled flight into space. WK2 sported two identical fuselages, a 140-foot wingspan, and four Pratt & Whitney turbofan engines. It was definitely an impressive sight!

As WK2 orbited overhead with its giant wingspan dwarfing everything else in sight, I realized how much it resembled two gliders glued together. After it landed and parked, and after Burt Rutan, Sir Richard Branson, and the media horde departed, I introduced myself to WK2 pilot Clint Nichols as "the other jet glider pilot" at Oshkosh. It seems they had noticed my diminutive jet-powered air show glider as they taxied by. He agreed that WK2 is basically a big high-tech jet glider. Its exceptionally clean shape allows it to climb quickly to 50,000-plus feet and then cruise at near idle power. We chatted, exchanged cards, and stayed in contact by e-mail.

Fast-forward to January 2011. While making plans to deliver my air show sailplane to the Los Angeles docks for a cargo ship voyage to the Australian International Airshow, I realized that I would be in Scaled's neighborhood. I e-mailed Clint and asked if I might get a tour of the shop. He replied that they are fairly tight-lipped about the spaceship development, but that there might be some interest in my light jet sailplane development. Through Scaled's Learn at Lunch program, where speakers are invited to talk about new aerospace technology, he might be able to swing not only a tour but also time in the SpaceShipTwo simulator in exchange for a presentation on my work. Feeling like I was definitely getting the better end of the deal, I quickly agreed.

VISITING SCALED

Accompanied by Mark Mocho, my hangar partner, crew chief, fellow sailplane pilot, and partner in crime for most of my crazy projects, I arrived at Mojave Air and Space Port and were greeted by Clint. We were issued visitor badges and escorted to the spaceship development area (no cameras, please).

As we walked into the hangar, we immediately were taken by the imposing giant of WK2. As we walked past the left fuselage, the ultimate glider in the form of SpaceShipTwo *Enterprise* (or simply SS2) came into view. With the reverence of altar boys on hallowed ground, we traversed the hangar to WK2's right fuselage, from which the ship is flown. (The left fuselage will eventually be used for additional training seats, passengers, or whatever, but for now it's basically empty.)

Access to the cabin is by means of a small round hatch. As we climbed aboard, the first thing we noticed was how much room there is in the cabin area. Though WK2 has approximately the same diameter as a

PHOTOGRAPHY BY **MARK GREENBERG**

Left: *In the SpaceShipTwo simulator cockpit, simulating captive carry by WhiteKnightTwo.*

Falcon business jet, there is no false floor. There are also no luggage bays, airline seats, or other space-robbing amenities. It is all functionally elegant. Stepping up to the flight deck, I was again struck by the stark simplicity of it all. There are two simple seats, three large multi-function displays (MFDs), and very few switches, knobs, and dials. Two carbon fiber control sticks round out the flight controls. Clint reminded us that WK2's main mission is to fly SS2 to release altitude directly overhead. There is little need for complicated navigation instruments. Cross-country flights are flown with a Garmin 530 GPS, with weather provided by a portable Garmin 396. The access hatch is a simple tapered plug arrangement, which is easily pulled inside to open, and placed into the access port like a champagne cork to close. A simple latching mechanism keeps it from falling out. The hatch is held tightly in place by internal pressure while in flight, but a smaller "cork" can be pulled to release cabin pressure for emergency evacuation.

The pilot sits in the standard left seat, but as Clint pointed out, flying from the left seat of the right fuselage presents an interesting perspective. Since the wheels are 53 feet apart, taxiing, takeoff, and landing are done about 25 feet right of centerline, and when turning, you either feel like you're accelerating or stopping, depending on the direction of the turn. Steering is accomplished by means of differential braking.

We then got a tour of the star of the Scaled show, SpaceShipTwo. It is 60 feet long, with a wingspan of only about 20 feet. It has a distinctively fast look, like a cross between a business jet and the space shuttle. The sharply tapered wings are truncated by long, arrow-like vertical stabilizers that sweep aft and up to support the horizontal stabilizers and elevons, which provide pitch and roll control. We were allowed to stick our heads into the access hatch, but because crews were working on the cockpit, we didn't climb aboard. Immediately apparent is the similarity of the SS2 cockpit with its matriarch. As Clint pointed out, Scaled has designed as much commonality between the ships as possible. Since SS2 is rocket powered only when ascending, it becomes a glider after main engine cutoff. Pilots are even required to hold a commercial glider rating to fly it. WK2 has large spoilers that can be deployed to simulate the steep descent of SS2, allowing pilots to train in an aircraft with go-around capability. Once again, the folks at Scaled demonstrate their knack for simple ingenuity.

THE SIM

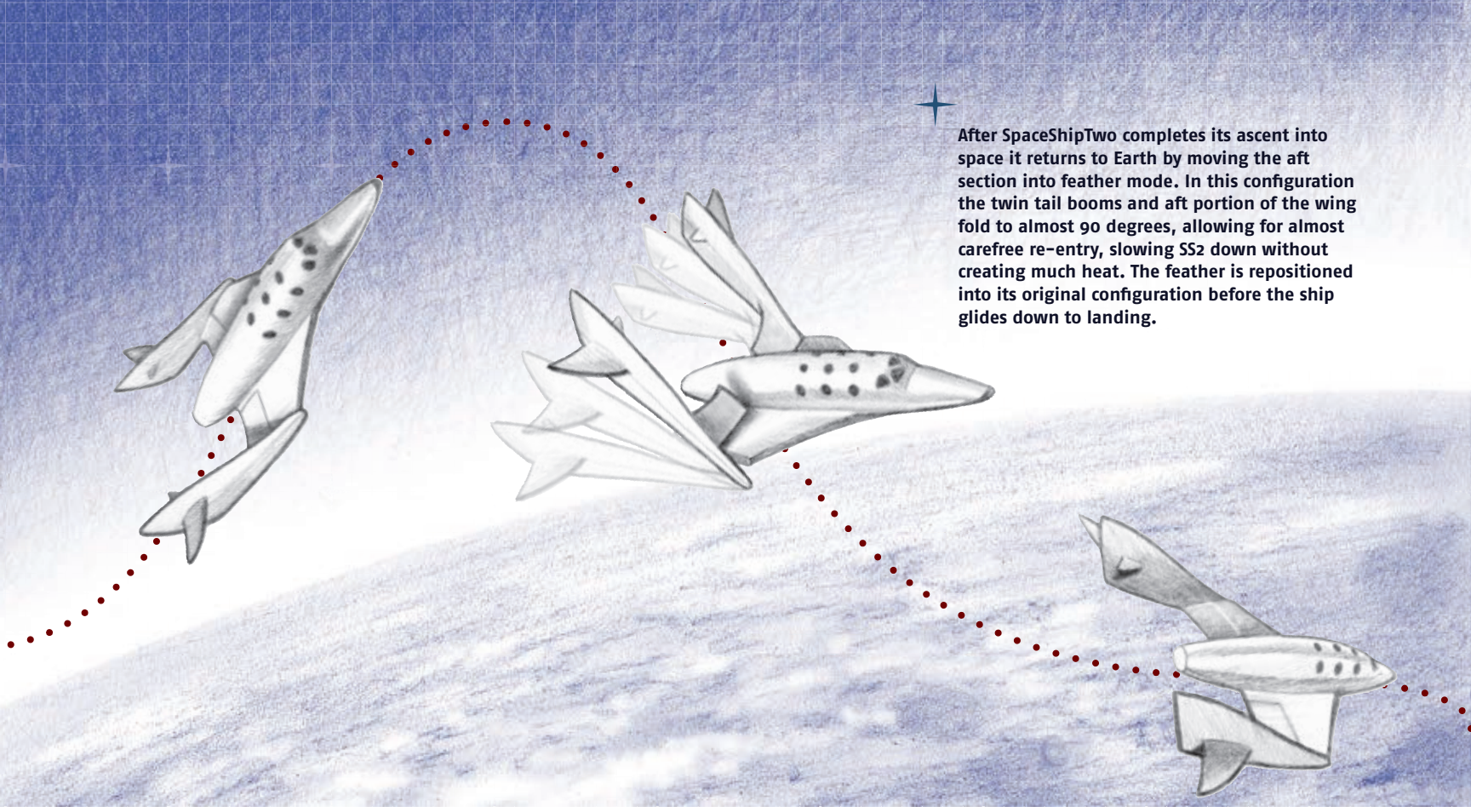
Leaving the spacecraft hangar, Clint directed us to a smaller hangar, which housed several of Scaled's other unique aircraft, including Proteus, a spindly looking tandem-winged research aircraft, and White Knight, mother ship to SpaceShipOne, which Mike Melvill and Brian Binnie piloted to more than 100 kilometers (328,000 feet) altitude to win the $10 million Ansari X Prize in 2004. SpaceShipOne now resides in the Smithsonian National Air and Space Museum, but White Knight is still serving regular duty lifting payloads for high-altitude research.

Traversing that hangar, we entered a small room, with a sign on the door that reads *Lasciate ogne speranza, voi ch'intrate*, Dante's famous inscription above the gates of hell, which translates to "All hope abandon, ye who enter here." Welcome to the simulator room, the lair of the evil geniuses who, through an elaborate computer-generated world, weave a tantalizing web of surrealism to ensnare unsuspecting pilots.

Before us sat the forward section of SS2 (or WK2, depending on the training mission). We were invited in by simulator operator Terry Agold, who helped strap us in with an uncanny, spiderlike quickness. A few seconds later, the IMAX-like visuals came alive and we were flying. A look out the windows to either side revealed that we were in captive-carry mode, suspended between the twin fuselages of WK2. With a few quick introductions to the in-house-designed instrumentation, we were unceremoniously dropped. "We're a little heavy, maintain 180 knots," came Clint's instructions. Having not done a good preflight brief, Mark and I were both trying to fly, making the short-winged ship wobble wildly side to side. After a few seconds, Mark relinquished the stick (and the blame), and I continued to wobble on my own, while also witnessing airspeed excursions well beyond the V_{NE} of most of the aircraft I'd flown before.

SS2 is definitely a handful. In short order, I began to get the feel of the docile ship, got the roll under control and, remembering that the most important glass in a glass cockpit is above the instrument panel, stabilized my attitude (and airspeed) by attitude flying through the rather small windshield. As the fog of sensory overload subsided, and with Clint's help, I began figuring out what the MFDs were telling me. As I noticed Mojave airport disappearing off the bottom of the screen, I realized I'd flown too far from home—the classic greenhorn glider pilot mistake. I asked Clint if we'd make it back. He pointed to my glide slope indicator. Not a chance. We were still above 15,000 feet, but with a glide ratio of only about 7-to-1, we were going to land somewhere in the Mojave Desert. With an approach speed of 180 knots, an off-airport landing wasn't a good idea. I suggested we bail out. Clint agreed

Right: *SpaceShipTwo, a six-passenger commercial spaceship, looks like a cross between a business jet and the space shuttle.*



After SpaceShipTwo completes its ascent into space it returns to Earth by moving the aft section into feather mode. In this configuration the twin tail booms and aft portion of the wing fold to almost 90 degrees, allowing for almost carefree re-entry, slowing SS2 down without creating much heat. The feather is repositioned into its original configuration before the ship glides down to landing.

that under the circumstances it would be our best option. At this point, he introduced us to one of SS2's most amazing features—feather mode.

Let me take a break from the inevitable crash for a moment to enlighten you on what is probably SS2's most unique feature: It folds! Since man first escaped the lower atmosphere back in the 1950s, the problem of how to return has been almost as perplexing as how to get there. You see, a falling body with no atmospheric drag tends to accelerate very quickly, reaching supersonic speeds in a few seconds. As it plummets through the very thin air in the upper atmosphere, it gets hot—really hot. Also, with very little air to react against, the control surfaces are next to useless. Without a sophisticated reaction control system (RCS) and ablative heat shields, the return trip can get pretty toasty—or even crispy. Enter Burt Rutan and his usual out-of-the-box thinking. At apogee, the pilot initiates feather mode, simply folding SS2 in half. The twin tail booms, horizontal stabilizers, and the rear portion of the wing fold upward almost 90 degrees. In this configuration, all of the stabilizing parts of the aircraft are holding the belly toward earth, providing maximum drag and maximum aerodynamic braking. Like a badminton birdie, SS2 falls slowly (relatively) and in an incredibly stable attitude until it reaches an altitude where normal flight is possible, at which point the pilot "unfolds" the aircraft and flies away in normal fashion. As Spock would say, "Fascinating."

Back to our doomed first flight. Bailing out is tricky enough when you can just jettison the canopy and step over the side, but when the only exit route is through a small hatch behind your seat, you could be in a really difficult situation, since the aircraft will be on its own while you're in transit. If the aircraft departs into a dive or spin, it can be impossible to reach the exit. By simply invoking feather mode, SS2's forward speed slows, and it begins to fall in a very flat, stable position, providing ample time for a safe exit. Since this was a simulator and we could reset our lives after the crash, we remained seated while the desert rose up to meet us, the aural terrain warning providing an ominous countdown of the last thousand feet.

Stunned, we sat silently. But in the training environment, there is no time to feel sorry for oneself. In an instant, we were back on the hook at 40,000 feet, nestled safely between WK2's gleaming white fuselages. Clint suggested this time we try the rocket, since after all, we were now seasoned pros with all of three minutes and one destroyed aircraft under our belts. Push full forward on the stick so as not to hit the mother ship, then, once again, the drop. Pitch to level flight and fire the rocket. The trick at this point is to fly as smoothly as possible—straight up. Any excursion from vertical subtracts energy from the climb and limits the peak altitude attainable. The MFD has a supposedly simple "join the dots" navigation tool for maintaining vertical, but my first attempt wasn't so smooth. Things are happening fast at this point!

The rocket burned for less than a minute, but pushed SS2 well beyond supersonic speed. At these speeds (and in the rapidly thinning air), the elevons don't provide enough reaction for good control. Borrowing from the original supersonic aircraft (the Bell X-1) in the supersonic regime, SS2 is controlled by trim, which moves the entire stabilizer, providing enough control surface to fly, albeit with a rather sluggish response time. Learning to fly smoothly through this transitional range might take more practice. Despite my ham-fistedness, we made it to something above 200,000 feet—close enough.

Once beyond the sensible atmosphere, time slowed to a crawl. We were gently tumbling end over end, but there was no urgency. The rocket was no longer pushing us, but we were still coasting upward. After all, without

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SpaceShipTwo is only rocket powered when ascending, making it a glider with a 7-to-1 glide ratio at 600 ktas after main engine cutoff.

that pesky atmosphere, it takes a while to slow down using only gravity. The view was phenomenal as the earth and black sky slowly swapped places through the windows. The atmosphere below us appeared only as a very narrow, glowing blue band on the horizon. It is easy to see why, to an even greater extent than atmospheric flying, those who have been to space will always long to return.

Clint instructed me on how to use the RCS to null rates to eliminate the tumble; effective, but tricky. The first trick, of course, is being able to recognize which way you're tumbling. This is harder than it sounds. The second trick is to recognize that any input will continue forever. A slight bump in the roll direction, for example, will result in a continuous, nonstop roll. Follow this with a slight bump in pitch, and you're in a head over heels tumble—again. Somewhere during this 3-D ballet, we reached apogee and began falling back toward terra firma. We're still tumbling, but Clint said not to worry—feather mode will take care of it. We pulled the handles for feather mode and waited.

After a time (hard to say how long with time oozing by at a molasses pace), the airspeed indicator began to come alive and the tumbling gave way to slow oscillations, ever lessening until we were completely stable. Despite the fact that we were now falling faster than a bullet, and our descent speed was visible by looking at the horizon, the airspeed indicator was still only showing double digits.

Like the ascent, things now began to happen at a quickening pace. Passing through about 70,000 feet, we de-feathered. We were now a glider with only a 7-to-1 glide ratio at 180 knots indicated (600 knots true). That means we were still descending at more than 8,000 fpm. The MFD gave all the information needed to establish a proper glide back to Mojave airport. It guided me through sort of a double overhead approach, with a downwind leg at about 4,000 feet. Still dropping fast, the MFD became secondary, as it's mostly good ol' stick and rudder skills from here on in. Looking good, a little high, added some spoilers, gear down now, buttonhooked the turn to final a bit, lined up on centerline, flared...

Because of the rapid descent rate, I began the flare at a much higher altitude than I expected. Surprised me a bit, but it felt right. Looking good, descent rate was slowing. Clint was calling my airspeed, nose high, and...touchdown. Still fast, rolling, stick back for aero-braking. Nose skid down. Slowing a bit. Clint has to remind me that I have toe brakes also. A little braking and we're stopped. Being a glider, that's it. No taxiing. We waited for the tug. Time to relax and savor the moment. Wrong! In an instant, we're back on the hook, counting down to another unceremonious drop. As the mother ship disappeared above us, we began another flight.

TACKLING THE IMPOSSIBLE

Scaled Composites is an incredibly unique place. There is no sign of a big corporate attitude. Its employees are daily striking out into the excitement of the unknown and pushing the limits. Almost everyone who is designing these aircraft flies something—from paragliders to jets. The pilots are drawn largely from inside the organization, with a "You built it; you fly it" philosophy. Their consistent ability and willingness to tackle the impossible, to have the courage to dream the impossible, represents the spirit that made America great. Thanks to Scaled (and Richard Branson's Virgin Galactic), it will soon be possible for any of us to experience the wonders of space travel. Many thanks to Clint Nichols and everyone at Scaled for an incredible experience. Best wishes for many successful flights. EAA

Bob Carlton, EAA 1011571, operates Vertigo Airshows and flies the jet-powered Super Salto sailplane. For more information on Scaled Composites, please visit its website at *www.Scaled.com*. To book your own space experience aboard SpaceShipTwo, visit Virgin Galactic's website at *www.VirginGalactic.com*.

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Maule Air

Fifty years of family-built aircraft

BY STEVE ELLS

The tangible factors of the success of Maule Air Inc. are easy to ascertain: Build airplanes that are sturdy, easy to repair, perform well, and dependable; keep overhead and research and development costs under control; and find a market niche and stick with it while constantly looking for ways to further improve an already good product.

PHOTOGRAPHY COURTESY OF **EAA ARCHIVES, MAULE AIR INC.**

The Maule family (L-R): Rautgunde, Raymond, Barbara, David, Brent, Shirley, and Charlie.

All models of Maule aircraft can be equipped with straight or amphibious floats.

THE INTANGIBLES ARE ALSO easy to define but harder to replicate. The Maule board of directors includes all the family members working at the company. Their decisions carry on the legacy of their parents' vision.

Maule Air Inc. is celebrating its 50th anniversary this year, and I had the opportunity to spend three days in early May at the factory in Moultrie, Georgia. Unlike my visits to other, larger manufacturers, I was given the run of the place to interview employees and take photos. There's no pretense at Maule. What you see is what you get.

FAMILY

Over the last 50 years Maule has shipped more than 2,500 airplanes to customers all over the world. The company was founded by Belford D. "BD" Maule and his wife, June, in 1941 and made engine starters and tail wheels. In the 1950s, BD began designing a high-powered utility aircraft. The result was the M-4, which received FAA certification in 1961. BD ran the business with June by his side until his death in 1995. June owned the company and remained involved with the factory's production until her death in 2009, and today BD and June's youngest son, David, is at the helm.

"If it wasn't for David, we'd be in a mess, 'cause David can do anything," said Tim Yoak, a Maule employee of 11 years. The Maule children, including David, Janet, Shirley, and Raymond, are all involved with the company, as well as some of their children: Robert Pitts, Charlie Dermyre, and Brent Maule. BD and June's son, Gary, was also involved in the company until October 2009 when he passed away from leukemia within hours of his mother's passing from old age.

David has carried on his father's work, and even though it may not appear as if Maule airplanes have changed much over the years, a series of small improvements have been implemented. The welded tube fuselage frame is now powder-coated to increase corrosion protection; wing sheet-metal parts are painted before assembly; fuel tanks are welded aluminum; both pilot and copilot positions have toe brakes; all airframes have float fittings unless removal is specifically requested; and steel grab handles are standard on both sides of the aft fuselage for moving and handling. The belly stringer, a small diameter tube welded in place to form the fore and aft fabric shape at the bottom of the fuselage fabric, is stainless steel to provide additional protection against rust—a small point, but evidence that the Maule team is continually improving what at first glance appears to be a prosaic tube and fabric airplane.

Raymond said he and his sister used to help build the tail wheels, "I was 9 and she was 8."

Raymond, EAA 91807, said he and his sister used to help build the tail wheels, which were one of BD's earliest airplane products. "I was 9 and she was 8," he said. "Luscombe used to order 1,000 tail wheels at a time."

Raymond and his wife, Rautgunde, own Maule Flight, a maintenance, refurbishment, and repair facility that's also located on Spence Field. Raymond does most of the flying for Maule. Asked which airplane he liked best, he answered, "I like the M-4 for just fun flying."

Like David, Shirley Maule is soft-spoken and wears many hats at Maule. She can usually be found in front of two large computer screens reviewing engineering drawings or other company business. Shirley is the push behind the Staggerwing Country Jamborees, held in an adjacent building formerly used as the Maule Pilot Lounge. These jamborees are held every Friday evening from 8 to 11, feature live music and dancing, and often include a short karaoke session. There's no alcohol allowed and everyone's welcome. "Shirley likes to get together with her friends and dance," Raymond said.

EXTENDED FAMILY

Most of the Maule employees have been with the company a long time. Tony Cato, who claims he does everything from taking out the garbage to building wiring looms and installing avionics packages, started when he was 20 years old. "I've been here over 20 years," he said as he was fine-tuning the fit on the cabin doors of an airplane that is part of a six-airplane order. "I like the variety, and it all pays the same."

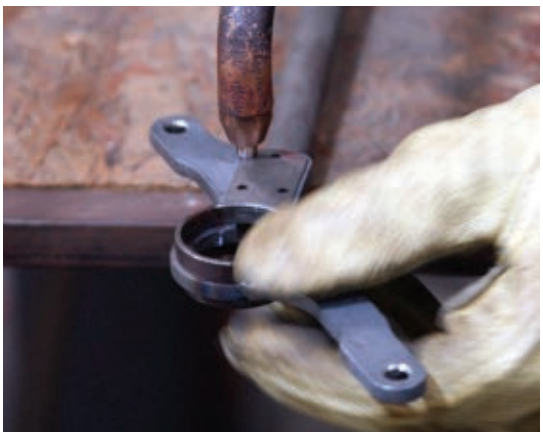
Lynda Suber tells a similar story. "My daddy was working here, and he called one day and told me to come on down," she said. Lynda helped build wings for six years before moving over to the fabric shop. "I learned to do fabric from Alice Kranstead, who started working on airplanes in Atlanta during World War II." Lynda was 18 when she started at Maule Air. "I'm 55 now," she said with a smile.

Wayne Suber, Lynda's husband, also works at Maule Air. He started in 1974. Wayne and John Fleming—who started four years ago—man the Stage 5 station, where everything from the cockpit forward gets finished. This includes items such as instrument panels, instruments and instrument connections, wiring, windshields, tires, brakes, and glare shield installations.

Bryan Horn holds down the parts desk. Duane Knauff sits nearby; he works in quality control and helps Bryan with the parts. Bryan wasn't hired to work parts but, as he tells it, before he had his jacket off his first day of work, he was told to report to the office. "I thought I was fired after being on the job two hours," he said. Instead of being fired he was told the parts manager had just turned in his resignation and he was the new parts manager.

"I really like it," he said. "Already this morning I've talked to a customer in England and one in Germany and answered an e-mail from Kazakhstan. Eighty percent of the time I can recognize customers by the sound of their voice on the phone. I'm pretty sure they like the fact they know me and know who they're going to talk to when they call in for parts."

Bruce Harlow, acting designated manufacturing inspection representative (DMIR) for the FAA at Maule Air, joined Maule in 1980. "I started out as a welder, but they found out I could read blueprints, so I became an inspector right away." Bruce is 67 and talks about retirement but then muses, "What would I do?" He concedes



ABOVE: The Stage 5 assembly station is where everything from the cockpit forward gets finished.

UPPER LEFT: A tailwheel steering arm being installed. The steerable, full-swiveling tail wheel was developed by founder BD Maule in the 1940s.

LOWER LEFT: Standard Maule interior is vinyl and fabric; however, an optional leather interior is available for all models. The leather is hand-cut and -sewn by Maule.

PHOTOGRAPHY COURTESY OF **MAULE AIR INC.**

that, "When you come to work here, it's kinda like home."

Bruce was supervising Bobby Brock as Bobby poured molten lead to ensure the correct balance of an elevator. Bobby has been with Maule since 1974.

"Bobby and I left Maule for a while to weld on boilers," Bruce said. They worked a lot of overtime and made more money but gave that up to return to Maule. "Boilers don't fly, and we both had a passion for airplanes," Bobby said.

REMEMBERING THE FOUNDER

Most of the employees at Maule have a BD story. Lynda Suber said that Mr. Maule always had a rocking chair, and when BD was interested in something she was working on, "He'd just sit there, rocking back and forth."

In the early days of the company, customers who didn't specify the paint colors they wanted always got a red airplane. "Mr. Maule liked to paint his airplanes red," Lynda said. "He was something else."

Charles Casey does all the painting, fiberglass work, prep work, and finish coats. Charles was unemployed when a friend working at Maule asked if he wanted to go to work as a painter. "Mr. Maule asked if I had ever painted before, and when I said yes, he said, 'Go to work,'" Charles said. He's been there 17 years.

Today paint is done in one of two state-of-the-art paint booths, but many years ago Maule airplanes were painted at the back of one hangar on the hangar floor. Visitors to the Maule Air website are mystified to see a photograph of a Maule airplane angled radically skyward after flying out the Maule hangar door. According to Bruce, BD flew an airplane out of the company hangar four times. The story differs slightly depending on who's telling it, but it seems that when BD got the itch, he would say something about dusting off the paint area.

That was the sign to the employees to clear the inside of Hangar Two. Soon after the hangar was cleared, BD would position a Maule airplane at one end of the hangar, start it up, and warm the engine

Company lore says BD Maule flew an airplane out of the company hangar four times.

before firewalling the throttle. Within a few hundred feet the airplane would lift off, and he would fly the length of the hangar before pulling up as he flew past the door opening. The only time it wasn't routine was the first time BD flew an M-6. The M-6 has a couple more feet wingspan and 30 more inches of flap than the M-5 he had been flying.

"That almost ended up in a disaster," Bruce said, as he explained the extra lift seemed to surprise BD so much he had to push the nose down to keep the tail from clipping the hangar structure as he flew the length of the building and out the door. "That was the last time he did that."

AIRPLANES

Maule's airplane offerings branch out from two basic airframes. Brent Maule, head of sales, explained, "The MX-7 and

Origins

In 1940, Belford D. "BD" Maule and his wife, June, moved to Michigan to start Mechanical Products Company, manufacturing the Hummer mechanical starter for light aircraft. A year later the BD Maule Company was formed to build a light aircraft tail wheel designed by BD. An improved version of the wheel is still made by the company.

During World War II the starter business waned, but tail wheels were in high demand. The company also did some subcontract work to support the war effort, and BD designed an ornithopter. He claimed to be the first person to have successfully flown such a device. In 1946, BD and June converted a farm in Napoleon, Michigan, into an airport, which flourished with a flight training business in the initial postwar aviation boom.

BD began designing the first of the current line of Maule aircraft in 1952. His goal was a high-powered utility aircraft. He wanted a four-place, "go anywhere" airplane, including wilderness environments. The first prototype was completed in 1957. BD brought his design to the EAA convention and won an Outstanding Workmanship award. Testing for certification began later that year.

Maule received FAA type certification for the Bee Dee M-4 in 1961. The first production model, known as the Jetasen M-4, was delivered in April 1962. In 1968 the company moved to Spence Air Base in Moultrie, Georgia. By this time the airplane had evolved from 145 hp with a fixed-pitch propeller to 220 hp with a constant-speed propeller, and approximately 250 had been delivered. The aircraft has seen a variety of powerplants through the years, with the structural design remaining the same and the original fuselage jig still being used.

At the time of his passing in 1995, BD held the distinction of being the only founder, owner, and manager of an existing aircraft manufacturing company. He remained in control of the company, as well as the development of the product, until his death.

PHOTOGRAPHY COURTESY OF **EAA ARCHIVES, MAULE AIR INC.**

Featured Titles

FROM THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS

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Daniel P. Raymer

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2006, 4th Edition, 869 pages, Hardback,
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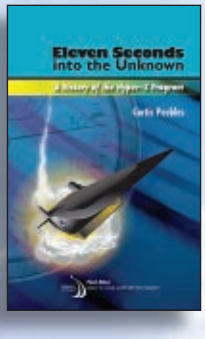

Eleven Seconds into the Unknown
A History of the Hyper-X Program

Curtis Peebles

A central theme of the Hyper-X story is how numerous commercial and governmental organizations each with their own culture, experience, and traditions, became a unified team working toward a common goal of hypersonic flight. *Eleven Seconds into the Unknown: A History of the Hyper-X Program* will appeal to anyone interested in high-speed flight, aerospace history, the organization and management of technological projects, and the future of spaceflight.

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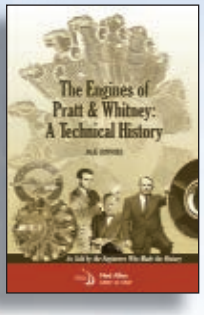

The Engines of Pratt & Whitney
A Technical History

Jack Connors

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MAULE AIRCRAFT DATA

Wing Span: 32 feet, 11 inches
Length: 23 feet, 8 inches
Best Climb Speed: 90 mph
Wing Area: 165.6 square feet
Height: 6 feet, 4 inches (tailwheel); 8 feet, 4 inches (nosewheel)
Fuel Capacity: 73 U.S. gallons (standard) 85 U.S. gallons (optional)

The Maule M-7 is the current incarnation of BD's original M-4 design. The MX-7 (shown above) is 3 inches shorter in height and 5 inches shorter in the cargo area than the M-7 fuselage. All Maule aircraft are four seaters, though the M-7 and MT-7 have an optional fifth seat.

the M-7 are similar except the cabin in the M-7 is taller, so there's 3 more inches headroom, and it's longer, so there's 5 more inches room in the cargo area for the optional fifth seat." The overall fuselage lengths are the same. Landing gear options include oleo strut or aluminum spring main landing gear and tail wheel or steerable nose gear.

MX-7 engine options include a 180-hp Lycoming O-360 with constant-speed propeller; the M-7 engine options include a Lycoming 235-hp O-540 or IO-540 with constant-speed propeller, or a Lycoming 260-hp IO-540 with a constant-speed propeller. Each engine comes with a spin-on oil filter and a stainless steel exhaust system.

At Sun 'n Fun 1998, a Maule MX-7-420 on amphibious floats (modified by Missouri Turbine Maule with a 420-shp Allison 250 turboprop) set a world record of 4 minutes, 29 seconds for a climb to 10,000 feet.

Brent reports that the number of orders received during the first half of 2011 have already exceeded the total sales numbers for 2009-2010. In addition to a swelling order book, Maule is anticipating a surge in worldwide sales with the introduction of the Maule M-9, a new model featuring powerplant and maximum takeoff weight (MTOW) upgrades for the company's rugged and dependable M-7 series airframes.

The 300-pound increase in MTOW to 2,800 pounds will give M-9 buyers useful loads of approximately 1,100 pounds. Powerplant options include two versions of the robust fuel-injected six-cylinder Lycoming 540 series engines—that burn avgas—or a fuel-injected turbocharged four-cylinder 230-hp SR305-230E compression-ignition (diesel-cycle) engine from SMA that burns Jet A.

In commemoration of the company's 50th anniversary, Maule re-introduced an upgraded version of BD's original M-4, the company's first airplane. The M-4-180V Jetasen II features a 180-hp four-cylinder Lycoming O-360 and can be purchased with either a fixed-pitch or constant-speed prop. It has two seats and a large cargo area with a cargo door, STOL-like performance, an average useful load of a little more than 900 pounds, and a five-page option list that includes everything from full IFR glass panels to extended range fuel tanks.

As the M-9 nears certification Maule Air is well positioned for the future. The well-rounded product-line, the stable leadership, and the companywide spirit of respect and kindness spiced with a dash of music and fun has sustained Maule Air for 50 years through the inevitable hard times. That spirit will undoubtedly continue to sustain it on into the equally inevitable better times. EAA

Steven Ells, EAA 883967, is an A&P/IA with a commercial pilot certificate and instrument and multiengine ratings. He owns a Piper Comanche and lives in California with his wife, Audrey. You can visit him online at *www.EllsAviation.com*.

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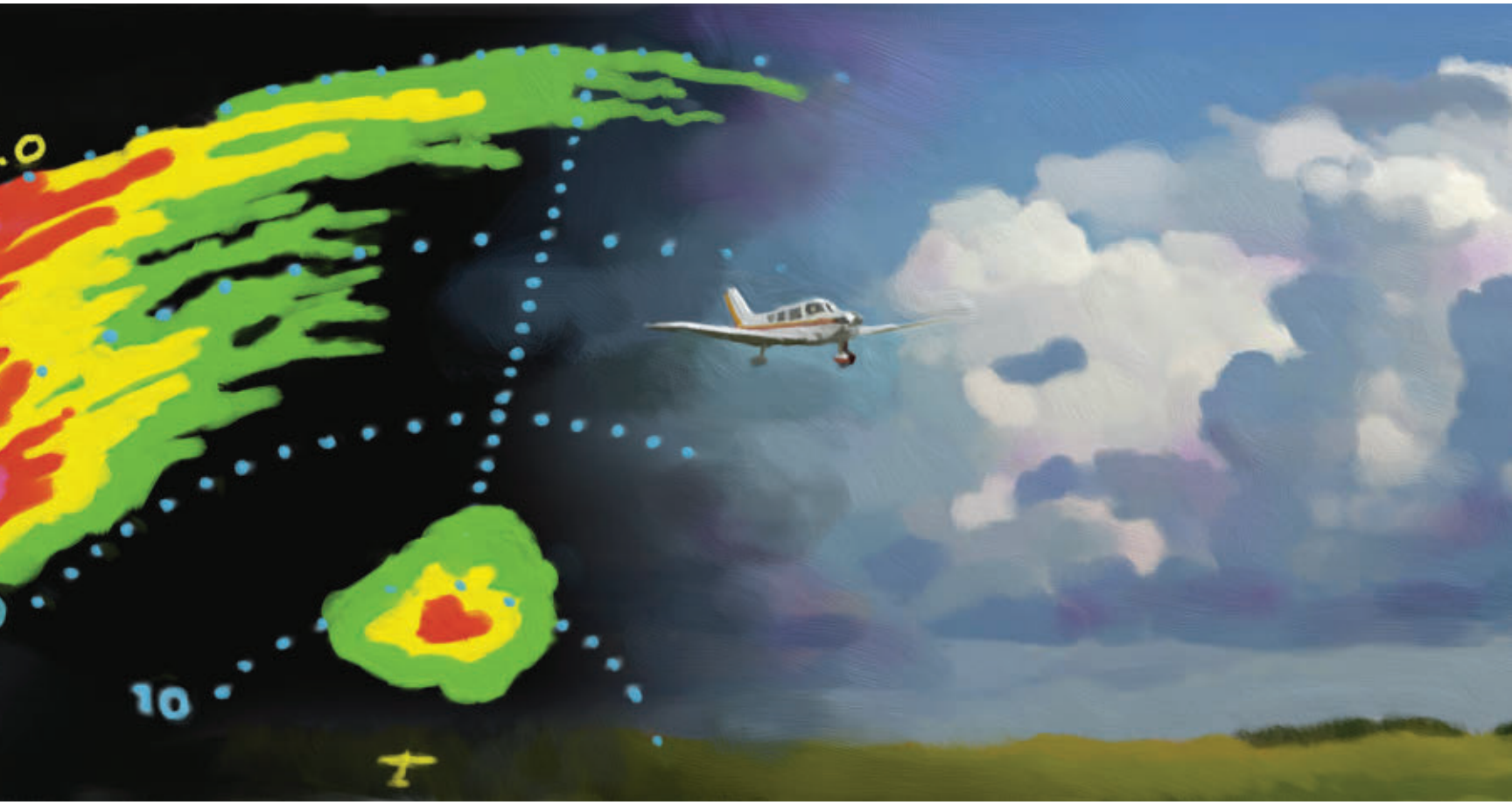
J. MAC MCCLELLAN
BETTER PILOT / LEFT SEAT



Weather Briefings and Satellites

Real-time weather data in the cockpit changes preflight planning

THE FAA'S RULES ARE constantly running up against new technology. As in much of our non-flying lives, new technology, mostly electronic, has transformed the way we live. Anybody seen a pay phone lately?

Good old FAR 91.103 is the FAA rule that requires preflight planning by all pilots in command. This rule contains the infamous demand that you "become familiar with all information concerning that flight." How could you possibly know *all* the available information there is? All is an exclusive word that allows no exceptions. It's the type of rule that would never withstand normal court procedures, but the FAA does not need to submit its laws to the conventional courts.

Since no pilot can ever prove that they were familiar with ALL information concerning their flight, it seems to me that not crashing is a sufficient defense. You may not have known ALL information, but you knew enough to avoid problems. But that is for lawyers to parse, not pilots.

To aid pilots on the way to learning ALL available information, the FAA provides at least a little guidance in FAR 91.103, including the requirement to familiarize yourself with weather reports and forecasts. We

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TBM850
by DAHER-SOCATA

J. MAC MCCLELLAN

What the weather would do three or four hours into the trip was just a guess, at best, and I would be able to watch the conditions change and develop on the displays in the cockpit.

have been told over the years by instructors that this means we must have an "official" weather briefing to comply with the rule. I don't know of an explicit definition of an "official" weather briefing and what it must include because that ALL demand keeps popping up. But a number of outlets in addition to a flight service station can deliver FAA-approved weather information. And when it comes to the basics such as METARs, TAFs, AIRMETs, SIGMETs, and winds aloft forecasts, there is only one source, and that is the FAA's weather office in Kansas City, no matter what outlet is delivering the info.

What started me thinking about FAR 91.103 and its absurd and unobtainable requirements for preflight planning was a recent flight from my home airport in Muskegon, Michigan, to Rocky Mountain Metro. The Pilatus Owners and Pilots Association was holding its annual conference in Boulder, Colorado, and was gracious enough to invite me to come and speak.

Big thunderstorms were the preflight planning issue that day. For some reason I don't understand, we have had an unusually large number of weather systems oriented almost directly east-west across the middle of the country this late spring and early summer, and this day offered up another. Really big thunderstorms were over Chicago, and a more or less unbroken line of radar returns stretched west into Nebraska and eastern Colorado.

Given this weather situation, what made sense for preflight planning for the trip in my Baron? The flight would take nearly five hours, and I would need a fuel stop to arrive at the destination with at least the one hour of fuel reserve that I demand for my own operations, no matter what the weather. If forecasts indicate a chance of the need to divert to an alternate, I plan to arrive at the alternate with one hour of fuel. For this trip I planned to stop at Norfolk, Nebraska, because the airport has long runways, ILS and GPS LPV (localizer performance with vertical guidance) approaches, and a quick check on FltPlan.com showed it had the lowest fuel prices along my route.

It took less than a minute of looking at the national Nexrad mosaic on the computer to see that there were no weather issues at all for departure and for the first few hundred miles of the trip. My route would keep me comfortably north of the line of storms. There was no TAF for Norfolk, but Sioux City, Iowa, just 54 nautical miles to the east, did have a forecast that included a chance of thunderstorms but with ceiling and visibility that qualified as a legal IFR alternate airport.

Did examining the weather radar picture and the terminal forecast for my alternate airport meet the demands of FAR 91.103 with its ALL requirement? I think that it did because I have satellite weather delivered into my cockpit by XM Weather and Avidyne Sirius/WSI. I know that it's weird to have two satellite weather systems in the same airplane, but it's a long story.

IN-FLIGHT INFORMATION

The fact is that most pilots who fly much at all have the capability to receive up-to-date graphical and text weather via satellite while in flight. There are the installed satellite receivers and displays like I have, but there are hundreds of thousands of portable receivers pilots own and use. Some pilots I know have even had good success receiving radar images on smartphones in the cockpit.

So what's the point of spending a huge amount of time poring over endless area forecasts or strings of terminal forecasts that simply repeat the obvious that there was a chance of thunderstorms along almost the entire route? If I had done

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The fact is that most pilots who fly much at all have the capability to receive up-to-date graphical and text weather via satellite while in flight.

that, would I be familiar with ALL information about the flight? I don't think so. And FltPlan.com, that wonderful free online flight planning and flight plan filing service, had considered my route and the winds aloft and spit out a prediction of time en route and fuel required. I have learned over the years FltPlan.com is very precise in its calculations, so that aspect of the preflight was done almost instantly and perfectly.

For me the valid question concerned the weather conditions for departure and early in the trip, and the general area conditions along the route to be sure some airports would have weather conditions above IFR approach minimums. What the weather would do three or four hours into the trip was just a guess at best, and I would be able to watch the conditions change and develop on the displays in the cockpit.

The first part of the trip worked out exactly as I expected. Crossing Lake Michigan, southern Wisconsin, and on into Iowa offered smooth air on top of low clouds with only light headwinds. The Nexrad images kept arriving on the Garmin and Avidyne displays about every five minutes, and the radar echoes stayed south of the magenta course line the navigation systems drew on the display. If I didn't know ALL about the weather, I sure did know what I needed to.

I had filed to cross the Janesville, Wisconsin, VOR and then direct to the fuel stop at Norfolk. That course looked good relative to the radar returns—for a while. But then the line of storms began to drift to the north. I could see on the flat glass displays that if I deviated north to the Mason City, Iowa, VOR and then direct to Norfolk I would stay clear of the weather. Minneapolis Center controllers thought that plan made perfect sense and issued the clearance.

But at some point I still had to go through the line of weather to make it to the Denver area. Each new Nexrad image showed at least small changes in the size and intensity of the radar returns, and it looked like there were some breaks in the line in the Sioux City area. I would continue on and see how the weather changed as I approached. So was I

making “preflight” plans because I was not yet to the line of weather, or was I making “in-flight” weather plans? Those satellites above were making FAR 91.103 very obsolete.

I have spent a lot of time flying over the Great Plains in thunderstorm season, and just like those guys in the DC-3s 70 years ago, I have learned that lower is better over this flat land. Heck, maybe even the guys struggling across the Plains in tri-motors learned the same thing. When thunderstorms are over the Plains, the visibility outside of the rain shafts is usually very good so you can dodge the cells visually rather than getting your brains kicked in flying along in the bottoms of the clouds associated with the storms.

As I approached the now-broken area of the line I was still in the clear. Minneapolis granted my request for 4,000 feet, and that got me below the bases for a time. As I flew into Sioux City terminal airspace the approach controllers there could clear me down to 3,000 feet, and I was again just below the bases and cleared to deviate around the rain shafts. By the time I got to Norfolk a thunderstorm had moved on a few miles to the north, and I landed in a gusty north wind behind the cell.

This trip is now typical in the days of satellite weather, but it would have been very different not that long ago. Before XM Weather and Avidyne Sirius/WSI, I would have had to make some sort of a preflight plan based on radar summary charts that were already a half-hour old, and I could have seen those charts only if I was able to walk into an FSS. My airplane has an excellent weather radar in the nose, but down low it can only effectively see storms for about 30 or 40 miles, which makes dealing with a long line of storms an iffy proposition. But with the Nexrad image, plus outlines of AIRMETs and SIGMETs, and text terminal forecasts and hourly reports, I was being “briefed” on the weather continuously during the flight.

The requirement to consider weather reports and forecasts before departure still makes sense, but on a trip of any length you are really only deciding if the weather is good enough to depart and fly the first part of the trip. You’ll get the weather information for the rest of the trip as you fly along. We now can know ALL about the weather thanks to satellites. The real requirement is not to know about the weather, but to have the discipline to land short of the destination or divert when the weather doesn’t allow us to safely continue. EAA

J. Mac McClellan, EAA 747337, has been a pilot for more than 40 years, holds an ATP certificate, and owns a Beechcraft Baron.

ROBERT N. ROSSIER
BETTER PILOT / STICK & RUDDER

What's Happening?

Crossed wires and cross-checks

SOMETIMES PROBLEMS JUMP UP and slap us in the face. Other times, they sneak up on us without as much as a shadow or a footprint. Either way, if we don't deal with them in due course, they're bound to get the best of us, especially when those problems are in an airplane.

CROSSED WIRES

The pilot of the Piper PA-28-181 knew he was going to have his hands full. He was over the water, approaching Kennedy International Airport's airspace, and the hazy summer weather meant visibility was on the decline. The problem was the attitude indicator, which was lazily rolling to one side, giving an indication of a climbing turn, when in fact the airplane was in straight and level flight. Better to just cover it over, he thought, as he placed a yellow Post-it note over the ailing instrument. The next question was where to land.

PHOTOGRAPHY BY **BONNIE KRATZ**

His decision-making process was interrupted as his scan crossed the instrument panel one more time, picking up a new problem. The oil pressure light was now on, suggesting the unwelcomed prospects of an engine failure and a ditching in the ocean. This wasn't his day, and with these two failures staring him in the face, the pilot called New York Approach to fill them in on his unhappy situation. No doubt, the sharks would be waiting for him if the engine quit before he could make landfall. He crossed his fingers for luck.

An important part of our aviation training is learning to monitor the systems that keep us aloft and heading in the right direction. The earlier we can spot trouble on our horizon, the more options we have available, and the more opportunities we have to make decisions that will serve our greater good. What we really need, of course, is a crystal ball that can tell us ahead of time when something will run awry, so we can head trouble off at the pass.

By cross-checking the instruments, we can determine which instrument or system is malfunctioning. The next step is to readjust to the partial-panel situation and continue to a safe landing.

Sadly, while modern cockpits might have liquid crystal displays, they don't have crystal balls. We're left on our own to monitor the best we can, and stay as far ahead of the aircraft as possible. Sometimes the indications we get from a single instrument can be confusing or even downright misleading.

Fortunately, the pilot sorted out the confusion before committing to an emergency landing at JFK. As it turns out, the

aircraft had recently undergone maintenance, during which the covers for the indicator lights had been inadvertently switched. The resulting indication when the vacuum system failed caused the pilot to get his mental wires crossed. Rather than seeing a "Vacuum" failure indication, he saw an "Oil Pressure" warning light. Once he cross-checked all the instruments, he figured out the real problem. He diverted to another airport where he was able to have the failed vacuum pump replaced. The sharks would have to wait.

UNDER PRESSURE

The pilot of a Beech Model 35 (V-Tail Bonanza) was beginning his initial descent to his destination airport when his confusion started. As he descended, so did his airspeed. Thinking he had inadvertently applied back-pressure to the yoke, he trimmed the nose down to accelerate to his normal descent speed. Rather than increase, the airspeed indicator continued to unwind toward the slow end of the scale.

Anytime an instrument responds contrary to control inputs, a pilot is bound to do some head-scratching. In this case, relying on a single instrument reading—the airspeed indicator—would likely end up putting the aircraft in an unusual attitude. The only way to sort out what is wrong is to take a look at the big picture. By cross-checking the instruments (airspeed, attitude indicator, power setting, altimeter), we can determine which instrument or system is malfunctioning. The next step is to readjust to the partial-panel situation and continue to a safe landing.

The trouble is, in most of our training it is obvious which instrument is incorrect; it's the one the instructor covered over. Unfortunately, when a real system or instrument failure occurs, all the instruments may look like they are working. Especially if we're flying in other than good VFR, it might be critical to sort the problem out pronto, and the pressure can build rapidly in the interim.

Fortunately, the Beech pilot reverted to his training and was able to sort out the issue. He configured the aircraft for the descent with the proper power setting and pitch attitude, and cross-checked the altimeter. He got his head out of the figurative clouds, recognized that it was the airspeed indicator that was in error, and covered it over to reduce the distraction. Knowing the prescribed pitch attitudes and power settings was the key to overcoming the problem. It allowed him to slow the aircraft below gear extension speed, lower the gear, and make an uneventful descent and landing.

If our navigational equipment gives us "bad intelligence" the situation can rapidly spiral out of control.

NAVIGATIONAL SNAFUS

Today we often rely heavily on precise electronics to handle the navigational details for us. Here again, if our navigational equipment gives us "bad intelligence" about where we are and where we're going, the situation can rapidly spiral out of control.

Consider the case of the two commercial pilots making a localizer approach to their home airport in a Piper Archer (PA-28-181). Undoubtedly, they were comfortable with the approach, and probably knew it so well they could draw the instrument approach plate from memory. Unfortunately, that didn't prevent them from falling into one of the oldest navigational pilot traps.

The first clue came when the approach controller asked them if they were established on the approach. The PIC responded in the affirmative; the localizer was dead center on the dial, and the DME was clicking down at a reassuringly steady pace. A short time later, ATC called again to ask the pilot if he was on course. Now a bit irritated, the pilot responded that he was on course and approaching minimums.

The pilot woke up when ATC finally called to tell him he was a half-mile north of the localizer. Just as he was about to jam the throttle in for a go-around, he broke out of the overcast and recognized the local landmarks. He leveled off his descent, made a dogleg to the touchdown, and landed without incident. No doubt, the pilots were lucky that day. The situation could have gone the other way.

In this case, the problem was a bad VOR receiver. Although the pilot had verified the ID, he didn't recognize that the needle wasn't responding correctly, and that set him up for a potentially lethal descent. A thorough check of the VOR might have uncovered the problem. If he had cross-checked his position with another instrument, such as another localizer, a nondirectional beacon, or a GPS if he had one available, he might have seen the problem before he even initiated the approach and been in a better position to cope with the failure.

Although this was a case of instrument failure, human error is perhaps a more likely cause of navigation mishaps. Lack of familiarity with the electronics, using the wrong mode, or any number of "simple mistakes" can lead us down the bumpy road to perdition.

KEYS TO SUCCESS

The problem of instrument failures is one to which we should perhaps pay more attention. While the slap in the face of an engine failure or cockpit fire might get our attention in a heartbeat, the subtle indications of a system malfunction can go unnoticed unless we really pay attention and cross-check all the indications. The key to successfully dealing with instrument and system problems is anticipating the failures, recognizing when something is wrong, and cross-checking the various indications. Provided we understand the systems, and their proper indications, we can keep a cool head and figure out what's happening—as long as we're paying attention! 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.

MAX TRESCOTT
BETTER PILOT / TRENDS ALOFT

FAA Snaring More Pilots

New culture putting certificates at risk

THIS TRENDS ALOFT COLUMN is about change and new technologies. So it's ironic that due to a change, this is my last column in *Sport Aviation* for the time being. I've loved writing the column and EAA and I are discussing other ways I can continue to contribute to EAA's publications regularly. In the meantime, please visit *www.TrendsAloft.com* and enter your email address, to receive future articles electronically.

Before signing off, I want to write about a disturbing trend in FAA enforcement that all pilots should know about. If you've flown for more than 20 years, you probably recall prior to the early 1990s that pilots lived in fear of the FAA. Then, even a small deviation by a pilot could result in an enforcement action, and pilots were justifiably afraid of interactions with the agency.

But a breath of fresh air blew into the agency in the early 1990s. Many of us began referring to it as a "kinder and gentler" FAA. That's when the agency changed its policy to focus more on education of pilots and less on enforcement action. As a result, when you heard a controller say, "Advise when ready to copy a phone number," a contrite demeanor during the phone call would often end the encounter right there. But beware: The winds have shifted again.

I interact with hundreds of pilots each year as an active flight instructor, author of aviation books, and public speaker. To some pilots, such as those getting a private certificate or instrument rating, I give a lot of training. But I also fly with many pilots only once or twice, and all of the pilots I'm about to mention are in that category.

In the past five months, I've had four clients and friends tell me that they've received pilot deviations (PDs) from the FAA. By comparison, in the prior 10 years I can't remember any friend or client who had a pilot deviation. Coincidence? Perhaps. Alan Armstrong, an East Coast aviation attorney, says the current "enforcement climate for pilots is poor" as the FAA culture has moved "from a 'win/win' paradigm to a

PHOTOGRAPHY BY **AARON LURTH**

'win/lose' paradigm." And we pilots are the losers.

In the past, FAA controllers had a lot of discretion as to whether they reported a PD. I recall a controller saying he avoided filing PDs simply because of the paperwork. Thus under the kinder and gentler FAA, unless a pilot was grossly negligent or had an uncooperative attitude, many potential PDs were never filed.

But the game has shifted. Another aviation attorney told me that controllers now have to look at job security. He e-mailed me saying an FAA tower chief told him, "If the controller doesn't pass the blame to the pilot, the controller gets in trouble ... The union also recommends filing the deviation reports, and he says they really have no discretion not to do so."

In the past five months, I've had four clients and friends tell me that they've received pilot deviations (PDs) from the FAA.

Here's a quick summary of PDs that have been filed against my clients and friends in the past five months.

A pilot departing on an IFR flight plan was given a clearance to fly the runway heading upon departure. He somehow became distracted during the departure and was flying 50 degrees from the runway heading. Compounding it, prior to takeoff, while in an area not visible from the tower, he was instructed to "continue taxiing west in the direction you're pointed." He continued taxiing in the direction he was pointed, which was east not west, but didn't point out the discrepancy to the controller. He engaged an attorney and was required to take remedial training from a flight instructor.

A pilot of a single-engine piston aircraft was cleared into Class B airspace and assigned an altitude of 3,500 feet. He was

These days when flying IFR, I triple-check everything. I hate having to be that paranoid, but it now appears necessary.

hand-flying the airplane and inadvertently ended up at 3,800 feet. This triggered a resolution advisory in a nearby airliner's traffic collision avoidance system, which commanded the airline pilot to climb. In the course of the investigation, it came out that he didn't have a current flight review in his logbook. He wasn't offered remedial training, and his case has been referred for legal action.

A private jet owner, operating the aircraft in single pilot operation, departed on an IFR flight plan. He was told to look for traffic at 1,500 feet and then he was cleared for takeoff. At 400 feet he received a traffic alert on his traffic advisory system and asked the tower where the traffic was located. The tower switched him to departure, which assigned a new heading of 360 degrees and a climb to 3,500 feet. During the climb, he received a second traffic alert, inadvertently climbed to 3,900 feet, and was given a phone number to call. He had asked both the tower and departure to point out traffic, but neither did. His case is still under investigation.

A flight instructor friend was giving instruction, and while on an instrument approach, the instructor became distracted while looking over the right wing for traffic. During this time, his client began to descend upon the approach, even though the aircraft hadn't been cleared for the approach. An investigation of the pilot and the flight instructor is continuing.

I've observed on instrument flights that pilots have trouble setting priorities. In my book, *Max Trescott's GPS and WAAS Instrument Flying Handbook*, I wrote, "I tell pilots to prioritize the following tasks above all others: leveling out at an altitude, rolling out of a turn onto a heading, and intercepting courses, particularly the final approach course. Whenever one of these tasks is coming up in the next minute, postpone lower priority tasks, such as getting the weather, reviewing charts, or running a prelanding checklist, until you've completed higher level tasks." Following this advice would have eliminated three of the four PDs listed above.

These days when flying IFR, I triple-check everything. I hate having to be that paranoid, but it now appears necessary. I'm also considering the advice that one attorney gave me while researching this column. Regarding being given a phone number to copy, he said, "to simply say you will comply [i.e., call the tower], and then go away without calling or talking with anyone." According to him, the "first evidentiary hurdle the FAA has is to ID who was the PIC. A phone call immediately IDs you. The case becomes pretty easy for the FAA after that admission."

I yearn for the kinder, gentler FAA. There was a "live and let live" philosophy that acknowledged that both pilots and controllers make mistakes, but that neither was going to lose their certificate or their job over a minor deviation.

For example, recently I was getting flight following with approach in Southern California, and the controller gave me no notice of a plane 400 feet above me that descended to my altitude while moving from 12 o'clock to 9 o'clock. I estimate it passed within a quarter of mile. When I queried ATC, there was a long pause. Then I heard the words, "I apologize." That's the way it should be.

I have tremendous respect for FAA Administrator Randy Babbitt, but I disagree with the agency's stepped-up legal pursuit of PDs. We don't need internecine warfare between pilots and controllers. And with huge government deficits, the FAA shouldn't be wasting our taxpayer dollars on prosecuting inadvertent PDs. EAA

Max Trescott, EAA 531980, is the author of books on the Garmin G1000 and flying IFR with modern GPS. He was the 2008 National CFI of the Year. Max can be e-mailed at *info@sjflight.com*. For more articles, enter your e-mail at *www.MaxTrescott.com*.

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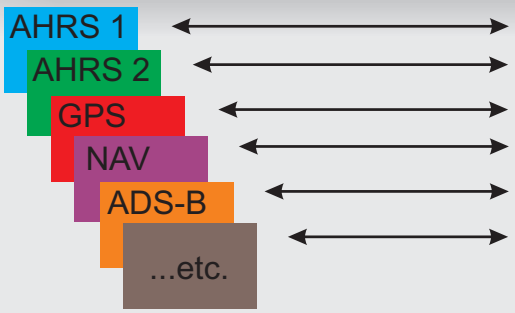

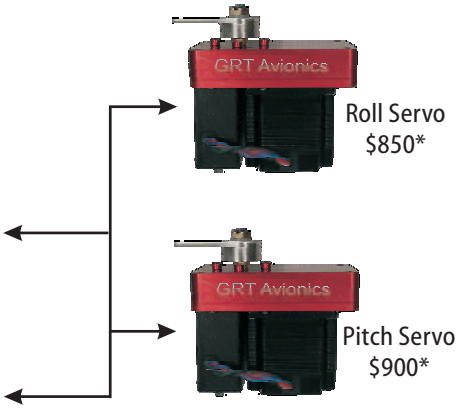

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BRADY LANE
BETTER PILOT / AB INITIO

EAA multimedia journalist Brady Lane chronicled his journey to earn his sport pilot certificate at www.EAA.org/wings. *Ab initio is Latin for "from the beginning," and this column is one in a series of transitioning from a sport pilot to a private pilot.—Eds.*

Aviating After Hours

Learning how to fly under the stars

LYING IN THE TRUCK bed of my father's faded blue F-150, I strained my 8-year-old eyes to see a small constellation my mother was pointing to. She wanted to teach me how to find Pleiades, her favorite cluster of stars.

After nearly half an hour of squinting, I was ready to admit defeat. Then she revealed the secret: "You can't look at the stars to see them. You have to look just beside them."

Magically this small cluster of stars appeared, then disappeared again as soon as I glanced toward them.

Twenty years later on another clear summer night, my eyes were again scanning the landscape, this time for a beacon light while returning to the airport on my first night flight lesson. Steve Krog, my instructor, repeated the same lesson my mother had so many years earlier.

I smiled and thought back to those magical stars.

PHOTOGRAPHY BY **BRADY LANE**

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ADIOS, CURFEW

As a sport pilot, I've always had to be on the ground before the end of civil twilight. I've watched many sunsets while pushing the plane into the hangar, wishing I was still airborne.

The moment the main wheels of the Cherokee lifted off the runway, I was in love with night flying. The air was the smoothest I have ever flown in, and I had to peel my eyes away from the beautiful sunset to focus on the task of making my first night landing.

SMOOTH AND STABLE

My first few trips around the pattern, I turned base where I always do. My landings were successful but not to be modeled. It wasn't completely dark yet, but I was already noticing how low light disrupts depth perception. "When I fly at night or at an airport I'm not familiar with, I give myself a little more time to establish a smooth and stabilized approach," Steve said. "Try extending your downwind another 10 seconds."

My next time around, I forced myself to wait another few seconds to turn base. With full flaps, I was able to hold a steady 500 fpm descent at a rock solid 75 mph on final. It felt great! This kept the runway, or at least the runway perimeter lights, at that picture perfect 3-degree glide slope perspective for our entire approach.

As we continued to fly, the runway became completely black and only the perimeter lights could be seen. Our landing light burned out a few seconds after turning it on, so those runway lights would be my only guide.

"As you see the runway lights begin to flatten out, start your flare and begin to bleed the speed off," Steve said.

That landing was the best landing I've ever made in a Cherokee. Steve challenged me to do it again. Never in my life have I been able to do two greasers in a row, but that night I did three back to back. I couldn't believe it.

I enjoyed this first night flight so much I asked Steve why more people don't fly at night.

Why were these landings super slick when I couldn't see anything but the perimeter lights? Steve said the secret to any good landing is a stabilized approach, and that was precisely what I was working on with these slightly longer approaches.

Night flying in many ways felt like simplified flying. Since there was less to see, there was less information to process. This made flying more challenging and more enjoyable. I wasn't fixating on the centerline as I descended toward the runway because it could not be seen. I was simply aiming for the middle of the black hole that appeared to be the same shape as the runway. I flared when the runway lights started to flatten, and surprisingly I kept making soft landings right on the centerline, something that rarely happens consistently during the day. I'm guessing this was because for the first time I was looking all the way down the runway.

FLYING INTO THE UNKNOWN

While not being able to see all the details simplifies flying, I'm not naïve enough to think it makes all the obstacles outside the plane disappear. As I pitched the nose up on each takeoff, it was pure black for the first 200 feet or so. This was slightly unnerving because I knew there were trees at the end of the runway, which were not lit. Just after takeoff I could no longer see the runway lights, and we weren't high enough yet to see the city lights for reference.

Steve said this is where instrument proficiency is crucial, at least for a few seconds. "Stabilize the artificial horizon, hold your airspeed, and within a few seconds you'll start seeing city lights outside the plane again," he said.

LEAVING THE PATTERN

After nine or so landings, we flew 15 miles north to give me my first taste of flying away from the airport. The lights of the city, highway headlights chasing each other, and the synchronized blinking lights on a nearby wind farm created an orchestra of lights far more dazzling than any neighborhood Christmas light display.

While I was enjoying the serenity below, we were unintentionally climbing about 100 feet a minute. Looking below, I had the sensation we were sinking, so subconsciously I was applying back-pressure on the yoke.

In many ways, night flying reminded me of the simulated instrument flying I had done with Steve. Even after this observation, I still had to force myself to fly the instruments and not my gut.

We turned back toward the airport, and I was amazed how hard it was to find the rotating beacon. I expected it to be bright and obvious, but car headlights turning on roads below were the only flashing lights I saw.

Steve gave me a brief lesson on cones and rods and how our eyes work at night. Basically, we all have a blind spot in the middle of our vision at night, which is what can make lights, airport beacons, or even stars for that matter hard to locate at night. Steve said it's important not only to scan with your eyes at night, but also to let your neck join the action.

PEACEFUL FLYING

I enjoyed this first night flight so much I asked Steve why more people don't fly at night. He said there are specific currency requirements for flying with passengers at night, which most people don't keep up. Night flying definitely requires some practice, but mastering those techniques will make any pilot a better daytime flier as well. *EAA*

Brady Lane, EAA 808095, is a multimedia journalist for EAA and a sport pilot.

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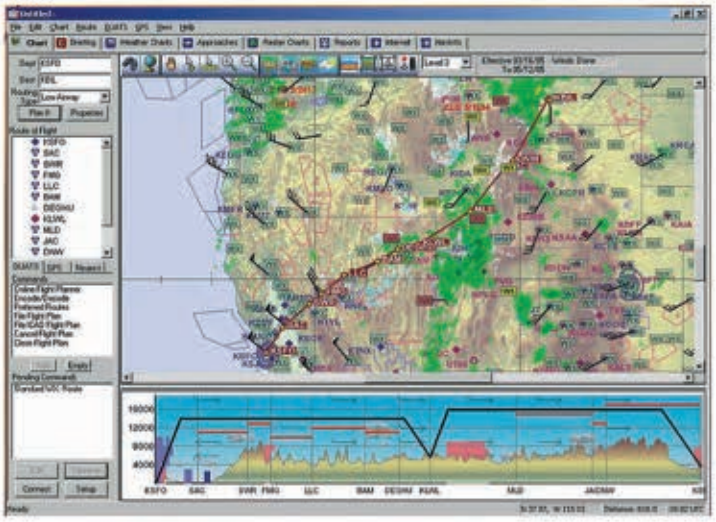

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BOB O'QUINN
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It's Good to Be in Control!

Most flight control failures are preventable

ONE OF THE MOST frightening situations any pilot can have is a flight control failure. Imagine a suddenly jammed elevator, an ineffective aileron response, or slack rudder pedals. Or what about full flaps on a go-around, when you selected 20 degrees? In these seemingly no-way-out crisis situations, 80 percent of the 107 pilots who experienced a flight control failure between February 2005 and September 2010 survived to tell their story, according to NTSB accident data. Amazingly, the pilots and passengers of 64 percent of the accident flights suffered nothing more than minor injuries.

Improper maintenance was a primary cause in more than one-third of the accidents, of which only two were amateur-built aircraft. Some specific maintenance issues included reversed flight control cables, modifications with disregard for manufacturer's instructions, inadequate lubrication, and chafed or corroded cables not observed during routine annual or 100-hour inspections.

In most cases, according to the NTSB findings, the flight control failures could have been prevented if proper maintenance procedures or manufacturer's instructions had been followed. Of special importance to pilots is the significant number of accidents that could have been prevented if the pilot had performed a thorough preflight and pre-takeoff check of flight controls. From the cockpit of most aircraft, flaps and ailerons are easily seen and checked for proper degree and direction of travel, and should also be checked during a preflight walk-around.

In aircraft designs where it is difficult or impossible to see the empennage from the cockpit, the pilot can stand beside the aircraft or on a wing (low-wing aircraft) and reach inside to move the elevator and rudder pedals. Or, the pilot can ask a person sitting inside to move the controls while he or she checks for proper movement. Although "Improper Maintenance" was cited as the cause of reversed flight control cables and pushrods, it follows that "Improper/Inadequate Preflight—PIC" was also included as a cause.

A thorough preflight would have eliminated many other more obvious discrepancies listed in the NTSB accident reports. These include:

- Control lock not removed
- Newly repaired seat blocked control stick movement
- Seat belt locked around copilot's control stick
- Item in front seat's back pocket restricted control stick
- Cargo shifted and jammed controls
- Tool left on seat fell and jammed control stick
- Failure to insert wing hinge pin of folding wing
- Frost contamination

An obviously preventable accident happened when a pilot who couldn't find the aircraft manufacturer's control lock decided to jury-rig it. The resulting NTSB report read: "Machine bolt (with no red flag) used as gust lock and not removed." Although the aircraft sustained substantial damage in the aborted takeoff, the pilot and his three passengers suffered no serious injuries. At the other end of the spectrum is the not so obvious, hidden effect of improper maintenance that resulted in a towplane's rudder cable failure during an attempted banner pickup. The NTSB report read, "Resulting from maintenance personnel's improper installation and inspection of the cable." Fortunately, the pilot suffered nothing more than minor injuries, although the aircraft was substantially damaged.

There are two actions pilots can take to help prevent flight control failures. First, as simple as it sounds, there is no substitute for a thorough preflight and pre-takeoff check of flight controls. Second, if the pilot is an aircraft owner, he or she owes it to his or her family to choose a quality maintenance shop or mechanic with good references and a good reputation for reliable maintenance. EAA

Flight Control Failure Causes

Improper Maintenance	36 %
Improper Preflight	20 %
Mechanical failure	11 %
Undetermined	10 %
In-Flight Planning/Decision	8 %
Exceeded Aircraft Limitations (Stress)	6 %
Inadequate Aircraft/Equipment Information/Design (Amateur-built)	5 %
Weather	4 %

SOURCE: NTSB Flight Control Failure Accident Reports, February 4, 2005–September 4, 2010.

Robert O'Quinn, EAA 742434, is a certificated flight instructor and advanced ground instructor whose focus is on tailwheel training.

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Thirty Years

Unhinged about aviation

THIRTY YEARS AGO, AS I was circling the field on my first solo, I looked out at my left wingtip and thought, "That's my wingtip. I can make it move," and wagged it up and down half a foot just to prove it.

Thirty years later, I still do that. I am an airplane nut, one of those people who always look up when an aircraft flies overhead, who slow down when driving past an airport, craning our necks to see what's going on. If we see an aircraft parked, and it's a fine day, we wonder what's wrong. Out of annual? Pilot stuck at work and can't get away?

We read books about flying and prefer novels that have flying in them. High-performance fighters are good, but slow old airplanes are fine as well—C-47s in Alaska, Cessna OV-1 Bird Dogs flown by forward air controllers in Vietnam. When we fly on commercial airliners, we keep track of what's going on. No sleeping or movies for us. We look out at the wing and try to visualize the air flowing over it, and regret that we're not up front in the cockpit, doing the actual flying. Most people think we are unhinged.

STILL CRAZY AFTER ALL THESE YEARS

I was raised on Air Force bases. I naturally saw aviation as my future. Unfortunately, a vision problem, just enough for me to need glasses, kept me out of military flight training. Instead, I used illustration and writing to shape a career, and messed about in boats for recreation. Conventional flight training always seemed too expensive, so when ultralights came along, it suddenly seemed my chance was here. Learn to fly for just $295 plus tax!

Because there were no two-seat trainers in 1981, my training was cave-man simple. I was harnessed into an engineless Eagle ultralight, to be hauled aloft by being towed behind a van down a 3,000-foot grass strip.

I remember, vividly, sitting in the Eagle, waiting for that first tow, surrounded by the rich smells of a hot August day—bean field and sweet grass. I also remember dry mouth and sweaty palms. A yank, a quick trundle over the grass, and then abruptly rising up as if by magic, hot breath of fragrant air whistling past. Technically, this first flight also was a first solo, although I didn't think of that at the time.

ILLUSTRATION BY **DAVE MATHENY**

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DAVE MATHENY

Because there were no two-seat trainers in 1981, my training was cave-man simple. I was harnessed into an engineless Eagle ultralight, to be hauled aloft by being towed behind a van down a 3,000-foot grass strip.

The experience would have been like an amusement park ride, where all you have to do is to sit back and let it happen, except that in this ride you absolutely had to take control and steer. The van got to about 30 mph and the Eagle flew along at maybe 25 feet, although from the pilot's seat it looked much, much higher. The instructor sat in the back of the van, shouting instructions. Sorry, never heard a word. This functional deafness is common, apparently, among hang-gliding students.

Having to work at it to stay behind the van taught you to steer. You learned pitch control at the end of the tow, when you were cut loose. Get the nose down to maintain airspeed, then flare before landing.

This sudden solo was a terrible way to learn to fly, not to mention unsafe and, as far as I can tell, has long since been abandoned. It's amazing that students not only survived but actually learned anything, but they did. After six or seven tows, which amounted to maybe four minutes of flight time, I climbed into an Eagle that did have an engine and was told to go fly around the field for half an hour. It was during that flight that I looked out and admired my wingtip. The landing was uneventful. I still have the certificate somewhere that declared me an ultralight pilot.

I bought a new Eagle ($4,995 plus tax!) and spent the next year searching for places to unfold it and fly for an hour's worth of just being a few hundred feet up and appreciating the simple but incredible truth that humans can fly.

CATCHING THE WAVE

Having taken this first step into aviation, I found myself carried along by events. It was something like what a surfboarder must feel when the wave first begins to build, a rushing feeling of things going your way. Things you would never have experienced if you hadn't mounted that board. Something new has happened every year since.

For starters, I gained an appreciation for just how you had to be ready for a forced landing at all times. The Eagle's powertrain was a Rube Goldberg arrangement that came unglued about once every two flight hours, resulting in forced landings from causes as varied as the drive belt slipping and stripping off its teeth, the reduction-drive shaft breaking, the lone spark plug blowing out, and the engine trying to ingest the carburetor's rubber velocity stack. The important lesson in all this was that you just can't count on the thrust to be there all the time.

This being the early 1980s, the era of the ultralight, multitudes of buyers thronged ultralight dealers' showrooms, each demanding one of these ultralight things. Because Cessna and Piper had shut down production of single-engine aircraft, anybody who produced even one tube-and-Dacron flying machine was making more airplanes than the big guys.

EAA founder Paul Poberezny was asked at the time whether ultralights were pretty much the future of aviation. He said that there had been another big stampede back in 1946, when it seemed that every man, woman, and child in the country must soon be flying around in airplanes. He advised caution about projecting present trends unquestioningly into the future. He was right, obviously.

I joined an EAA chapter. Members brought in pieces of projects they were working on. One, who was also a sky diver, would repack the hand-throwable parachutes that some of us were carrying while flying. The ballistically deployed BRS was not yet ready.

Boris Popov, who brought the BRS into being about then, also was a local ultralight dealer and was selling an ultralight a day during the summer months. In 1982 he opened an airpark near St. Paul, Minnesota, to train new pilots in the just-developed Quicksilver MX Sprint two-seat trainer. He thought I'd be good at teaching, so I jumped through the hoops and became an official, FAA-legal instructor.

LEARNING BY DOING

For the illustration I've drawn a two-seater that I used for instruction. (The technically minded will note that it's an early one, with a single-surface wing and an early BRS. It definitely brings back memories.) At home I was soon studying for the private pilot certificate, surrounded by a sea of ASA study manuals. I was so enthusiastic that I studied for the commercial certificate as well, just because it was enjoyable to learn new stuff. It was all part of the forward charge.

The very act of teaching makes you learn your subject. Flight instruction is harder than it looks, but you do get to spend a lot of time in the air, and students are always interesting. Most are apprehensive about landings; one will focus on the airspeed indicator to the exclusion of all else, another will seem completely confident on the controls, but will take longer than average to nail down level turns. It's always fascinating and sometimes maddening, rarely boring, and invariably rewarding to see a student solo and go on in aviation.

An unexpected benefit from instructing was that one of my students was a young lady who would eventually become my wife. Boris was best man at the wedding, and our paths have intersected often over the years. I pulled the handle on some on-ground BRS test deployments and flew the camera guy for some in-air tests. Having grown up around pilots and aircrews who always had parachutes and ejection seats as an ultimate backup, I've had a BRS installed on every ultralight I've flown since they became available.

We flew to fly-ins, which are among life's greatest pleasures. There's always that picnic atmosphere, and a sense of shared adventure and exploration.

RIDING THE WAVE

My wife, Jean, and I bought an Ercoupe and joined the local Ercoupe club, which led to more adventures. We flew cross-countries—longer ones than were feasible with an ultralight—just for the joy of going somewhere by air. On one, we got trapped by weather at a field outside of Chicago. I had to explain to my editor back in Minneapolis that I couldn't be at work because of the weather. He didn't understand why I didn't just bulldoze my way through. I was putting into practice a piece of wisdom I had come across somewhere, that you don't have to be anywhere—not if it means flying into instrument conditions just because you're meeting a schedule.

We flew to fly-ins, which are among life's greatest pleasures. There's always that picnic atmosphere, and a sense of shared adventure and exploration. And, to be honest, an awareness that not just anybody can do this.

We got into sky diving and made more than a dozen jumps each, but never quite got off student status. I still fly in to the drop-zone field a few times a year to see old friends. I sold the Ercoupe, bought an ultralight, sold it, bought it back, sold it, bought another...you know how it goes.

A spectator at our field once asked me what I liked about flying. Now, there are a million answers to that, but without thinking I said, "Takeoffs are a rush, and landings are sweet." That's true of most of us.

But then there's the whole craft of flying, the navigation, the steady monitoring of temperatures and pressures, watching the sky for other aircraft, the unbelievable scenery. Unhinged, yes. I pity those who aren't unhinged about aviation.

The most common question I hear from visitors to the airfield is, for some reason, the one about how far you can fly in one of these contraptions. (Well, they use a nicer word. It's usually more like, "How far can you go in one of these—uh, one of these things?")

That's easy: Go where? When I leave the ground, I'm already there. EAA

Dave Matheny, EAA 184186, is a private pilot and an FAA ground instructor. He has been flying light aircraft, including ultralights, for 30 years. He accepts commissions for his art and can be reached at *DaveMatheny3000@yahoo.com*.

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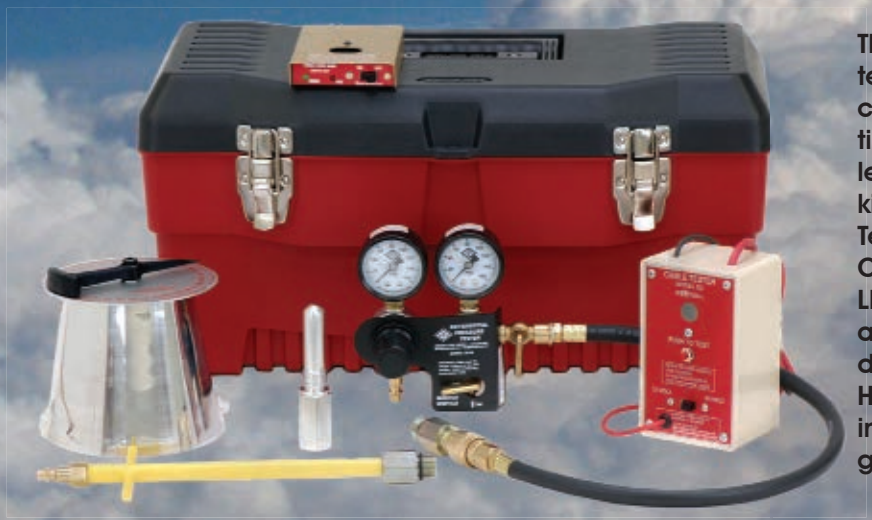
ATS ENGINE TEST KIT



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Santa Cruz Composite

Lancair is first of its kind in Bolivia

BY JOAQUIN AGUIRRE, EAA 828572; SANTA CRUZ, BOLIVIA

IN 2010, WITH HELP from building partners Jorge Pereyra and Gustavo Damm, I had the honor of completing the first all-composite kit-built aircraft in Bolivia. My Lancair ES (CP-AD005) took to the sky for its maiden flight on June 6, 2010, at the expert hands of NAFI Master Instructor Ron Galbraith.

The inspiration to build the Lancair ES came to me in 1992 after seeing a fuselage mock-up at Oshkosh. It was love at first sight! After many years of raising a three-kid, two-dog, one-cat, and two-parrot family, opportunity knocked. I ordered the kit and three months later a semi truck rolled up our quiet neighborhood street with a 40-foot container carrying the kit.

The most challenging part of the building process was obtaining building tools and supplies, as we do not have Home Depot-like stores here in Santa Cruz, Bolivia. Electrical and avionics installation was self-taught as there are no avionics shops here either. Everything had to be sent from the United States by airfreight, which added to the costs and bureaucracy due to customs.

Attending Sun 'n Fun and AirVenture Oshkosh was of significant importance in buying supplies as well as learning from other builders of their approach to building challenges and adapting them to our less resourceful environment. Signing up with the Lancair ES builders Yahoo! Group was also valuable. The vast resources of information I found from helpful and knowledgeable fellow builders was tremendous; that helped me in tackling simple and difficult building issues, as well as making new friends along the way.

CP-AD005 was born with a zero-time TCM factory IO-550N powerplant and Hartzell three-blade scimitar propeller and polished spinner. Avionics are all electric and include side-by-side Cheltons, GNS 430, GI-106A, PS Engineering audio panel with marker beacon lights, Garmin transponder, MX20 electronic flight instrument system with chart view, WX-500 Stormscope,

Joaquin Aguirre (left) and Gustavo Damm hold the two awards CP-AD005 received at the 30th annual convention of EAA Chapter 722 in Buenos Aires, Argentina.

PHOTOGRAPHY COURTESY OF **JOAQUIN AGUIRRE**

1.) *The instrument panel houses a laundry list of glass-panel avionics with backup altimeter, attitude, and airspeed indicators.*

2.) *The zero-time TCM factory-fresh IO-550N, ready to roar.*

3.) *The custom light provides great visibility for night landings.*

4.) *Joaquin test flies his Lancair ES.*

TruTrak Digiflight II VSGV autopilot, a built-in Mountain High oxygen system for four passengers, AOA Pro, Zulu power panel headsets, Kannad 406 AF emergency locator transmitter (ELT), and backup altimeter, attitude, and airspeed indicators.

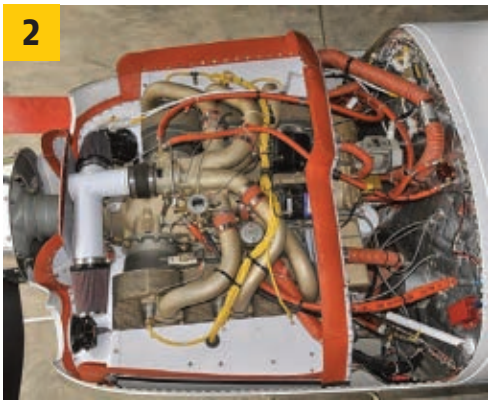
The interior includes leather seats purchased from a factory in Uruguay that makes leather seats for Toyota, with carpet and wood décor. I used Sikkens automotive paint, and the design and colors were at the hands of my wife, Tania.

In March 2011, after 115 total hours of flying time, Gustavo Damm and I made our first international flight to the 30th annual convention of EAA Chapter 722 in Buenos Aires, Argentina. The flight was magnificent with great weather and beautiful scenery as we headed VFR from Santa Cruz (SLET) south alongside the foothills of the Andes at 11,500 feet. Upon our arrival at the General Rodriguez grass strip, we were told that it was the first time a "CP" registered experimental aircraft attended this event.

We were encouraged to enter the aircraft-judging contest and were honored to receive two awards: Grand Champion Experimental International and Longest Flight International Visitor. The event rounded up about 300-plus aircraft and daily air shows including an Argentinian aerobatic squadron with kit-built RANS S-10 and S-9 aircraft, a few Pitts, autogyros, helicopters, and a never-before-seen privately owned L-29 operating from a grass strip!

The flight back home was uneventful, but we again enjoyed the beautiful scenery flying over the foothills of the majestic Andes, whose snow-covered tops could be clearly seen towering well above 20,000 feet at our comfortable cruising altitude of 12,500 feet.

I plan to take many more international flights, including to the beautiful beaches in the northern coast of Brazil, and, of course, to Oshkosh, Wisconsin, in the plane AirVenture helped me build! EAA



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FLORIDA 7BCM

ON THANKSGIVING DAY, 2010, N1413E took to the air again after nearly 40 years. A relatively rare Aeronca with fuel injection, it was used in air shows back in the late 1960s until it was torn down and stored in a barn for nearly 30 years. After it spent yet another short stint in another owner's barn, my wife and I purchased the project airplane in late 2007. A frame-off restoration began, and three years later on Thanksgiving Day, I flew the Aeronca Champ off one of the largest grass strips in the United States at Indiantown Airport (X58).

During the extensive three-year restoration all new wood, including spars, was installed. An STC change with the engine and dorsal fin increased the gross weight to 1,300 pounds, keeping it in the light-sport aircraft category. An overhauled, carbureted, 85-hp Continental C85-12F was installed in place of the original fuel-injected engine. This accommodated a lightweight electrical system, making N1413E night VFR capable, with electric start and built-in radio/intercom. I opted for a new Sensenich wood prop for that classic look.

Charles Stence, EAA 847130; Indiantown, Florida; E-mail: *charles.stence@gmail.com*

OHIO ULTRA CRUISER PLUS

I BEGAN BUILDING MY Hummel Ultra Cruiser Plus in 2004 after meeting Morry Hummel at a radio-controlled model flying field in Bryan, Ohio. I was impressed with an ultralight called the Ultra Cruiser I saw flying there, but discovered I was too big for the plane. Then I saw the Ultra Cruiser Plus, which was an experimental category aircraft that would fit me fine. Five years later, on May 22, 2009, my childhood dream of flying my own airplane came true after 41 years; my Hummel Ultra Cruiser Plus flew for the first time with me at the controls. After a little over a year of flying, modifying, painting, and paperwork, that plane was ready to make my second childhood dream of flying to Oshkosh in my own plane come true. Thanks to the guys at Hummel Aviation: Terry Hallet, Morry, Steve, and Mike. Morry passed away before the plane was Oshkosh-ready. Thanks for a great plane, Morry.

Neil Byers, EAA 757893; Hicksville, Ohio;
E-mail: *nsakb@defnet.com*

FLORIDA CH 701

I BEGAN CONSTRUCTION OF my CH 701 in June 2009 and finished in August 2010. A 100-hp Rotax 912 ULS swinging a Warp Drive 72-inch prop powers the plane. It is equipped with full steam gauges, a Dynon SkyView glass panel, Becker transponder, and a Flightline FL-760 radio. It is also equipped with AeroLEDs MicroSun landing lights and a BRS parachute system. After so much sacrifice, the feeling of flying your project is exhilarating. My first passenger was my wife, her first flight ever that was not on a commercial airplane, and she loved it. Takeoff distance is around 100 feet, and landing is not much more. Thanks to Keith Dull, and my sister, Cynthia Pimentel. Last but not least, thanks to my wife, Tanya, who did not see me much during the year of building my plane. For more information, visit my site at *www.Zenith.aero/profile/ThomasLongo.*

Thomas Longo, EAA 779702; Brooksville, Florida

SOUTH AMERICA RV-7

AFTER THREE AND A half years of construction, I flew my RV-7 for the first time in March 2010. The plane features a 180-hp Superior XIO-360 engine, Raven oil inverted flight system, and a 74-inch constant-speed Hartzell prop. Avionics include a Dynon D100 with autopilot, Dynon D120 with fuel flow, TruTrak ADI with GPS, iPhone dock, heated pitot/angle of attack tube, Garmin GPS 495, SL30 nav comm, GMA 340 audio panel, Icom comm (backup), KT-76 transponder, and an Ameri-King ELT. The biggest challenge was tackling the project myself, including the engine installation, the panel build, and the installation of all the instruments. Special thanks to my wife, Mariela, Pablo Colombo, Ignacio Fernandez, Roberto Garcia, and Anne and Gus from Van's Aircraft.

Roberto Buonocore, EAA 714357; Mar del Plata, Argentina; E-mail: *roberto@buonocore.com.ar*

COLORADO F1 EVO

I PURCHASED MY F1 Evo as a "never started" project in May of 2007 and began construction in August of the same year. The empennage is an RV-8 vertical stabilizer and rudder. The horizontal stabilizer is a modified (strengthened) RV-8 unit, and the elevator is a standard F1 Evo unit. The engine is a modified AEIO-540 that outputs more than 330 hp. The canopy is a tilt-over of my own design, which features a triple locking device. The instruments include everything for IFR flight plus a two-axis autopilot. The paint scheme is one of Gene Kear's originals and elicits many favorable comments. The first flight was made on April 27, 2010, which was one day after my 78th birthday. The 40-hour test period was completed on Christmas Day 2010. My suffering wife was the first passenger on a flight the day after Christmas and made a comment just before landing, to wit, "I really like this airplane, so I think I'll allow you to keep it."

Lee Wolford, EAA 758163; Colorado Springs, Colorado; E-mail: *leefly@sprynet.com*

COLORADO PULSAR

I AM HAPPY TO report that I've completed my Pulsar after nine years. The first flight took place December 28, 2010, and it went great. The Pulsar is powered by a 66-hp Rotax 582. Thanks to my wife, Theresa, and friends for their support. I think the biggest challenge was building the wing, which is covered with thin sheets of plywood. The leading edge plywood had to be dampened so I could bend it into shape. It took my wife and me two days to complete this section with her handing me wet towels so I could shape and epoxy it to the main spar. The building experience was not difficult but did take longer than I expected, but it was worth the time and enjoyment that I spent building the plane.

Alan Kloos, EAA 174863; Pagosa Springs, Colorado;
E-mail: *n512st@yahoo.com*

VIRGINIA AIR CAMPER

I BEGAN WORKING ON my Pietenpol Air Camper N304MD in August 1995, and my first flight was the Sunday before Thanksgiving of 2010. The build time covered 15 years of building wing ribs in our unfinished bathroom, working on the tail feathers in the basement in the winter, and rib stitching and gluing in the summers in the shop. The plane takes off, flies hands-off, and lands well. I used the Corvair engine and built the "long" wooden version with the Poly-Fiber covering and paint system. I spent a lot of time scrounging for parts and materials and learned a tremendous amount about the homebuilt process along the way. I'd like to thank my wife, Terry, and my daughter, Simone, for all their support, encouragement, and help along the way.

Mike Denton, EAA 418261; Clarksville, Virginia;
E-mail: *info@kerrlakedocks.com*

Copper Crush Gaskets

BY RICHARD KOEHLER, EAA 161427

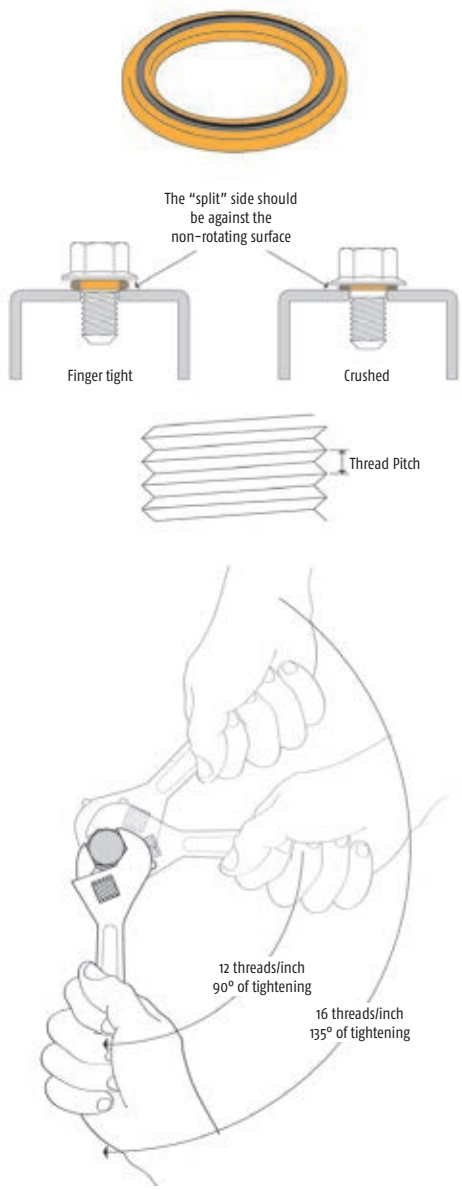
AN900 COPPER CRUSH GASKETS are commonly used on Lycoming and Continental engines, and they usually cost less than a dollar. You should not reuse one of these gaskets, so you will want to have the sizes you need when doing your annual/periodic inspections and other engine work.

The AN900 annular gaskets are made from soft copper, which has been wrapped in a tubular 1/8-inch wide by 3/32-inch thick cross section around an asbestos core. As you examine one of the gaskets you will note one side is smooth and the other has the slot or split where the copper was formed around the core. This split side should always be placed against the surface that is not moved or rotated when the parts are assembled. The size of the gasket is defined by the inside diameter in 16ths. In other words, the 5/8-inch gasket for the oil temperature sensor on my Lycoming is an AN900-10, for 10/16- or 5/8-inch inside diameter. A common gasket on older Cessna 182s is the oil pressure screen on the Continental O-470, which uses an AN900-28 (1-3/4 inches). It should be replaced at every oil change, when the screen is inspected and cleaned. It is penny wise and potentially pound foolish to reuse the old gasket. These gaskets are good to 500°F and 200 psi.

These soft gaskets are often referred to as "crush" washers or gaskets because they are physically deformed and crush into place as the parts are assembled. This feature helps to conform to mildly uneven surfaces. So how much do you "crush" it during installation? Interestingly, this is one item not installed to a certain torque value, but rather to a certain number of degrees of tightening rotation. You need to know the thread pitch of the plug or sensor you are installing. Thread pitch is the number of threads per inch. Simply measure a quarter inch of the threads with a ruler or vernier calipers and count the number of included threads. Multiply by four and you have the threads per inch, or their pitch. Now go to a table of rotation values for the angle of turn. I usually use the table in the back of the *Lycoming Overhaul Manual* (Table III), but most all aviation mechanic handbooks will have the data. For example, for a pitch of 12 threads per inch, the torque value is 90 degrees, and for a 16 pitch it is 135 degrees after making finger tight contact.

Let's go through the sequence of installing a crush-type copper asbestos gasket. First, the threads should be lightly lubricated. Install the gasket with the unbroken surface against the flange of the plug or part being tightened against the seal. Turn the part until the sealing surfaces are in contact, and then tighten to the angle of turn listed for the appropriate thread size.

Note that there are also aluminum asbestos crush gaskets, and their angle of turn is usually twice that of the copper type. Also, the AN900 designation is being replaced by MS35769, but the dash numbers are not in a logical sequence, so you will need to look up the correct sizes. For instance, an AN900-10 is replaced by an MS35769-11.



Finally, since there is nothing to "lock" this gasket seal in place, you will probably have to safety wire the part in place to prevent vibration from backing off the crush on the gasket and resulting in a leak.

To see EAA's collection of Hints for Homebuilders videos visit *www.SportAviation.org*.

ILLUSTRATION BY PIERRE KOTZE

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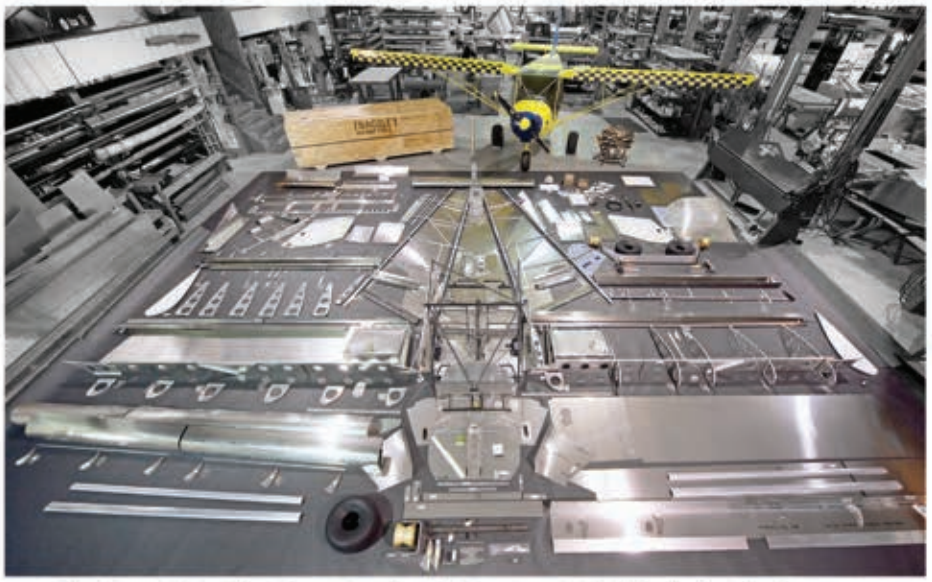

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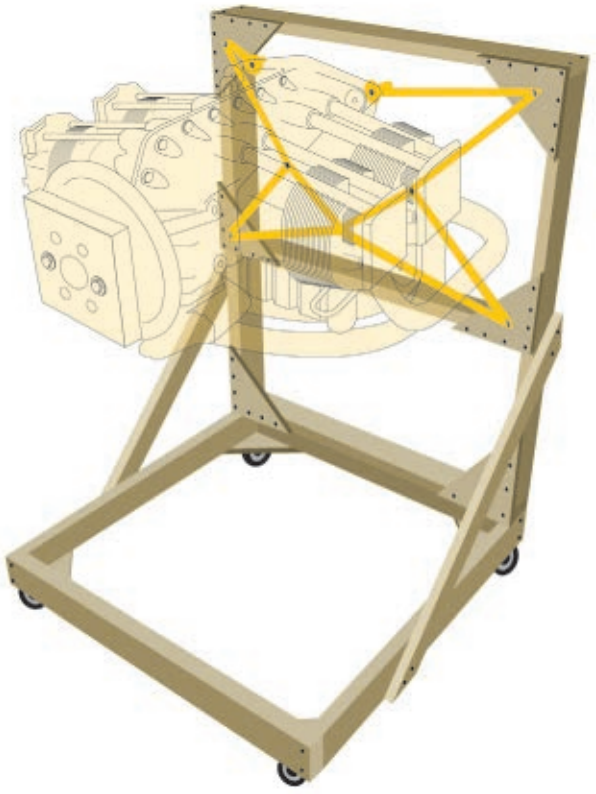
ROLL-AROUND ENGINE STAND

BY FRED KEIP, EAA 93236, TC 2001, MEMBER OF HOMEBUILT AIRCRAFT COUNCIL



WHEN I FINISHED BUILDING the Lycoming O-290-G/D for my Wag-A-Bond project, I needed a stand to store it on that would allow me to move it around and put the engine at a height that would allow me to work on it easily. Using some spare lumber, drywall screws, and casters, I was able to build one.

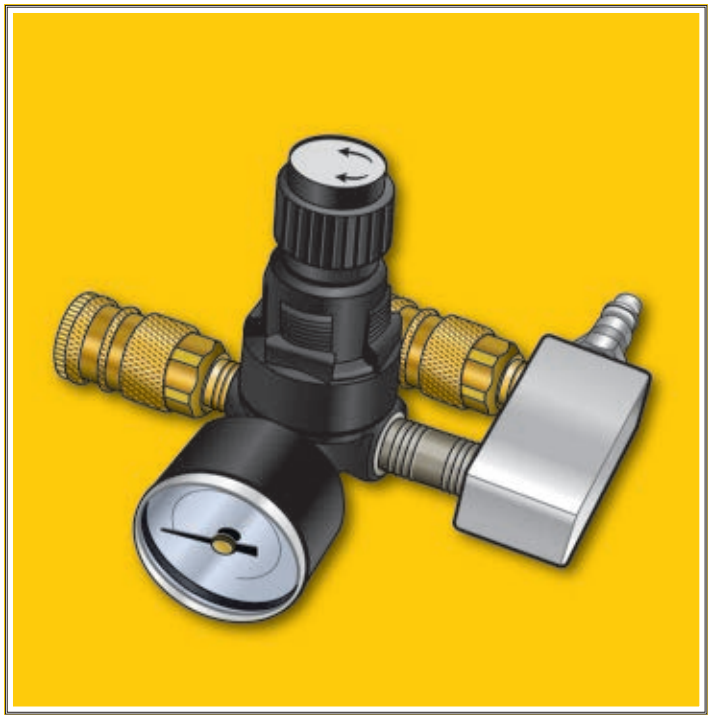
The basic frame is made from 2-by-4s that are fastened with 2-1/2-inch long drywall screws. The base is 35 inches wide by 36 inches deep. The back is 35 inches wide by 44-1/2 inches high, sits on the top of the base, and is held in position with several more 2-1/2-inch long drywall screws. The corners are reinforced with 8-by-8-inch gussets cut from 3/4-inch plywood and fastened with 1-5/8-inch drywall screws. The side braces are 1-by-3 pine boards, also fastened with 1-5/8-inch drywall screws.

There are two fixed casters with 2-inch wheels and two swivel casters, also with 2-inch wheels, mounted on the bottom to facilitate rolling the unit around. They are adequate for smooth concrete floors, but larger diameter wheels would make it easier to move.

These dimensions can be altered to suit the engine mount from your airplane.

For a PDF of plans and dimensions visit *www.SportAviation.org*.

ILLUSTRATION BY JOHN A. JOHNSON



QUICK SWITCH

BY J.D. WOODS, EAA 89812

HERE IS A TOOL that anyone building a metal aircraft will find valuable. Many times it is necessary to use an air drill followed by a rivet gun. One example would be chasing a hole so the rivet will fit.

It is a waste of time to have to switch hoses and perhaps reset the regulator to accomplish this simple task. By using an aluminum block drilled and tapped to accept one air inlet and two air outlets, you can easily switch tools. The first outlet is at line pressure for the drill, while the second is regulated for the rivet gun. Air enters at line pressure and is directed to a quick connect fitting used to power the drill. Line pressure is also directed to the regulator so pressure can be reduced for the rivet gun. The gauge allows the pressure for the gun to be known. EAA

ILLUSTRATION BY ALAN LEPKOWSKI

Greg Hale's RV-10

At What Price?

The costs of a homebuilt masterpiece may go beyond money

BY DICK VANGRUNSVEN, VAN'S AIRCRAFT

THE JUNE *SPORT AVIATION* feature story "Mod Masterpiece" extolled many features of the absolutely gorgeous interior that Greg Hale built into his award-winning RV-10. Unfortunately (perhaps unwittingly) the article drew *our* attention more to the price he paid than his admittedly wonderful workmanship and customization. I'm not referring to the usual costs measured in dollars and building time; I'm referring to the price that airplane builders often pay in reduced utility and, more important, impaired safety

The article started with a pull-quote: "The RV-10 impressed us since you could load four passengers and bags and be well within the maximum gross weight and CG." Normally, that's true. An RV-10 usually weighs about 1,600 pounds empty, so with its rated 2,700-pound gross it has a 1,100-pound useful load. That translates into four 170-pound people, 60 gallons of fuel, and 60 pounds of baggage. But given what the article goes on to describe, this quote appears increasingly ironic.

EMPTY WEIGHT

Greg's modifications and additions had a dramatic effect on the empty weight of his RV-10. The reported empty weight of 1,848 pounds is 248 pounds over the 1,600 pounds that we consider "standard." This translates into the equivalent of 1.5 passengers who must be left behind or 41 gallons of fuel that must remain on the ground if the airplane is to remain within the design gross weight limit of 2,700 pounds. With full standard fuel tanks, his RV-10 effectively becomes a two-seat airplane. Then, we noticed the spec sheet accompanying the article giving the fuel capacity as 120 gallons! If this is accurate, it means that, in addition to the cabin interior modifications, Greg installed additional fuel tanks in his RV-10 and *doubled* the standard 60 gallons. With 120 gallons on board, his RV-10's payload would be further reduced to 132 pounds—not even a single-seater anymore.

Many builders will tell you that it is not possible to meet the factory empty weight figures. In some instances this may be true—some kit suppliers have been known to optimistically quote an empty weight based on an unfinished and unequipped prototype, or weights that could never be equaled by subsequent builders. But the 1,600-pound empty weight Van's Aircraft quotes for a 260-hp Lycoming-powered RV-10 *is* realistic. An example is my personal RV-10, built from a standard kit and employing no special weight-saving efforts. It weighs, empty, just 1,595 pounds. This includes full paint, wheel fairings, electronic flight instrument system, radio, transponder, GPS, two-axis autopilot, ELT, an intercom system w/CD, carpeting and headliner, and landing lights.

PHOTOGRAPHY BY JOHN DETTOR

Though it may seem spartan to some, it is comfortable and totally functional for long-distance VFR flight, day or night.

We anticipate that builders will customize and will add weight in the process. This does not mean that there are not compromises or penalties involved. At the very least, any added weight will subtract from the useful load of the airplane. This is the reason that so many four-seat factory airplanes cannot fly with full seats and full fuel at the same time. But for homebuilt aircraft, this is a compromise any builder has the freedom to make, and many do. But adding 248 pounds of "stuff" is rather extreme. It is the equivalent of adding the weight of an entire ultralight, engine and all. It's almost equivalent to adding another pair of RV-10 wings.

GROSS WEIGHT

The spec sheet also notes Greg's airplane has a listed gross weight of 2,800 pounds instead of the 2,700 pounds the factory specifies. Yes, we realize that a builder of an experimental amateur-built airplane can list any gross weight or flight limits he wishes. It's just that we don't accept that. Our factory specified gross weight is based on the best science we have available. This includes careful stress analysis calculations and extensive static load and flight limit testing. We wonder what basis Greg (or any other builder who uses a higher-than-recommended gross weight) uses for establishing the 2,800-pound gross weight of his airplane? If it isn't based on the same science and testing, we simply cannot recognize it as valid, and neither should anyone else. Any "penciled in" gross weight increase is just wishful thinking. The laws of physics are not repealed by wishful thinking.

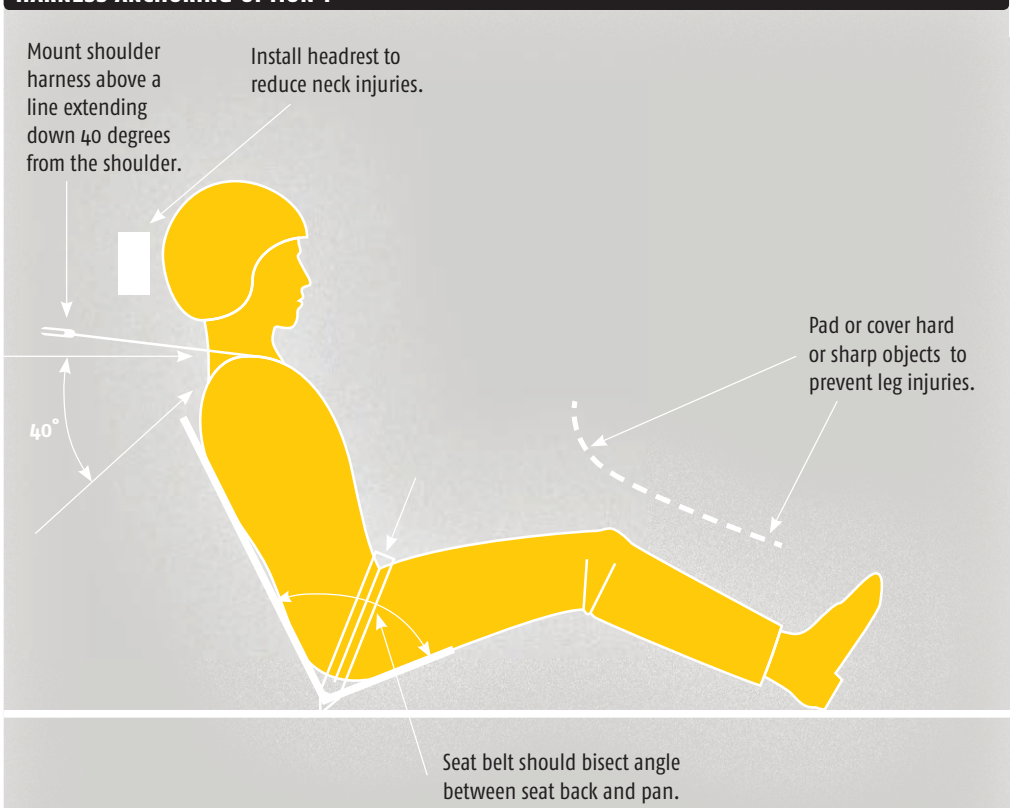
We anticipate that builders will customize and will add weight in the process. This does not mean that there are not compromises or penalties involved.

HARNESSES

But this discussion of payload trade-offs is not the primary purpose of this article. While we hate to see our laboriously designed four-seat payload erode to a two-and-a-half-seat limit, that is the builder's privilege. Our primary purpose here is to point out several modifications made to primary flight control systems and safety features. We feel these are detrimental to safety, and that readers and other RV-10 builders should be aware of our concerns. Modifications undertaken for otherwise good reasons can have negative consequences.

Specifically, we see a real problem with the front seat shoulder harness attach modification. As designed the RV-10 uses a

HARNESS ANCHORING OPTION 1



HARNESS ANCHORING OPTION 2 (NOT RECOMMENDED)

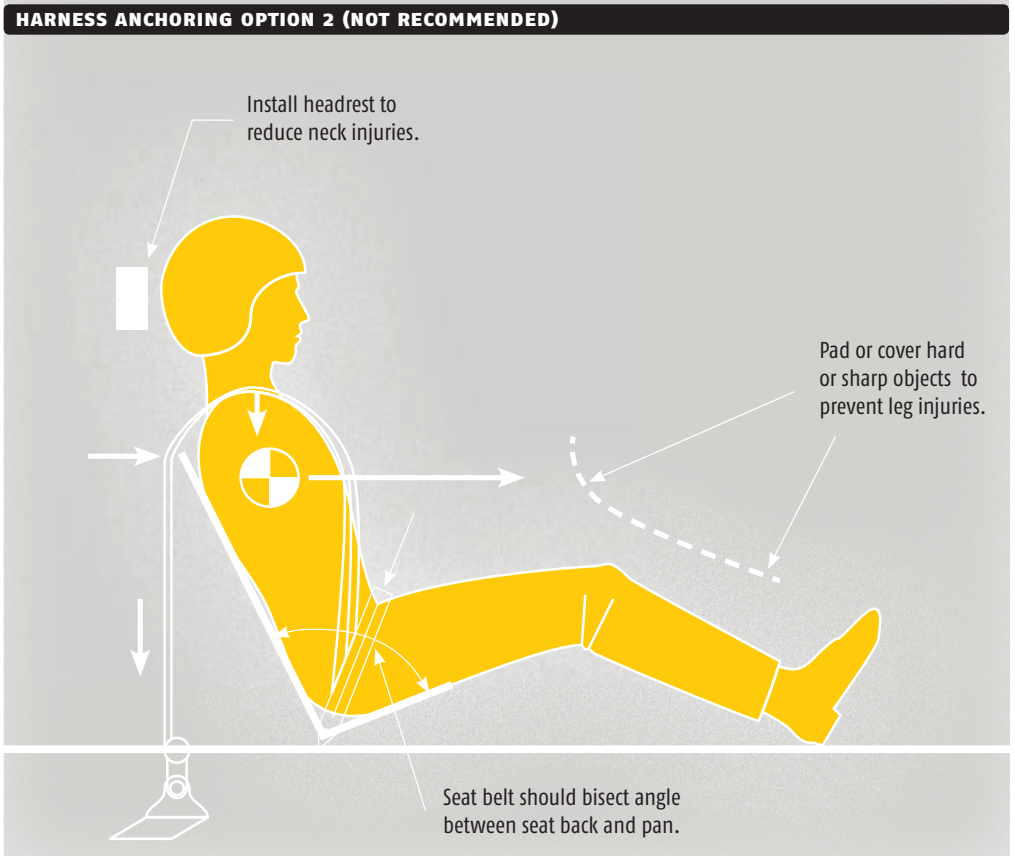


ILLUSTRATION COURTESY OF VAN’S AIRCRAFT

Considerable conversation on this article and subject has taken place on Facebook and Oshkosh365 since Van's Aircraft posted this article on its Facebook page in late June. Since then Greg Hale has posted a response on his Web page. To read Greg's clarification and the responses on Facebook and Oshkosh365, visit *www.SportAviation.org*.

two-strap shoulder harness attached to a hard point in the structural cabin top. We used the two-strap (one over each shoulder) harness because it is the universal aircraft standard and has been demonstrated to be superior to the automotive-style single cross-strap. Anchoring the harness to a hard point in the cabin top provides a near ideal load path for crash restraint forces. (See Illustration 1.)

The subject airplane uses a single cross shoulder harness anchored to a hard point in the fuselage under and aft of the seat. The strength of the anchor point is somewhat irrelevant in this installation, because the load path essentially applies the crash loads to the top of the seat back. (See Illustration 2.) The low anchor point for the shoulder harness causes the tension in the strap to bear down on the occupant's spine, and to pull forward on the top of the seat back. The back of the Oregon Aero seat supplied in the RV-10 kit was not designed to withstand shoulder harness crash impact acceleration forces. When the seat back fails, the upper body will pitch forward because the shoulder harness essentially becomes slack. While some automotive seats do apply the shoulder harness loads to the top of the seat backs, we assume that those heavy automotive seats have been adequately designed and tested for this purpose. The RV-10 seats have been designed and tested by Oregon Aero Inc. to withstand anticipated crash impact loads of the occupant, but not acceleration loads transmitted through shoulder harnesses.

Another safety feature of the Oregon Aero seats is the foam used to make the cushions. Its type, density, and lamination schedule have been carefully tailored and tested to absorb vertical impact loads. Any changes or replacements may not provide equivalent protection.

In addition, the modification made to the active seat belt attach points is suspect. Our design provides for each belt to be attached directly to anchor points in the airframe structure. Anticipated crash acceleration loads are transferred in linear tension into these hard points. In the subject airplane, the seat belts are attached to a small diameter cross shaft between the intended structural hard points. Crash acceleration loads will be applied to this cross shaft, loading it in bending, which in turn will apply eccentric (twisting) loads to the mounting brackets in the cabin structure.

The rear seat shoulder harness modification of the subject airplane also uses a single cross-strap rather than the standard RV-10 dual-strap harness. The load path into the airframe is again an unknown—in contrast to the static load testing performed on the factory-supplied harness assemblies. These transmit loads linearly to the aft fuselage structure.

RUDDER CABLES

Another worrying modification altered the attachment of the rudder cables to the rudder pedals. Greg used an offset stud on the rudder pedal to which the rudder cable is attached. While this may provide a more attractive cabin appearance, it causes an inferior load path for the rudder control forces. Cable tension loads will apply a twisting force to the rudder pedal attach horn.

EXTRA FUEL TANKS

While we're on the subject of modifications and how they might affect safety, let's go back to that question of 60 extra gallons of fuel. When the fuel load causes an over gross weight condition, it adversely affects performance and flight safety. Even if the additional fuel weight *is* within gross weight and CG limits, the location of the added weight can adversely affect the aircraft's polar moment of inertia. Reduced to its most understandable form, it means that the spin recovery characteristics of the aircraft will be affected. While the article never says where the extra fuel goes in this RV-10, the most likely place for additional fuel tanks would be in the outer sections of the wing—outboard of the standard wing root leading edge tanks. With regard to the polar

WHO OWNS THE MARGIN?

It seems common practice among homebuilders to second-guess the factory engineers, particularly regarding gross weight increases. Because of all of the added features, empty weight creep erodes the aircraft's useful load. The simple solution for the homebuilder is to "pencil in" a new gross weight limit. "It's only 100 pounds (3.7 percent) more; how much effect can that possibly have?" Imagine this example: You are on a mid-size airliner with a gross weight of 270,000 pounds. Just before leaving the gate, the captain comes on the PA system and says: "We've overbooked more than usual today, so we're going to assume that the factory engineers over-designed this airplane and allowed an abundant safety margin. We're going to take off at 280,000 pounds instead. So move over, there are 50 more passengers coming on board." Run the numbers; it's the same over-weight ratio as simply pencilling in an additional 100 pounds to the gross weight of an RV-10.

Along with gross weight increases, some builders take the same liberties with horsepower increases and speed increases, betting their lives on the assumption that the airplane is designed with a huge margin of safety—it is really far stronger than it needs to be. This is not really true. Certificated aircraft, and well-designed kit aircraft, are designed to withstand limit loads at specified maximum weights. During testing, they are subjected to ultimate loads, which are higher than design limit loads by a specified margin. Yes, there is a margin between the design and ultimate strengths. But that margin *belongs* to the engineer. He *owns* the margin. It is his insurance against the things he doesn't know or can't plan for, and the pilot's insurance against human error, material variations, and the ravages of time. Wise pilots respect this design safety philosophy and leave this insurance policy in effect by operating strictly within established limits.

moment of inertia, this is possibly the worst place (other than in the tail) to add weight to an airplane. Also, weight added anywhere in the wing will affect the flutter characteristics of the wing. The RV-10 wing has been subjected to ground vibration testing with standard tanks both full and empty. With significant weight of any kind, structural or otherwise, added to the wing, the flutter speed limits *will* change—and until the new arrangement is tested, nobody knows what the new limits will be.

RESPONSIBILITY

Like many kit-plane suppliers, we endeavor to supply complete, thoroughly designed and tested airframe kits. It is our hope that builders will construct the airframe assemblies in compliance with our proven design. Most do. Details such as instrumentation, avionics, and cabin interior appointments are often not included in kits because we know from experience that builders have very special individual preferences for these details. These are areas where builders can usually express their individuality without as much concern for safety of flight as would be the case with changes to the structure or aerodynamics. I say *usually* because even any seemingly insignificant part of an aircraft can affect safety of flight. With reasonable care, interior appointments will remain benign.

We all know that builders of experimental amateur-built aircraft have the right to make changes to their aircraft at will—whether or not their changes are based on good science. If they choose to operate the aircraft with a lesser or unknown margin of safety, that is their prerogative. However, unless the aircraft is single-seat, any passengers carried in that aircraft will be exposed to the same unknowns that the pilot has accepted for himself. We feel that this is a responsibility often overlooked by pilots. While they may be willing to accept certain risks for themselves, what should their responsibility be to their spouses, friends, children, and grandchildren? EAA

Dick VanGrunsven, EAA 3204, is the designer, founder, and CEO of Van's Aircraft in Aurora, Oregon.

MIKE BUSCH
HANDS ON / SAVVY AVIATOR

Owner-Produced Parts

Replacement parts you can make yourself for certificated aircraft

BY MIKE BUSCH

THE 1960s AND 1970s were the biggest years for production of piston GA airplanes. By the peak production year of 1979, manufacturers like Beech, Cessna, Mooney, Piper, and others were pushing new airplanes out the door as fast as they could, and owners were snapping up all they could produce. This came to a crashing halt in the early '80s, when the effects of a double-dip recession were magnified by passage of massive tax reforms that eliminated financial incentives to buy new airplanes. Piston GA manufacturing all but ceased, and it has never really recovered.

It's no surprise, then, that most of the piston GA aircraft flying today are between 30 and 50 years old. Keeping these aircraft flying is becoming more challenging every year, particularly with respect to finding replacement parts. Some manufacturers—notably Cessna—continue to do a far better job of keeping replacement parts available for these out-of-production aircraft than we have any right to expect. Other manufacturers don't support their legacy aircraft nearly as well. Many parts are becoming breathtakingly expensive, and some are simply unobtainable at any price.

For those parts that are available from the manufacturer, pricing seems to invert the normal laws of supply and demand. Parts that deteriorate or wear out quickly and need to be replaced frequently are often priced reasonably (at least by aircraft standards), but parts that need replacement only rarely can cost a king's ransom. The cost of parts is often a function of how many are produced. If a manufacturer sells only one or two of a particular part in a year, the cost of keeping that part in production can easily get out of hand.

ALTERNATIVES TO OEM PARTS

The cost of high-volume replacement parts is kept within reason by competition from third-party sources that manufacture replacement parts under an FAA parts manufacturer approval (PMA). A company other than the manufacturer that wants to make and sell replacement parts for installation on certificated aircraft must apply to the FAA for permission to do so, and convince the FAA that its parts are equivalent in form, fit, and function to the original equipment manufacturer (OEM) parts they replace. It must also show that its specifications and quality-control procedures will ensure that the parts it produces are of quality at least equal to the OEM parts. The FAA will then issue the company a PMA authorizing it to enter the replacement parts business. Such PMA parts are often less expensive than those from the factory, and generally they're every bit as good as—and sometimes better than—OEM parts.

Generally, companies will only go through the expense and hassle of applying for a PMA for parts that are in reasonably

PHOTOGRAPHY BY **BRADY LANE**

high demand. If you need an often-replaced part like a seat track, flap roller, fuel bladder, or wheel fairing, you often have PMA alternatives to buying a part from Beech, Cessna, or Piper.

On the other hand, if you need a new wing rib, elevator trailing edge, or cowl flap, the OEM is likely the only source—if indeed the part you need is available at all. If it is, be prepared for serious sticker shock.

Sometimes your best bet may be to find a used serviceable part from a salvage yard. Generally, salvage yards will sell you parts in "as removed" condition for about 50 percent of what a new part costs from the OEM. When the part arrives, you and your mechanic should inspect it to ensure that it is airworthy. If you find the part unsatisfactory, any reputable salvage yard will allow you to return it for a full refund.

Without such a provision, an aircraft needing a replacement part not available from the manufacturer, a PMA supplier, or a salvage yard would be permanently grounded.

THE OWNER-PRODUCED ALTERNATIVE

But there may be yet another alternative: Fabricate the part yourself, or hire someone to fabricate it for you.

In light of the FAA's emphasis on ensuring that only fully documented approved parts be used, and its stepped-up enforcement actions against purveyors of unapproved aircraft parts, it might seem counterintuitive that it would allow an aircraft owner to produce repair parts for his own aircraft. But that's indeed the case, and it's a lucky thing, too. Without such a provision, an aircraft needing a replacement part not available from the manufacturer, a PMA supplier, or a salvage yard would be permanently grounded. That's why the FAA made provisions for an owner to produce his own repair parts as "the source of last resort."

The rules that govern owner-produced parts are a bit cryptic and often poorly understood. Before you try to take advantage of them, you'd better be sure that you and your mechanic understand them.

WHAT THE REGS SAY...

Part 21 of the FARs contains the rules for certification of products (aircraft, engines, propellers, and appliances) and parts. The key regulation concerning repair parts is Section 21.303:

MIKE BUSCH

SECTION 21.303

REPLACEMENT AND MODIFICATION PARTS

(a) Except as provided in paragraph (b) of this section, no person may produce a modification or replacement part for sale for installation on a type-certificated product unless it is produced pursuant to a Parts Manufacturer Approval issued under this subpart.

(b) This section does not apply to the following:

(1) Parts produced under a type or production certificate.

(2) Parts produced by an owner or operator for maintaining or altering his own product.

(3) Parts produced under an FAA Technical Standard Order.

(4) Standard parts (such as bolts and nuts) conforming to established industry or U.S. specifications.

So parts sold for installation on a certificated aircraft, engine, propeller, or appliance must be either an OEM part produced under a type certificate or production certificate or a non-OEM part produced under a PMA or TSO. There are two exceptions: "standard parts" and "owner-produced parts."

The FAA has traditionally interpreted "standard parts" to mean fasteners and other parts meeting National Aerospace Standards (NAS), Air Force-Navy Aeronautical Standard (AN), Society of Automotive Engineers (SAE), SAE Aerospace Standard (AS), and Military Standard (MS). On March 5, 1997, the FAA published a Notice of Interpretation in the *Federal Register* that broadened the definition of "standard parts" to include standard electronic parts such as resistors, capacitors, diodes, transistors, and non-programmable integrated circuits. Prior to 1997, it was technically illegal to replace a burned-out panel light rheostat or dimming transistor with one purchased at your local Radio Shack—now it's officially kosher.

The meaning of "owner-produced parts" was rather murky until April 5, 1993, when Donald P. Byrne, the FAA's assistant chief counsel for regulations, issued a memorandum defining the term "owner (or operator) produced part" as used in FAR 21.303(b)(2). Byrne's memo clarifies the FAA's interpretation of the owner-produced parts exception, and as you'll see, that interpretation is surprisingly generous and liberal.

...AND WHAT THEY MEAN

Byrne explained that it is not necessary for the owner to actually manufacture the part himself for the part to be considered an "owner-produced part." The owner may contract with a mechanic, a repair station, or even a non-certificated individual or firm (e.g., a machine shop) to manufacture the part for him, provided that the owner "participated in controlling the design, manufacture or quality of the part." The FAA deems the part to be owner-produced if the owner does any of the following things:

- Provides the manufacturer with design or performance data from which to manufacture the part—this test would be met if the owner provides the manufacturer with the old part and asks that it be duplicated; or
- Provides materials to make the part; or
- Provides fabrication processes or assembly methods to be used in making the part; or
- Provides quality control procedures to be used in making the part; or
- Supervises the manufacture of the part.

In short, a part whose manufacture is contracted by the aircraft owner will qualify as "owner-produced" if the owner participates in the production of the part in any meaningful way at all.

THE MECHANIC'S ROLE

Interestingly, while FAR 21.303 authorizes an owner or operator to produce repair parts for his own aircraft, it does not

authorize an A&P mechanic to produce parts for use in a repair. Except for certain special situations involving STCs or major repairs or alterations made under an FAA field approval, an A&P is allowed to maintain, repair, and modify parts, but not to make a new replacement part.

But, an owner or operator may contract with a mechanic (or non-mechanic) to produce a repair part for the owner, and that part will be considered an "owner-produced part" under FAR 21.303 so long as the owner "participates in controlling the design, manufacture or quality of the part" by providing the specifications or materials or supervising the manufacture of the part.

While only the owner or operator is allowed to produce an "owner-produced part," it typically requires an A&P mechanic or certified repair station to install the part on the aircraft, determine that the resulting repair is airworthy, and approve the aircraft for return to service.

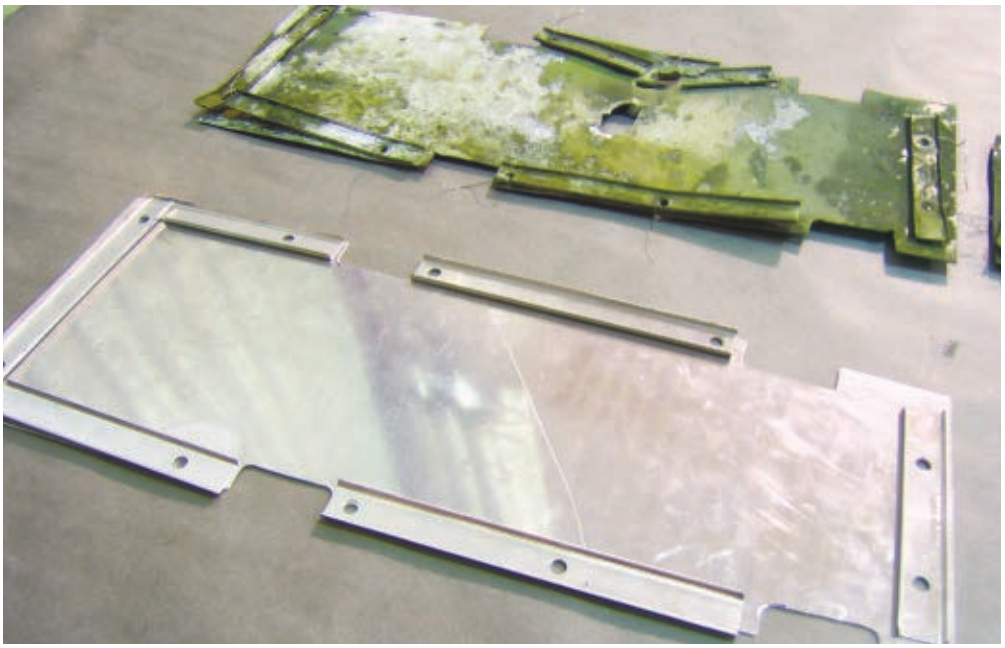
The bottom line is that the use of the "owner-produced part" provision typically requires teamwork between the owner and mechanic. It makes no sense for an owner to produce a repair part for his aircraft unless he's sure that his mechanic is willing to install it and sign off the repair as airworthy. The best way for the owner to ensure that his mechanic will consider the owner-produced part airworthy is to enlist his mechanic's help in producing the part.

IS THE PART AIRWORTHY?

If the owner-produced part is to be used to effect a major repair—a wing spar or primary control surface or landing gear strut, for example—then the repair must be inspected and signed off by an A&P with inspection authorization (IA) and documented on FAA Form 337.

In completing the Form 337, the A&P/IA must certify that the owner-produced part conforms to FAA-approved data. As a general rule, this means either the owner-produced part was made from a manufacturer-approved drawing, or it was made by duplicating an existing approved part and therefore all materials and dimensions can be determined from the existing part. If the A&P/IA has any doubts about whether or not the part conforms to approved data, he may choose to ask the local flight standards district office for a field approval of the repair (which could delay return of the aircraft to service) or require that a designated engineering representative be hired to generate the necessary approved data.

If the owner-produced part is to be used for an ordinary "non-major" repair—replacing a damaged wing rib or fairing or interior trim part, for example—then the part can be approved and the repair signed



The FAA has made provisions for an owner to produce his own repair parts if the parts are not otherwise available from the manufacturer, a PMA supplier, or salvage yard, but before you go ahead and start cranking out pieces, be sure you and your mechanic understand the regs.

off by any A&P (not necessarily an IA), and just an ordinary logbook entry is required. However, the mechanic still needs to ensure that the owner-produced part conforms to the aircraft type design, which may be easy or difficult depending on what kind of part is involved.

In all cases, the mechanic must also ensure that the repair is made (to quote FAR 43.13) "in such a manner and us[ing] materials of such a quality that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or properly altered condition (with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness)."

Presumably if the owner works with the mechanic to produce the part, the mechanic will be satisfied that the part conforms to and the repair meets the "at least equal to the original" requirement of FAR 43.13.

SIGNING OFF THE REPAIR

Although it's seldom done, the best and safest way to document a repair involving an owner-produced part (and ensure that the feds are happy) is to make two separate entries in the aircraft maintenance records—one by the owner who produced the part, and one by the mechanic who installed it and approved the aircraft for return to service.

The owner should make and sign a logbook entry that identifies the part as an owner-produced repair part under FAR 21.303(b)(2), describes the approved data used in manufacturing the part (generally either a manufacturer-supplied drawing or duplication of an existing approved part), and explains the owner's participation in controlling the design, manufacture, or quality of the part (e.g., furnished materials or supervised the manufacture). The owner must sign and date the logbook entry.

The mechanic should then document the repair work and approve the aircraft for return to service with a normal logbook entry made in accordance with FAR 43.9. The mechanic's entry can state that he helped manufacture the owner-produced part, but should clearly state that the owner supervised the manufacture, furnished the materials, or otherwise participated in controlling the design, manufacture, or quality of the part.

When the paperwork is complete, it should be obvious to anyone reading the logbook that the owner was responsible for producing the part and ensurisng its conformity to the aircraft's type design, and the mechanic was responsible for installing the part, making any other necessary repairs, and approving the aircraft for return to service.

With this sort of owner/mechanic teamwork, almost anything is possible. EAA

Mike Busch, EAA 740170, was the 2008 National Aviation Maintenance Technician of the Year and has been a pilot for 44 years, logging more than 7,000 hours. He's a CFI and A&P-IA. E-mail him at *mike.busch@savvyaviator.com.* Mike also hosts free monthly online presentations as part of EAA's webinar series on the first Wednesday of each month. For a schedule visit *www.EAA.org/webinars*.

PHOTOGRAPHY BY JIM COOPER

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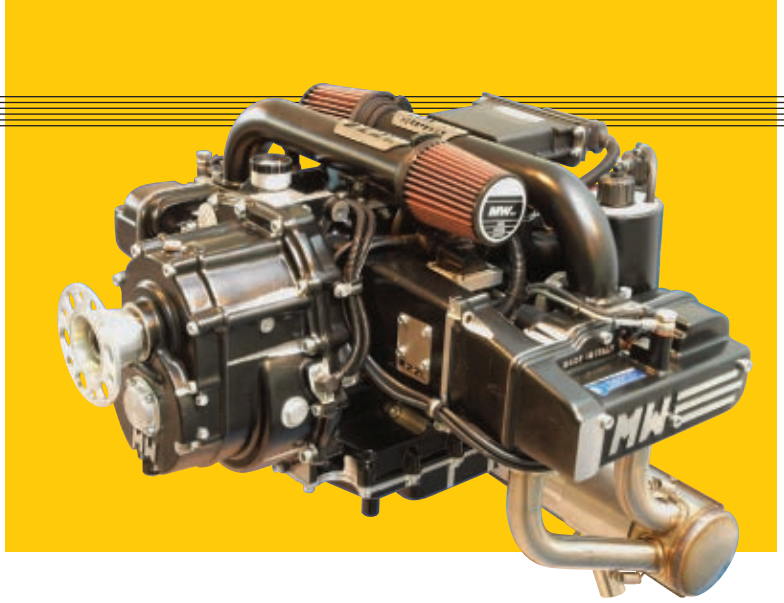

Italian Alternative to Rotax?

Metalwork B22 engine

BY MARINO BORIC

IN THE LAST DECADE there has been little competition for the Rotax 912 and 914 engines. We have seen technically good alternatives develop, but somehow all projects have disappeared from the scene. Starting at 95-hp, the Metalwork B22 engine series could become an interesting alternative to Rotax, including more power-hungry applications demanding output of up to 130 hp.

Almost 10 years ago, two Italian engineers, Guido Fantini and Stefano Marella, began to design the B22 engine. In 2004, the first two prototypes were running on a dyno stand and a year later with propellers on a firewall mock-up. The engine was flown for the first time in 2006 powering a trike. That same year their FlyStar, a proprietary digital EMS (engine monitoring system), was tested. Two years later the B22 was installed in an Italian ICP Amigo ultralight. Mid-2010 the company officially presented the Metalwork (MW) engine to the Italian public. The company tested the engine in January 2011 in a Magni Orion autogyro. Since mid-April, the B22R 130-hp engine has been installed in the company's official demonstrator, a Dova Skylark. This engine/aircraft combination was officially presented this past June at the Ozzano fly-in in Italy.

ONE BASE—THREE VERSIONS

The B22 is a classic four-cylinder, four-stroke boxer engine with three variants: The B22D, 95 hp; B22L, 115 hp; and B22R, 130 hp. All three engine models are water-cooled and have a 2.2-liter displacement, overhead camshafts, and two valves per cylinder. The power range of the naturally aspirated engines is 95-130 hp. A turbocharged version, expected to develop more than 160 hp, is under development.

Almost all components are included as standard equipment. All three versions are supplied with an integrated engine oil and coolant tank, fuel-injection system, cooling thermostat and expansion tank, electric starter, 350-watt alternator, and dual-injection pickups. Also included is the wiring harness from the engine to the aircraft, an electric fuel pump, and the manual. Not included in the price are the radiator and exhaust system. All MW engines are "bolt on" self-sustainable packages, ready to be attached to the engine mount.

The B22 is only an inch wider but shorter than the Rotax. The dry engine weights are 162, 174, and 180 pounds (D, L, R versions). Weightwise, these numbers are higher than the Rotax 912/S, but the power output is higher. The B22R delivers 130 hp, 15 to 20 hp more than the Austrian counterpart, giving favorable power-to-weight ratio. Almost all hydraulic and electric variable-pitch propeller systems can be used.

TECHNOLOGY IN DETAIL

The engine is a clean-sheet design. The boxer design principle, widely used in aviation, was chosen because of its low vibration; the liquid cooling system for reasons of durability and easy maintenance. Speaking of maintenance, in recent years I have never seen an engine that has so many inspection openings for borescopes. Because of these openings it is possible to inspect all internal parts of the engine, investing little more than 15 minutes' work

PHOTOGRAPHY BY MARINO BORIC

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to get to those hidden spots without having to disassemble the engine. This is easy maintenance!

Normally, crankshafts and connecting rods in aircraft engines run in sleeve bearings that have high friction and need high oil pressure. Metalwork is using ball and needle bearings (less heat development) that need less lubricant on much lower pressure. In case of mechanical oil pump failure—it is driven directly by the crankshaft—the engine can run for 30 minutes using the oil mist present in the crankcase for lubrication. The crankshaft ball bearings are designed to sustain a minimum of 3,000 engine hours at full throttle. The piston rods are monolithically built (single piece)—a contribution to greater robustness. The crankshaft is pressed together, and connecting surfaces have longitudinal grooves to prevent possible contortion (shift/movement) of connecting surfaces. Two valves per cylinder are driven by overhead camshafts (one per cylinder bank) that are connected by a chain to the central, over-the-crankcase-positioned shaft.

ENGINE VARIANTS

- **B22D**, 95 hp, 3300 rpm, direct drive, price €12,500/€13,800*
- **B22L**, 115 hp, 3950 rpm, reduction gear, price €14,500/€15,700
- **B22R**, 130 hp, 4550 rpm, reduction gear, price €17,900/€19,000

**The higher price includes the factory-supplied FlyStar. Separately ordered the EMS costs €1,600.*

REDUCTION GEAR

Except for the basic B22D engine that is direct drive, the L and R versions have a propeller speed reduction unit functioning without mechanical or hydraulic shock absorbers in the classic meaning of the word. Metalwork developed an electro-hydraulic system that uses two-step motors mounted on the camshaft and controlled by the central engine management system/computer. Engine vibrations are dampened by compression reduction of the engine at and below 1900 rpm, resulting in a smoother-running engine. The system functions automatically; no special pilot action is needed. If this system should fail, the engine runs with a lower compression ratio, developing 30 percent less power.

INJECTION AND IGNITION SYSTEM

As in any modern engine, the fuel-air mixture is controlled by a dedicated engine control unit (ECU) with emergency mode. The ECU calculates the amount of injected fuel based on engine speed, intake air pressure, engine oil temperature, air temperature, and absolute atmospheric pressure. The ECU (located on top of the engine) also controls an electric fuel pump, which could be backed up with a mechanical pump. One injector per cylinder pair is located directly behind the throttle body on each cylinder head. A second set of injectors can be installed—the holes for their installation are already present. The fuel lines are made of steel.

The basic B22 engine is fitted with one ECU and one spark plug per cylinder. Since March 2011, new cylinder heads are in production with the capability of accommodating two spark plugs per combustion chamber. Using the second (optional) electronic control unit the system can be duplicated for redundancy.

FLYSTAR

Metalwork B22 engines are delivered as self-sufficient units; the connection to the aircraft electric system is provided through

two multiple-pin connectors. FlyStar is offered as an option, though it is not strictly necessary for correct function of the engine. This digital instrument displays engine and flight data. It is connected via a CAN bus to the engine and can log all relevant data, particularly the minimum and maximum values reached in the complete engine life cycle.

FlyStar dimensions are 7.5-by-5-by-1 inches, and it weighs 15 ounces; the LED display is amber with black characters. The backlight is adjustable in five stages.

The display shows four different pages: ignition timing, engine data, odometer, and flight data. On each of these pages are five graphic elements and six numeric fields. FlyStar can display and log beside engine parameters all flight parameters such as aircraft speed, altitude, VSI, and *g*-meter readings. The current fuel consumption, the residual fuel quantity, and the engine hours can be displayed, too. A green light indicates if the required engine temperature for a takeoff is reached. Additionally, the FlyStar is able to calculate and indicate the stall and maximum speed of the aircraft through a series of four green and a single red indicator light.

In flight, the pilot is able to engage the fuel save mode; the injected fuel quantity is then reduced by 10 percent. This function is automatically turned off when the power setting is changed.

IN-FLIGHT IMPRESSIONS

I was able to test the engine in flight. My overall impression was positive; the absence of the fuel-mixture lever simplifies a lot. The vibration and sound level is low; engine temperatures are kept in the green arc by the cooling thermostat. The engine runs even with a disconnected battery in flight and on the ground on minimum rpm.

ENGINE SERIAL PRODUCTION

The first batch of engines is in production right now. All of the engine parts are manufactured by specialized Italian manufacturers, while the final assembly is performed by the David company in Brescia. That company has specialized in maintenance and overhaul of certified aircraft engines since 1989. The introductory price for the B22L engine with 115 hp is €11,500. EAA

Marino Boric is an aeronautical engineer, and holds a private pilot license in Germany with commercial and instrument ratings (CPL/IFR). He also flew as a military pilot. A professional journalist and editor, he specializes in aviation and propulsion and travels worldwide writing for special interest magazines and scientific publications in four languages. One of his passions is his homebuilt experimental airplane. For more information about the B22 engine visit *www.SportAviation.org*.

LAURAN PAINE JR.
COMMENTARY / SPIRIT OF AVIATION

Band of Builders

'Teen Flight' flies!

THE RV-12 BUILT FROM start to finish by teenagers has flown, and it's a pretty big deal around these parts!

You may remember that I initially wrote about "Teen Flight" in the August 2009 issue of *Sport Aviation*. There I talked about how an idea—have a bunch of teenagers build and fly an airplane—took its first step toward reality. Donors were rounded up, a leader took charge, mentors were found, rules and expectations were established, space to build was donated, and kids stepped up to the plate. They had to agree to one thing: *commitment*. And they did. All the ingredients were in place. But how would the recipe turn out?

Scott McDaniels, a Van's Aircraft employee, took the leadership role. He gave an outstanding "day one" presentation to the kids on the commitment it takes to build an airplane. Then he gave a talk on metallurgy, procedures, techniques, terminology, tools—stuff like that. The first project was an aluminum toolbox; each kid built their own. Aluminum and rivets. High standards. It's not a sprint; it's an endurance test. And all of that set the tone.

Mentors came from many backgrounds, most having already built an airplane, a couple from airline maintenance backgrounds, and VanGrunsven brothers Jerry and Stan. None were trained teachers per se, but all are passionate about aviation. It was a wonderful mix. They all lined up to help, me included, and gradually learned to "advise but don't build it for them." Things were clicking right along.

In the April 2010 issue, I gave a mid-term report: The recipe was working out just fine, but not without some "lessons learned" along the way. We started with 12 kids and ended with 10; one had to move away, and another started college in another city. I thought the completion percentage was outstanding. It was funny—in 2009 most of the kids were driven to work sessions by their parents; by 2011, most of the kids were driving themselves. They were maturing in many ways. Take this to the bank: Airplanes are pretty darn captivating once the kids get hands-on!

We met every Saturday, 9 a.m. to 3 p.m. Scott briefed the work to be completed and assigned kids and mentors. With all the big pieces—empennage, tail cone, wings, and fuselage—there was plenty for all to do, and no one really got in anyone's way. The airplane slowly began to take shape. And here is where some self-evident learning took place: Building an airplane is not instant gratification. It takes time and—

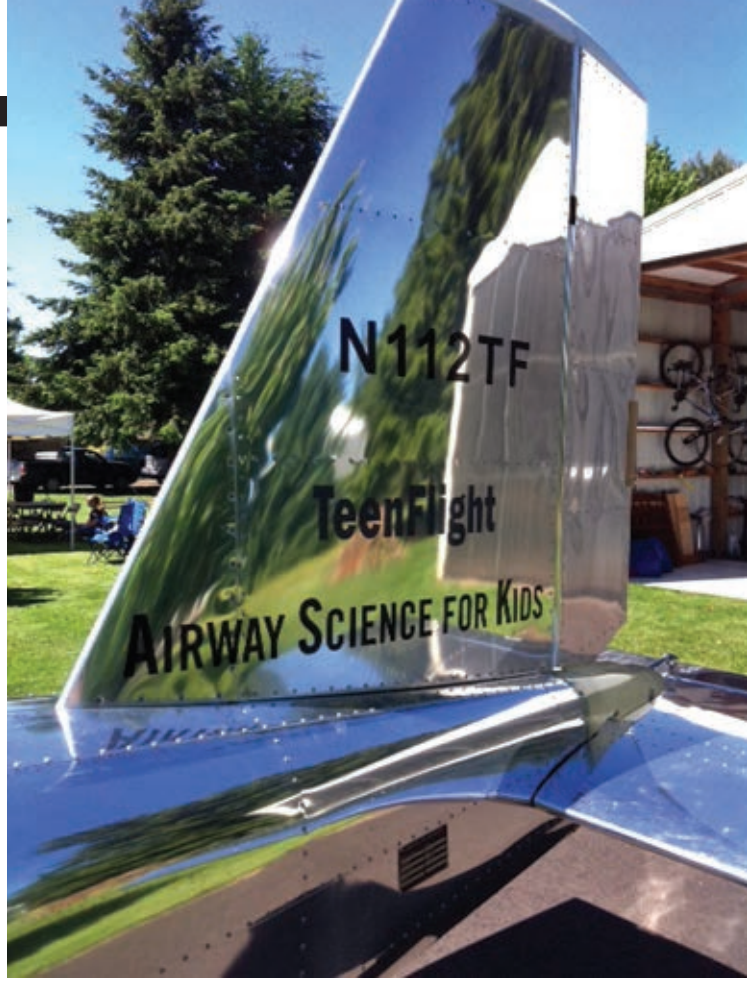
PHOTOGRAPHY COURTESY OF **LAURAN PAINE JR.**

here's that word again—commitment. The kids adapted nicely, and it was fun to witness them embracing the small victories needed to make the airplane whole.

Then we took a couple months off during the summer. Summer is a busy time for all in Oregon; it is (almost) the only time it doesn't rain every day. It was a good break, but I did hear one teen say, "I missed building."

When the break was over we all came back with gusto. This airplane was going to *happen*, and by the hands of a bunch of teenagers. More and more the mentors stepped back. Now the teens would gather the parts required for the "widget" they were working on, read the directions, and, with a mentor observing, build the part. This RV-12 was becoming *their* airplane, and each one was proud of the part they contributed.

A couple things to mention that are very important: schedule and leadership. A scheduler published the schedule monthly since not every mentor could be there every Saturday. That made it easy to know when you were supposed to be there. If you couldn't be there, you traded with someone or called one of the "spares." That system ended up working quite nicely. Leadership is also key, and we had a good one in Scott. He was there *every* Saturday. (A "thanks" is in order here to his family for being so generous with him.) And every Saturday there were assignments and goals; there was *never* any fiddling around. Scott had the demeanor, the



knowledge, and, of course, the commitment to keep the project going. And he didn't coddle the teens. If one wasn't performing, he talked to them: "This is a team effort, and you don't let your teammates down!" The kids responded well to that.

And there was something else that is very important that Scott took charge of, too: In a group project someone has to be the final authority to make sure that required standards are met. Scott made it clear from the beginning that "good enough" was *not* acceptable. So, in all matters of construction, all kids and mentors deferred to Scott's final judgment. That served to keep standards both consistent and high.

Tim Williams rivets the skin onto the wing ribs.

The teens were unfailingly polite from beginning to end. They're kids; they have lots going on in their lives. But when they came to work on the airplane they focused. Most enjoyed their daily construction accomplishments in a rather low-key manner. I only once saw one get fairly exuberant: James. He formed a bad rivet and had to drill it out. The back side of the rivet fell inside the wing and on the rear spar between two ribs. Only way to get it out was to "fish" it out through some lightening holes. He got a wire, put some masking tape on the end of it, lay on his back with that contraption, and, using a flashlight and an inspection mirror, got the rivet piece to stick to the tape and got it out...after about 45 minutes. When he finally got it he jumped up and cheered, "Yeah!"

There was another interesting phenomenon taking place as the project matured. During lunch break, when we first started, the kids gravitated to one area and the adults (mentors) gravitated to another. The kids caught up on their texting and said "dude" a lot; the adults caught up with the latest on Social Security and told war stories. But, later in the project, we all gathered together for lunch; we listened to them and they listened to us. Not sure how many of the kids thought of adults as someone they could actually talk to.

Almost two years from the beginning, we were nearing completion. Builders know instinctively what "nearing completion" means: 90 percent done and 90 percent to go. A list of "squawks" in the form of a to-do list was put on the dry-erase board: swap EGT connectors, battery bolt, re-torque bottom plugs, redo pitot line, brake fluid leak, etc. Each teen was assigned an item or two to complete; once completed, the kids checked off the item and signed their initials by it. Keagan said, "A year ago I didn't even know what any of that meant."

You could sense the excitement building as the airplane neared completion. Detail work was being completed: Seat belts were installed, placards were put in the cockpit, oil was put in the engine, control checks were being made. This former box of parts was becoming an airplane!

Then the day came to push the airplane outside and start the engine. Connell said, "I never thought I'd see this." You could *feel* it: Golly, they were proud! Scott and the teens did all the preparatory work (Scott's been to the Rotax school; he knows the engine well), and then he started the engine. Noise! The airplane was alive! There were smiles all around. Big smiles.

The Teen Flight kids show off their RV-12. From left: Clayton Davis, Tim Williams, Adam McDaniels, Connell Hawkins, Nathan Vielmette, Aric Kraus, and Daniel Wanvig. Not pictured: James Dicky, Ben Porter, Sebastian Benner, and Keagan Brown.

Was the journey worth it thus far? What do you think?

Then the "adult stuff" took center stage for a while: schedule the airworthiness inspection, apply for registration, secure insurance, and transfer ownership to the Airway Science for Kids Program—which is where most of the kids came from. The registration finally arrived: N112TF. Get it? "One (RV) Twelve (for) Teen Flight." Then insurance was secured, actually *donated* by Tom Johnson of Airpower Insurance.

Frank Snead, a designated airworthiness representative, arrived for the airworthiness inspection. There was excitement and a

little tension—which is normal—in the air. Frank gave the airplane a thorough going over and pronounced it—drum roll, please—airworthy! A small step, perhaps, in the big scheme of life but certainly a huge step in the right direction for a bunch of teenagers. Frank completed the required paperwork and handed over the airworthiness permit. Then he handed over his invoice, which said, "Fee waived. Use for flight training or maintenance."

Nothing left to do but fly! Given the Oregon weather, we had to wait a few days for that. A "weather window" finally opened—on short notice so not everyone could be there—and Scott flew the first flight with Dick VanGrunsven (Van) flying chase in his RV-12. That evening, Scott sent out an e-mail: "RV-12 N112TF lifted off this evening a little past 7 p.m. The flight went very well with absolutely no problems. You guys built a great flying airplane."

We had a "Teen Flight End of Project Open House" at Scott's house. All the groups that were present in the beginning gathered again: donors, mentors, and kids. There was food, camaraderie, thanks, and lots of well-deserved backslapping. Van was master of ceremonies. I got the mic to talk of the rewards the mentors felt while participating in the program. Aric, one of the builders, spoke of his thanks for all involved and how the program made a difference in his life. Shannon, a mom, spoke off the cuff, saying, "I watched my son grow up doing this program." She was about an inch from tears. And then she added, "And thanks for making them sand that edge one more time, until it was perfect."

The end? Nope. Just the beginning.

Ideas abound: One of them is to fly the teen-built RV-12 to AirVenture 2011 and have some of the teens accompany it. I'm told the airplane will be either at Van's tent or the Young Eagles area. And look up Scott McDaniels at the Van's tent. Ask him about Teen Flight. Trust me, he's a wealth of good information. Might be just the thing to get *you* started with the teens in your area!

The airplane itself? The kids may fly and train in it for a while. They may later sell it, buy another kit with the proceeds, and start the process all over again, this time with some of the original Teen Flight teens serving as mentors. Success generates success.

To thank? This whole band of aviation-minded people who do what they do for one reason—because they love it. People like you.

In retrospect, it wasn't just an airplane that was built. *Character* was built, too. And, aviation competed favorably with other activities; you just have to let the kids get hands-on. And you don't do that by building fences around airports; if you want 'em to play, you have to invite them in. Don't underestimate the kids: Give them parts, and they *will* build. It's about opportunity, and it's up to us to foster it. And it's worth it: Aviation is a lifetime of satisfaction. EAA

Lauran Paine Jr., EAA 582274, is a retired military pilot and retired airline pilot. He built and flies 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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LANE WALLACE
COMMENTARY / FLYING LESSONS

Time to Spare

Finding good times in bad luck

"THERE ARE TWO MAIN RULES you have to live by in aviation."

I was standing inside a hangar at some long-forgotten airport, many years ago, listening to a friend hold forth to a group of young aviation aficionados. My mind ran through a quick list of possibilities. Respect the laws of physics and the limitations of your machine? Don't stall and don't *ever* stall? Don't hit the ground? Speed costs money?

"The first," he said, "is that all plans are subject to change, at all times, with very little notice." He paused. "And the second is that if you never count on anything, you'll never be disappointed."

It's true, of course, cynical as that might sound. Life in general may have no guarantees, but that overall level of uncertainty gets ratcheted up to another whole level when airplanes are involved. "Time to spare, go by air" and all that.

One of our close encounters with bison at Yellowstone National Park.

It's always perplexed me, in fact, that pilots—who tend to be certified control freaks, according to people who've studied our personalities—are drawn to an activity that involves so many components we are powerless to control. Weather. Maintenance. Delays.

Or, as in the case of the Cheetah in Montana...all of those things together.

Flying VFR across the country from west to east can be a lovely experience, as long as you catch the waves right. If you catch a wave of nice, high pressure weather, you can ride it all the way east, as long as you keep pace with it. But one little glitch or delay can get you out of the groove, as surfers would say. At which point your options are to stubbornly and determinedly push ahead through the rough and tumble of the next frontal system, or step aside and wait for the next smooth wave to come along.

If lives were at stake, or if I was flying for a living, I'd soldier through. But I fly for *fun*. And I've tried the "soldier through" approach often enough to learn that whatever else that kind of flying is, it's decidedly not *fun*. So I'm much more inclined to approach my trips with a generous helping of patience, these days. Which is to say...I now know far more about Billings, Montana, than I ever thought I would.

PHOTOGRAPHY BY **ED CATALDO**

The good news was that we—we being me and Connor, the 17-year-old who was flying with me across the country—got into Billings before the massive cold front that was trailing us caught up to us. The problematic cylinder we'd been watching as we flew through the mountains turned out to be a problematic gauge, instead. And the Corporate Jet FBO at Billings had an instrument shop next door that could fix both that instrument and our leaking whiskey compass.

Life in general may have no guarantees, but that overall level of uncertainty gets ratcheted up to another whole level when airplanes are involved.

But even a quick maintenance stop meant the cold front was going to catch us. And it wasn't scheduled to move out again for at least three days. Connor and I asked the young women at the hotel's front desk what there was to see or do in Billings. "Well, there's the Little Bighorn Battlefield, about an hour east of here," one of them offered. That was something, anyway. And beyond that? They exchanged a look and giggled.

"Umm...that's about it, I think," the other one said.

It began to occur to me that it might be a long three days. On the other hand, Yellowstone National Park was only a couple of hours down the road, and it was Friday afternoon. I called Connor's dad and suggested he hop on a plane to Billings and meet us for the weekend. A few hours and many frequent flyer miles later, Ed arrived in town and we set out for Yellowstone.

The route we chose took us over the Beartooth Pass—a spectacular stretch of scenery that beat any of the vistas we encountered in the park itself. It also took us higher (10,947 feet) than the highest Connor and I had flown in the Cheetah, getting through those same mountains. Connor, who'd brought our Garmin 696 GPS along to see how it performed on the ground, verified the altitude, and noted the irony of the numbers.

"Well, at least we didn't have to deal with

recreational vehicles in the plane," I offered as we crawled along the winding mountain road behind an underpowered and oversized camper. Connor granted me the point.

It was the third week of August, but there was still snow at the top of the pass and a series of small glacial lakes dotted the landscape.

"Those lakes are all *above 10,000 feet*," Connor said, looking at the GPS.

Ed glanced at the lakes, most of which were located a good hike across the tundra as we descended into Yellowstone.

"If there was one close to the road, I'd go swimming," he said.

"You're on!" Connor responded like a shot.

The universe, of course, has a tendency to call all bluffers. So it didn't surprise me when we rounded the next curve and found a small lake right alongside the road. Connor looked at the GPS.

"10,006 feet!" he announced excitedly.

"Let's go!" his dad responded.

And so it was that Connor got the experience of *swimming* at the exact same altitude the Cheetah had *flown* through the Monida Pass—all because of the "bad luck" of a couple of broken instruments and an unexpected weather delay. Not that it was much of a swim, mind you. I clocked it at 27.2 seconds in duration. Apparently glacial lakes are a bit on the nippy side. But as with many uncomfortable adventures in life, it's also something he and his dad will still laugh about 20 years from now. In fact, I think it was the highlight of the Yellowstone visit, for both of them. That and a few close encounters with bison from a car, a horse, and even on foot (the last one prompting a hasty retreat on both of their parts).

Oddly enough, the weather in the park was also far better than in Billings. It wasn't until we started back to Billings on Sunday afternoon that we ran into any serious weather—although the first element we encountered was actually fire. Wildfires had sprung up on both sides of the highway, turning the sky into a dense thicket of brown smoke that was overpowering, even with the car windows

Connor and his dad getting ready to go swimming at 10,006 feet.

A photo of the pictograph cave in Billings where there used to be cave drawings, before a well-meaning volunteer washed the wall.

up. Then, only a couple of miles farther down the road, the skies opened up with lightning, thunder, a deluge of rain, and marble-sized hail.

"Jeez! A minute ago we were in the middle of fire, now we're in a frickin' flood! What the hell's going on around here??!!" Ed exclaimed. It was true. We'd covered two of the four famous California seasons in less than a mile (the other two being earthquake and drought). Add a little plague and a little more pestilence, and we would have had something akin to the four riders of the Apocalypse.

"Well, at least we're not in the airplane," Connor offered when we both finally stopped laughing.

Amen to that. As it was, the back side of the front didn't clear out until late Monday night. So Connor and I got to explore all the local nooks and crannies of Billings, anyway. Including what may be the world's largest secondhand consignment store and some pictograph caves that had once had really impressive cave drawings...until someone decided they'd look a lot better if they were cleaned. But 20 years from now, Connor and I will still be laughing about those memories, too.

So, we lost three days in Billings. But we also found things there—treasures known as memories we never would have known had everything gone efficiently, smoothly, and precisely according to plan. EAA

Lane Wallace, EAA 650945, has been an aviation columnist, editor, and author for more than 20 years. More of her writing can be found at her blog, *www.NoMap-NoGuide-NoLimits.com*, and at *www.TheAtlantic.com/Lane_Wallace*.

PHOTOGRAPHY BY **CONNOR CATALDO, LANE WALLACE**

Name: Shannon Stumpf, EAA 650572
Position: Manager, Member & Technical Services

WHO'S WHO AT HQ

Describe what you do: I manage the staff of representatives who are here to help you with your needs and questions. We can be reached six days a week via phone or e-mail. Our job is to not only meet, but exceed your expectations.

What do you enjoy most about your job? My favorite part of my job is AirVenture! I love to meet our members face to face and see the joy on their faces when they come to visit and tell me that they have finally made it to Oshkosh!

If you could own any airplane, what would it be? The Harrier or the Falcon 900. I am mesmerized every time I see the Harrier fly. It isn't all that often that you see a plane hovering. The Falcon 900 is my dream plane. It's everything a girl could want!

Who introduced you to flying? Rusty Sachs introduced me to flying. He worked for the National Association of Flight Instructors at the time. At lunch one day he came to my office and said, "Let's go flying!" I'd never been in a small aircraft before. I couldn't believe the views. I was hooked!

Most unique experience as a student pilot? Birds! On one of my takeoffs a large flock of birds flew right in front of the plane. All I heard was my instructor scream, "Birds!" Being a student pilot, I'm not so sure I understood what that could mean.

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FROM THE DESK OF...

CHARLIE BECKER, DIRECTOR OF MEMBER PROGRAMS

BY THE TIME THIS ISSUE is in your hands, AirVenture Oshkosh will be in full swing. I can't predict the future, but I do know that no matter what, the event will be a huge success because of our volunteers. It simply would not happen without the more than 5,000 volunteers who step up each year to make "Oshkosh" the special experience that it is. Volunteers teach the workshops, volunteers work the front gate, volunteers park aircraft, volunteers register aircraft, and on and on.

Every year I marvel at what can be accomplished by motivated, smart, friendly, giving people. So all of you AirVenture volunteers, I want to thank you on behalf of the entire membership for making AirVenture 2011 a magical experience. And if you have never volunteered, put it on your list for 2012. Not only will it help others, but you'll enjoy it, too. It may just start a new tradition in your life.

Don't Know Much About...
EAA AIRCRAFT INSURANCE PLAN

FROM AMATEUR-BUILT TO STANDARD CATEGORY, from gliders to warbirds, and from vintage to light-sport, EAA makes aviation insurance accessible and affordable. The EAA Aircraft Insurance Plan and the EAA Non-Owned (for renters and students) Aircraft Insurance Plan offer a wide array of expanded insurance coverage, including special insurance for EAA members who are building or restoring aircraft.

Whatever your needs are, you're assured of the best coverage at the best price. Contact a representative of the EAA Aircraft Insurance Plan by calling 1-866-647-4322 or visit *www.EAA.org/insurance*.

Don't worry, Canadian EAA members—we didn't forget about you! Canadian EAA members can now enjoy affordable, extensive liability and aircraft hull coverage through C-PLAN, a new offering within the EAA Aircraft Insurance Plan. Underwritten by Global Aerospace, C-PLAN has coverage for standard, ultralight, amateur-built, and kit aircraft. For more information, call 1-855-736-3407 or visit *www.EAAInsurance.ca*.

Last Call for AirVenture 2011!


Boeing 787 Dreamliner


B-29 "FIFI"

THE WORLD'S GREATEST AVIATION CELEBRATION is just days away, or already underway, depending on when you're reading this issue. It's an event you won't want to miss, 'cause you'll miss seeing:

• Boeing's 787 Dreamliner, which will be onsite and open for tours on Friday, July 29.

• AirShip Ventures' Zeppelin NT, the first airship to fly in the United States in 70 years, which will be offering scenic flights throughout AirVenture week.

• The only flying B-29, *"FIFI"*, from the Commemorative Air Force.

• A replica of the first aircraft to make a carrier landing, the 1911 Curtiss-Ely Pusher, and many other naval aircraft, celebrating the 100th anniversary of naval aviation.

• Tributes to Burt Rutan and Bob Hoover.

• A Super Corsair F2G-1 and hundreds of other warbirds.

Visit *www.AirVenture.org* to get your heart racing about all there will be to see at EAA AirVenture Oshkosh 2011. We hope to see you here!


Super Corsair F2G-1

Zeppelin NT

ELECTRIC FLIGHT PRIZE COMPETITION PUT ON HOLD FOR A YEAR

DESPITE A STRONG INFLUX OF APPLICATIONS, EAA postponed its $60,000 Electric Flight Prize until EAA AirVenture 2012 so viable candidates could complete Phase One flight certification according to FAA regulations.

Aircraft designers and innovators submitted nearly a dozen entries into the competition, which sought to award cash prizes for endurance, time to climb, maximum speed, and innovation evaluation.

"After discussions with the prize candidates, it was evident most would not be able to meet the FAA requirement by AirVenture 2011," said Tom Poberezny, EAA and AirVenture chairman. "By staging the Electric Flight Prize at AirVenture 2012, innovators will be able to secure necessary certification and build on their advancements, resulting in a strong field of viable candidates ready to make the future of aviation a reality."

The Electric Flight Prize competition is sponsored by AeroLEDs, Aircraft Spruce & Specialty, Dynon Avionics, and Wicks Aircraft Supply. EAA AirVenture 2012 will be held July 23-29.


At Chapter 44's hangar dedication, Rod Hightower meets with Chris Wall, who in 2000 flew around the world with friend Dan Dominguez in a restored Rockwell Aero Commander 560E.

GRASSROOTS PILOT TOUR HIGHLIGHTS NEW CHAPTER HANGAR

EAA CHAPTER 44 OF ROCHESTER, NEW YORK, welcomed EAA President/CEO Rod Hightower to its new hangar dedication at Ledgedale Airpark (7G0) on June 21, and Hightower christened the new facility with its first official event—a Grassroots Pilot Tour presentation.

"Just a beautiful facility," Hightower said of the chapter's new Sport Aviation Center, which provides plenty of meeting and work space. "Chapter 44 is a switched-on, exemplary EAA chapter that has a real can-do attitude. They know how to grow a chapter with lots of family activities, Young Eagles rallies, and events to engage both builders and aircraft owners," added Hightower, who was made an honorary Chapter 44 member.

Chapter 44 always brings a large group to Oshkosh via the annual Oshkosh Airlift, and this year marks the 30th anniversary for that effort.

PHOTOGRAPHY BY **JIM CAVANAUGH**

BURT RUTAN'S RACE TO SPACE AVAILABLE NOW AT EAA

BURT RUTAN'S RACE TO SPACE: *The Magician of Mojave and His Flying Innovations* is out and available through the EAA Web store. Author Dan Linehan, who also wrote *SpaceShipOne: An Illustrated History,* provides the most comprehensive work to date on Rutan's career—from his post-collegiate days as an Air Force flight test engineer at Edwards Air Force Base to starting the Rutan Aircraft Factory and, later, Scaled Composites in Mojave, California.

The chronological journey begins before the VariViggen and concludes with SpaceShipTwo, featuring Burt's personal photos and some fascinating sketches and drawings throughout the book.

To order your copy of *Burt Rutan's Race to Space* for only $30, visit the featured products area of the online store at *www.ShopEAA.com*.

THOUSANDS FLY ON INTERNATIONAL YOUNG EAGLES DAY

NEARLY 150 EAA CHAPTERS WORLDWIDE celebrated International Young Eagles Day on Saturday, June 11, by giving thousands of young aviation enthusiasts the opportunity to learn about aviation and fly in an aircraft for free.

Several chapters, including Chapter 309 in Charlotte, North Carolina, had huge turnouts; others, like Oshkosh's planned event, were cut short by the weather, but volunteers were still able to introduce aviation to the eager children ages 8-17 through mini ground schools and preflight demos. They also issued lots of rain checks for future flights.

Since its founding in 1992, the Young Eagles program has launched more than 1.6 million flights. Research shows that Young Eagles are five times more likely to become pilots than non-Young Eagles. Nearly 20,000 pilots are former Young Eagles participants, meaning they already compose more than 7 percent of the nation's pilot population under age 35.

EAA's Flight Plan, which helps young people move from an initial flight toward the full potential of aviation, provides free EAA student membership, free online access to Sporty's Complete Flight Training Course, a free flight lesson, and reimbursement for the costs of a successful FAA written test. For more information, visit *www.YoungEagles.org/flightplan*.

GRASSROOTS AVIATION AT FRASCA FLY-IN

RUDY FRASCA'S ANNUAL FLY-IN AT Frasca Field (C16) in Urbana, Illinois, was a true grassroots aviation event: a wide variety of GA airplanes, including pristine warbirds and EAA's Ford Tri-Motor, a turf runway—and lots of grassroots aviation enthusiasts. EAA founders Paul and Audrey Poberezny were there, as was EAA President/CEO Rod Hightower, who gave his 25th Grassroots Pilot Tour presentation.

"It was a great success," Paul said. "The turnout was great, and lots of people took rides on the Ford Tri-Motor. The fly-in brought out lots of people from the Champaign-Urbana area, and it did a lot of good for aviation in this area."

Frasca, a pioneer in the flight simulator business, had several of his private aircraft collection on display and flying, featuring the Flug Werk Focke-Wulf 190 and Supermarine Spitfire, both destined for Oshkosh this year for EAA's Salute to Bob Hoover. The two former foes will be displayed at the EAA AirVenture Museum following AirVenture.

During Hightower's Saturday night presentation, an energetic Q&A session focused on the key issues facing aviation today. "The passion for aviation is everywhere," Hightower commented. "It is becoming more evident to me that EAA will lead the way in creating the next generation of aviators."

Rudy Frasca's beautiful Flug Werk 190 will be on display in the EAA museum this year.

THE AVIATORS SELECTS WITTMAN AS OFFICIAL HOME AIRPORT

***THE AVIATORS* TELEVISION SHOW**, which airs on PBS stations across the United States and on other major networks around the world, recently made Wittman Regional Airport (KOSH) in Oshkosh its new official home airport.

Wittman is home to EAA AirVenture, as well as Basler Turbo Conversions, Fox Valley Technical College's aviation programs, Oshkosh Corporation, and Sonex Aircraft LLC.

"Hundreds of thousands of aviation enthusiasts flock to Oshkosh every year, which makes Wittman Regional Airport a natural home for *The Aviators*," Executive Producer Anthony Nalli said. The show has aired more than 10,000 times across North America to an audience of millions. The show also airs on Discovery in several Australasian markets and is moving into Europe and South America. Its second season is scheduled to premiere this September.

CALENDAR OF EVENTS

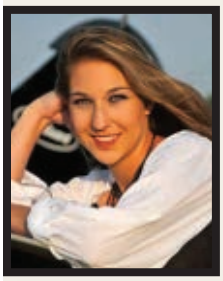
Colorado Sport International Air Show and Rocky Mountain Regional Fly-In
Rocky Mountain Metropolitan Airport (BJC),
Denver, Colorado
August 27–28, 2011
www.COSportAviation.org

Mid-Eastern Regional Fly-In
Grimes Field-Urbana Municipal Airport (I74),
Urbana, Ohio
September 10–11, 2011
www.MERFI.com

Copperstate Fly-In
Casa Grande Municipal Airport (CGZ),
Casa Grande, Arizona
October 20–22, 2011
www.Copperstate.org

Southeast Regional Fly-In
Middleton Field (GZH),
Evergreen, Alabama
October 21–23, 2011
www.SERFI.org

For details on hundreds of upcoming aviation happenings including EAA chapter fly-ins, Young Eagles rallies, and other local aviation events, visit the EAA Calendar of Events located at *www.EAA.org/calendar.*



Amanda Franklin

3/14/1986–5/27/2011

AMANDA M. FRANKLIN, A POPULAR air show performer and pilot, passed away on May 27 at the Brooke Army Medical Center in San Antonio, Texas, after battling severe injuries sustained from an aviation accident in March. She was 25.

Aviation was deeply rooted in Amanda's life. She grew up in the aviation community, spending her childhood traveling to air shows around the country with her brother, Matt Younkin, and father, Robert "Bobby" Younkin.

Amanda began her piloting career when she was 16 years old. She quickly became an accomplished multiengine and tailwheel pilot, having flown more than 15 different types of airplanes.

On October 18, 2005, Amanda married longtime friend, fellow pilot, and air show professional Kyle Franklin. The couple resided in Neosho, Missouri, and began performing their popular Pirated Skies wing-walking act in 2009. When she wasn't wing-walking, Amanda worked as the manager for Franklin's Flying Circus & Airshow and Younkin Airshows Inc. She was also the full-time announcer for her brother's air show routine.

Amanda is survived by her husband, Kyle; mother, Jeanie Younkin; brother and sister-in-law, Matt and Michelle Younkin; niece, Kimberly; grandfather, Jim Younkin, and his wife, Ada; mother-in-law, Audean Stroud, and her husband, Steve; and extended family.

Friends and family are invited to post obituaries and sign a memorial guestbook online for Amanda and other EAAers who have "gone west" at *www.EAA.org/obituaries*. The names and stories of each person enshrined on EAA's Memorial Wall in Oshkosh, Wisconsin, are also available here.

IN MEMORY OF

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

ALABAMA
Don Traylor (EAA 99899), Mobile

ARIZONA
Kenneth Rice (EAA 867708), Huachuca City
Herbert Williams (EAA 184971), Tempe

CALIFORNIA
William Brown (EAA 1029463), El Dorado Hills
Ray Cary (EAA 770037), El Monte
Richard Dyer (EAA 1023791), Redondo Beach
Ellen Marks (EAA 830538), Apple Valley
Denis Porter (EAA 585115), Lockwood

COLORADO
Rod Kleweno (EAA 574786), Arriba

CONNECTICUT
Charlie Falke (EAA 483928), Union

FLORIDA
James Broady (EAA 598738), Weirsdale
Rob Chapman (EAA 580102), Miami
Donald Costa (EAA 547449), Cape Coral
Oran Grahl (EAA 189522), North Fort Myers
Frank Little (EAA 716461), Fort Myers
Otto "Jim" Martin Jr. (EAA 195422), Summerfield
Skip Perry (EAA 690869), Fort Myers
G.H. Rhyne (EAA 182525), Fernandina Beach
Gene Roeckers (EAA 823052), Fort Myers

GEORGIA
Ralph Hardeman (EAA 67367), Oxford

IDAHO
Richard "Dick" Anderson (EAA 5432), Hailey
Robert Finer (EAA 219293), Star

ILLINOIS
Karl Niedermann (EAA 287620), Belvidere
Harold Pritchard (EAA 105032), Geneseo
R. "Pat" Williams (EAA 684487), Metropolis

INDIANA
Mark Angell (EAA 783059), Linton
Harold Broyles (EAA 402446), Pittsboro

IOWA
Beryl Weekley (EAA 232998), Vinton

KANSAS
Donald Ware (EAA 96676), Whitewater
Ralph Witzke (EAA 115667), Wichita

KENTUCKY
John Ellis (EAA 736583), Georgetown
William Strasinger (EAA 26340), Fort Thomas

MAINE
John Greaney (EAA 222999), Williamsburg Township

MARYLAND
Charles Puglisi (EAA 397949), Clarksville
Dennis Smith (EAA 196385), Solomons

MASSACHUSETTS
Gregg Andrews (EAA 499419), Spencer
Robert Sprague (EAA 111230), Williamstown

MICHIGAN
Lester Faus (EAA 92024), Grawn
John McFarlin (EAA 676618), Canton

MINNESOTA
David Asp (EAA 141831), Prior Lake
Vincent Blau (EAA 253042), Minneapolis
Rienard Linde (EAA 227751), Owatonna

MISSOURI
James O'Brien (EAA 9005029), St. Louis
Milton Pfeiffer (EAA 577460), St. Louis

MONTANA
Dave Gates (EAA 834746), Butte

NEBRASKA
Charles De Ganahl (EAA 549829), Lakeside
Ed Garner (EAA 785), Humboldt

NEW MEXICO
Leon "Junior" Billstone (EAA 679811), Las Cruces

NEW YORK
Donald McKay (EAA 73490), Troy

NORTH CAROLINA
Ralph Bitely (EAA 796910), New Bern

OKLAHOMA
Lonnie Hardin (EAA 380446), Tulsa
Joseph Provenzano (EAA 802098), Tulsa
Richard Shimer (EAA 831412), Owasso

OREGON
William Edwards (EAA 698558), Redmond
Rea Frisbie (EAA 2020), Lincoln City

PENNSYLVANIA
Joe Krajci (EAA 515728), Philadelphia
Warren "Skip" Love (EAA 21701), Linesville
Donald Wolfe (EAA 55832), Erie

TEXAS
Robert Hazen (EAA 273500), North Richland Hills
William Nelson (EAA 35969), El Paso
Bill Stratton (EAA 147044), San Antonio
T.W. Wheelock (EAA 82213), Fort Worth

VIRGINIA
Richard Newhall (EAA 592918), Annandale
Thomas Trump (EAA 509010), Crewe

WASHINGTON
Mark Ennis (EAA 1031298), Graham
William Walker II (EAA 577359), Sammamish

WEST VIRGINIA
Lawrence Gum (EAA 604099), Martinsburg
James Shearer (EAA 937), Berkeley Springs

WISCONSIN
Michael Jurmu (EAA 237098), Suamico
Roy "Tex" Lundquist (EAA 6614), Oshkosh
William Spear (EAA 343317), Milwaukee
Gunter Voltz (EAA 208981), Grafton

AUSTRALIA
Sidney "Felix" Armstrong (EAA 592784), Rye, Victoria

CANADA
Donald Ruth (EAA 557860), Gore Bay, Ontario

Daher-Socata: A Century of Airplanes

DAHER-SOCATA, THE MAKER of the fast TBM 850 single-engine turboprop, is celebrating a century of continuous airplane manufacturing during EAA AirVenture 2011. Daher-Socata traces its roots back to 1911 when Raymond Saulnier and the Morane brothers, Leon and Robert, teamed up to build their Model A monoplane that won the Paris-to-Madrid race. The Morane-Saulnier company recorded many firsts during its long history, including having the first fighter airplane in World War I, the Type L. Roland Garros—tennis fans will recognize the name because the stadium where the French Open is played is named for him—invented the interrupter mechanism to fire a machine gun through the propeller arc. Garros became the first ace of the war flying the Morane-Saulnier and was a French national hero.

Morane-Saulnier also manufactured general aviation airplanes, including the STOL Rallye piston single and the MS 760 Paris, the first very light personal jet. More recently the company built the TB series of piston singles, including the Tampico and Tobago. It introduced the TBM 700, the first high-performance personal turboprop single in 1991.

Nicolas Chabbert

Morane-Saulnier—renamed Socata—was absorbed into the French aerospace conglomerate Aerospatiale in the 1960s to concentrate on building civilian aircraft and major subcomponents. The Daher family purchased a controlling interest in 2009.

For one quarter of its century of airplane building, Daher-Socata has exhibited at Oshkosh. "Socata has been attending the EAA gathering at Oshkosh for 25 years, even in the days when there were only a few aircraft manufacturers present," said Nicolas Chabbert, president of Socata North America. "The aviation enthusiasm that floods all over the show has always been an inspiration for our team." And Socata is totally immersed in the Oshkosh experience; they all—including top management—camp on the EAA grounds for the week.

The Daher-Socata team at AirVenture 2010. The entire group camps at AirVenture each year to "get the full experience."

Socata sells its 300-knot-plus TBM 850 to those who appreciate its excellent flying qualities, its sturdy design and world-class construction quality, and its long range. "The Oshkosh show brings together people who love airplanes, all types of airplanes, and these are exactly the people we want to meet and show our TBM 850 to," Nicolas said.

Socata is also dedicated to helping EAA fuel people's passion for aviation, and doing all it can to see the pilot population grow. "EAA and Oshkosh provide our future customers," Nicolas said. "We build airplanes for people who want the highest-performing, highest-quality airplanes for their personal and business travel, and EAA brings those people together every year.

"Through each edition, Oshkosh rejuvenates our company's passion for aviation. It is pure joy to be surrounded by so many people who love all aspects of aviation," Nicolas said. EAA

TOM'S WORDS

DAHER-SOCATA IS ONE of EAA's strongest and most dedicated supporters; the company's leadership understands that people who are passionate about airplanes are their best customers. And Socata also knows it must have a new generation of pilots to buy and fly their airplanes. That's why it has been so dedicated to the success of Young Eagles.

For several years Daher-Socata has purchased the tables on the balcony at the Gathering of Eagles dinner. The dinner celebrates the Young Eagles program and raises money to continue our efforts. Daher-Socata hosts owners of its speedy TBM single-engine turboprops from around the world. The pure enthusiasm for flying and aviation these pilots and airplane owners display is a joy to see, and the TBM group always makes generous contributions through the auction and other donations.

But Nicolas Chabbert, a lifelong pilot and airplane enthusiast, wanted to do more and asked what else Socata could do to help the Young Eagles program. Nicolas offered the idea of internships for two Young Eagles. The teenagers—a boy and girl—spend six weeks at the Socata factory in Tarbes, in the south of France, where they get hands-on experience in the design and building of airplanes. They complete the program working with Socata during AirVenture. It is a coveted opportunity, and selecting just two Young Eagles is very difficult.

EAA's relationship with Daher-Socata is the perfect example of what is needed to ensure the future of aviation. EAA casts a wide net, bringing aviation enthusiasts of all stripes together as members and AirVenture attendees. Daher-Socata, through its generous contributions and consistent appearance at Oshkosh, provides the fuel for the fire that EAA has lit.

PHOTOGRAPHY BY CRAIG PEYTON

C-PLAN

Everyone's getting on board.

Now there's a choice in aircraft insurance, and more and more Canadian aircraft owners and pilots are choosing C-PLAN.* It's EAA Aviation Insurance, the Canadian way. C-PLAN can save you money on this year's premiums. Like other plans, you choose the coverage you need. Liability. Hull. Or both. We cover standard as well as amateur-built, ultralight, and kitplanes. C-PLAN is underwritten by Canada's largest aviation insurer. So it's coverage you can depend on. The quote is free. Just call 1-855-736-3407. Or visit us online at www.eaainsurance.ca

Visit us in the EAA Welcome Center for a FREE quote.

*Administered by Nacora Insurance Brokers Ltd.

CHECKLISTS

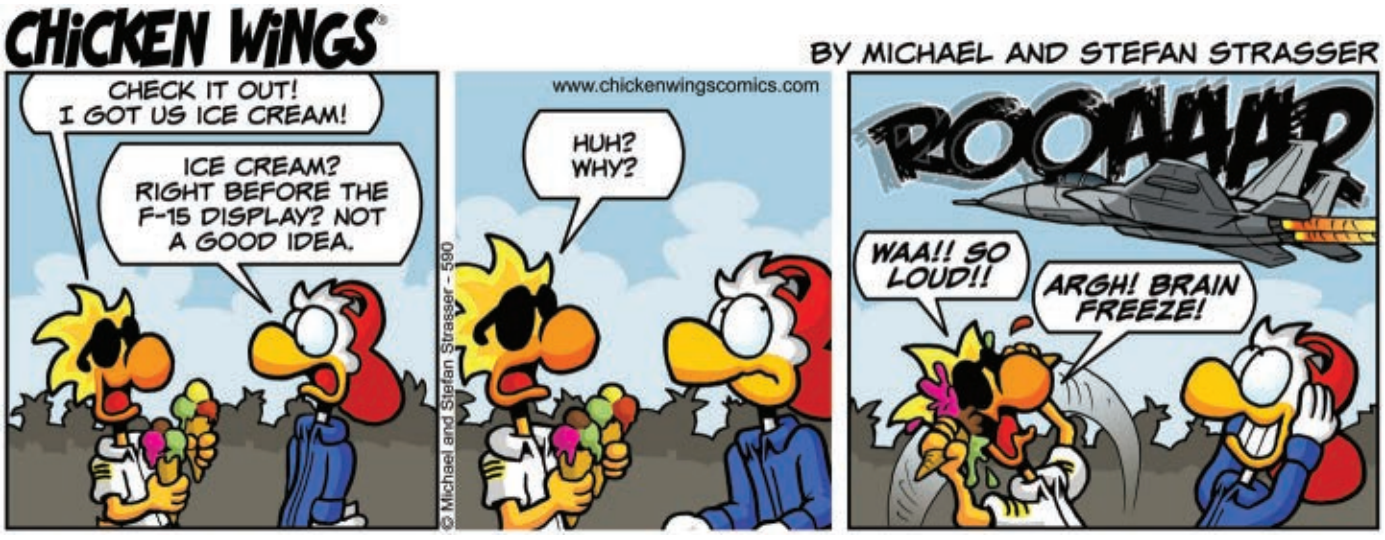
MAC MCCLELLAN IS RIGHT ON with his article "Checklists Are Too Long" (June issue). In the case of older airplanes, the manufacturer's checklist also can be too short and miss critical items. I have used a slightly more complicated checklist that has done well by me for 42 years in any single- or multiengine piston aircraft. It is a silly little sentence: "Can I Go Flying Today Peter Rabbit Sir." Can = controls, I = instruments, Go = gas, Flying = flaps, Today = trim, Peter = props, Rabbit = run-up, Sir = safety (seatbelts, doors, etc.). I was given this tool by my boss, Tommy Rhoads, who owned a flight school at the Bayport Aerodrome in 1969, Long Island, New York. I still use it.

Mike Coligny, EAA 552155
Prescott, Arizona

Gentleman Bob

I ENJOYED THE RECENT ARTICLE on Bob Hoover. In the mid '70s a friend of mine had a chance to interview Bob before an air show. Bob asked if we would like to see a little of his performance. He then proceeded to load us into his aircraft and give us an outstanding demonstration of abilities. What a great experience for both of us. My friend, Gary, had never flown before and couldn't wipe the smile off his face for days! This was my first GA flight, and one I will never forget! Thanks to Bob Hoover for such a great treat; I will always remember him for his kindness and love of aviation to take a few nobodies up for such an exciting adventure. Thanks again, Bob.

Steve Holowach, EAA 764181
Pensacola, Florida



FOR MORE INFORMATION about the Chicken Wings strip, visit *www.ChickenWingsComics.com*. Chicken Wings merchandise is also available at *www.ShopEAA.com*.

SUBMISSIONS

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

ILLUSTRATION BY VUIFAH@ISTOCK.COM

There's a Different Engine in Rudy's Fw 190

I HAVE BEEN WATCHING Rudy Frasca's Fw 190 ("Money in the Bank," June 2011, sidebar: "The Dumbest Thing I Ever Did") go together for some time, and it is powered by a Russian/Chinese ASH-82 engine, not an R-2800 (which wouldn't fit inside an Fw's cowl). The ASH-82 is a Russian copy of the R-2600 14-cylinder engine (that powered the B-25) with the BMW fuel injection fitted to it. Also, Rudy's Fw 190 is not a full-scale replica as each kit was given a Focke-Wulf serial number, so it's a warbird like the new Yaks made in Russia.

John Hartgerink, EAA 62950
DeKalb, Illinois

Sport Aviation at Risk

THIRTY-SEVEN YEARS OF SPORT flying has shown me the best and worst of aviation. In the current atmosphere of extreme sports mania, the public is drawn to the adventure of flight, unwittingly exposing themselves to individuals bent on financing their own thrills at the expense of others.

Three fatal crashes in light-sport aircraft (trikes) in Hawaii recently demonstrate my argument that these flights were for the sole benefit of the pilots involved. Each, a certificated flight instructor, operated under a provision in the FARs that allows the use of a light-sport aircraft for pay.

Under the guise of a flight school, these individuals demonstrated flight operations exceeding the limitations of the aircraft and regularly disregarded sound aviating practices. This has led to six deaths, suggesting something other than a training environment. At the controls, each of these pilots flew their aircraft to destruction, killing themselves and their supposed students. I expect there have been similar problems within sport aviation not limited to weight-shift control aircraft. There have been great gains made. With that comes responsibility; speak up, mentor, set a good example, and raise hell when it's called for—your sport and peoples' lives depend on it!

Kimball Dodds, EAA 537680
Imperial Beach, California

Mac's Blog

"The FAA wants to broadcast your position." That's what Mac McClellan announced in a recent blog post discussing a planned change in FAA policy that will eliminate pilots' ability to use the "blocked aircraft registration request" process (BARR) to prevent the release of information about their flight plans, routes, etc.

To some, this is a fundamental question of government versus individual privacy rights; to others, it doesn't seem to be an issue at all. Not surprisingly, a number of readers have responded with thoughts of their own.

Here's a look at some of the comments:

How would you like the government to broadcast where your car is located at all times? **—Dan Stanzione**

I always felt secure because of the IFR tracking of my position. To turn this into a violation of privacy is ridiculous. **—Joe Melloy**

I'm worried about the government tracking me, and not at all worried about private parties knowing where I am. **—Averroes Ibn Rushd**

I choose to actually broadcast the movements of my Maule, in that often I go to very lonely dirt strips, for camping. This gives me some comfort to know they will at least know where to start looking. **—Stormy Dayton**

If 9/11 had used a corporate jet ... then we'd be seeing a lot more intrusion into "privacy rights" of private and business aircraft, too. Enjoy what you've got, while it lasts. **—Gordon E. Peterson II**

As a shareholder, I like to see where corporations are flying to and when. I am against blocking. **—Bruce Ziegler**

It should be up to the individual if the information is published or not. **—Lindy Kirkland**

The way to fight this is not BARR. It is to ask friends of privacy in Congress to pass a more sweeping law prohibiting the public dissemination of information that could reasonably identify the movements of individuals. **—Thomas Boyle**

Initially I was absolutely pro blocking. Then I thought about the fact that we are flying over other people's property and homes. Do they have a right to know who is overflying them? I think they do. **—Larry Baker**

Yeah, and what about all the cars and trucks driving by my house? Who knows what's in them. And they're a lot closer than some jet 5 miles overhead. The people have a right to know! **—Craig**

I believe that our right to privacy is protected by the Constitution. The FAA must show compelling need to publish our IFR flight before we should allow it to do so. I am against giving it this power. **—Duane Beland**

I do not like the idea of my personal information being either collected or broadcast, but this is not personal info that is being disclosed, just the airplane N number. **—Gordon Arnaut**

To follow this conversation, visit *www.SportAviation.org*.

Airport Day in Zambia

FOR MORE THAN TWO YEARS, Rick Rempel, EAA 862261, and his family have been living in a rural community in Zambia, Africa, working with Flying Mission and basing a Cessna 206 in the area to support the local hospital, malaria research, and the rural community development program. After seeing the airplane, many locals wanted the opportunity to fly, so Macha Airport Day was born.

More than 160 people, some walking more than an hour to reach the airport, got flights that day. Rick flew the 206, and another Flying Mission pilot brought a Cessna 210 to help. Passengers, including the local chiefs and headmen from the surrounding area, got to see the community from above during five-minute flights. "It was neat to hear the excitement that came from those who flew with us as they recognized the different buildings on the ground and also as they saw the people," Rick said.

The day was so successful and so many more people want to fly that the community is already planning another airport day. "Now people who have hardly a chance to see an airplane are having an opportunity to ride in one," Rick said.

Locals watch Rick Rempel come in for a landing.

The crowd looks over Flying Mission's Cessna 206.

PHOTOGRAPHY COURTESY OF **RICK REMPEL**

HIGH-FLYING HOMEWORK

High school class builds an RV-12

BOB KELLY, EAA 666953

EAA CHAPTER 1328 IN North Vernon, Indiana, has two Young Eagles days each year, and we have flown hundreds of kids. Getting them involved in building an airplane seemed to be the next, most logical step.

I talked with Dick VanGrunsven, founder of Van's Aircraft, about the idea at AirVenture the first year Van's Aircraft displayed the RV-12 prototype. During this time, Van's began the Teen Flight program. Following the Teen Flight blog, it was obvious that the RV-12 was the right choice. (For more on Teen Flight, see page 110.)

Fast-forward to early September 2010. I got a call from Andy Doboze, the engineering teacher at Jennings County High School. "When do you want to start?" I asked.

"How about Tuesday?" Andy replied.

I had five Van's practice kits and enough tools to get started, so Tuesday it was. Later on, one post on *www.VansAirForce.net* brought the donations necessary to buy all the tools we needed.

The empennage and tail cone kit arrived during Christmas break. The kids took the practice kits seriously, but it was nothing compared to working on the real thing. We found the Hints for Homebuilders videos on the EAA website a big help in getting up to speed. Even the mentors learned from them.

A happy group of builders with a finished tail cone.

We plan to have the fuselage and wings finished by the end of summer. Some of the kids will be at AirVenture 2011, and I will share a forum with Scott McDaniels, supervisor of the Van's Teen Flight group.

The kids? All have had their first airplane ride and are Young Eagles. Some have joined EAA and our local chapter. Five want to get their pilot certificates, and two are considering aviation-related careers. All plan to be part of the Eagle's Nest Project during the next school year.

YOUNG EAGLE LANDS FIRST SOLO

LILLYMAE GUNICK, EAA 1049346, completed her first solo glider flight on May 6. The 14-year-old Young Eagle, of Ennis, Montana, is a newer member of the EAA community, having joined the organization in January.

Before moving to Montana in 2008, Lillymae did all of her training at Eagle's Nest Airport in Waynesboro, Virginia. Three weeks before her solo flight, she and her father, Richard, traveled back to Waynesboro to prepare for her endeavor.

Lillymae said she didn't encounter any problems while flying, but was nervous throughout the whole flight.

"I didn't make any critical mistakes, but it wasn't a perfect flight," she said.

Lillymae said she soared through the clear skies in her glider for 15 minutes. The landing wasn't intimidating to her, but it required all her concentration. She said it was her favorite part of the flight.

"I was giddy with relief and happiness," she said.

Lillymae's love for flying sparked when she was 9 years old and has continued to grow ever since. She pilots gliders now but hopes to learn how to fly other types of planes in the future.

Once she turns 16, Lillymae plans on earning her private pilot certificate for gliders and, eventually, her commercial pilot certificate.

Lillymae Gunick, with instructor Jay Darmstaedter, completed her first solo glider flight on May 6.

PHOTOGRAPHY COURTESY OF **RICHARD GUNICK**

2011 TONY BINGELIS AWARD WINNER: MICKEY WHITTENBURG

MICKEY WHITTENBURG OF KILN, MISSISSIPPI, received the 2011 EAA Tony Bingelis Award recognizing his contributions to EAA and the aviation community.

He soloed in 1947 at age 17 and has been deeply rooted in the aviation community throughout his life. Mickey is one of the first 500 EAA members—EAA Lifetime 415—and has continually encouraged builders and their projects as well as promoted aviation safety. He flew his first homebuilt design—a Whitcraft 165—to EAA AirVenture Oshkosh twice and has also built a Hummel Bird, two Challengers, and a modified Ultra Pup. Mickey also has helped other builders complete their projects, including a Pietenpol, Bearhawk, Highlander, Zenith 701, RV-12, and Sonex.

Since becoming an EAA technical counselor in 2001, Mickey has inspected many building projects along the Gulf Coast, and now he also serves as an EAA flight advisor in helping pilots prepare for their first flights.

The Tony Bingelis Award was created in 2002 to recognize a member from the aviation community who has contributed to homebuilt projects and safety promotion while maintaining EAA values. The award honors the late Tony Bingelis, who was noted as a homebuilding authority and *EAA Sport Aviation* columnist.

WELCOME, NEW CHAPTERS

EAA Chapter 1521
Albuquerque, New Mexico
Contact president for meeting time.
Double Eagle II Airport (AEG)
Frank Dempsey
505-281-9101

EAA Chapter 1522
Cynthiana, Kentucky
Meets fourth Sunday, 2 p.m.
Cynthiana-Harrison County Airport (0I8)
Bob McCulla
603-520-1114

PHOTOGRAPHY COURTESY OF **MICKEY WHITTENBURG**

A NEW ILLINOIS AVIATION HALL OF FAMER

FRANCIS "NICK" LUNG, a member of EAA chapters 22 and 23 and a volunteer at AirVenture for more than 20 years, was inducted into the Illinois Aviation Hall of Fame. Nick, EAA Lifetime 133270, started the Ogle County Pilots Association in 1975, the Ogle County Airport (C55) in 1978, and the Ogle County Sheriff's Department in 1984, acting as its primary pilot on a volunteer basis until 2005. He was one of the founders of the Rock River Flyers, the Illinois Council of Independent Airports, and the Illinois Ultralight Advisor Council.

Nick's ratings include CFII, CFII multiengine, commercial glider, seaplane, ASEL, AMEL, British private pilot, and flight engineer (reciprocating and jet). He is type-rated in the DC-3, DC-6, DC-7, DC-10, and Boeing 727, and he retired from United Airlines with more than 26,000 hours of flight time.

EAGLE SCOUTS CONNECT WITH EAA

MANY CHAPTERS AND MEMBERS have long been associated with the Boy Scouts by teaching the Aviation Merit Badge or working with Aviation Explorer Posts to educate and inspire the next generation of aviators. Two chapters recently saw the roles reversed; they were the beneficiaries of Eagle Scout projects. To earn the rank of Eagle, a scout has to design and lead a community service project.

Josh Wreyford, 18, EAA 632063, became an EAA member when he was 8 years old. As a member of Chapter 889 in Kingsland, Texas, he noticed the chapter building at Shirley Williams Airfield (44TE) needed better facilities—namely an outdoor pavilion to provide shelter and a place to cook, eat, and sit outside. For his Eagle Scout project he designed and managed the construction of a concrete patio with a covered roof. The chapter has already noticed an increase in members "hangar flying" at the pavilion, and it plans to use the space for classes and meetings in the future.

Jack Foersterling, 16, EAA 1044906, took his first Young Eagles flight in 2005 when he was 11 years old. As part of International Learn to Fly Day on May 21, he hosted 14 kids from local Boys and Girls Clubs at Galt Airport (10C) in Greenwood, Illinois. They had the opportunity to experience aviation, many for the first time, and receive Young Eagles flights. They also got some stick time in the chapter's recently completed flight simulator—a restored experimental biplane that has its flight controls linked to a computer running Flight Simulator X.

"Seeing the kids' reactions of being able to be at the airport taking their first flight in a plane, just seeing the look on their faces when it took off and then when they came back out of the plane, that was really life-changing for me," Jack said.

WELCOME, NEW LIFETIME MEMBERS

Carol Andrews (EAA 544173), Penn Valley, California
Stephen Bohlig (EAA 231959), Minnetonka, Minnesota
Donald Green (EAA 230897), Stoddard, New Hampshire
Patrick Hoyt (EAA 373507), Eagan, Minnesota
Jacob Kelley (EAA 1033237), Jacksonville, Florida
Michael Kent (EAA 585163), San Antonio, Texas
Georges Lebeau (EAA 1026769), Marsanne, France
James Moran (EAA 1007599), Burlington, Wisconsin
Naison Nyamatutu (EAA 602823), Racine, Wisconsin
Mary Pennington-Hoyt (EAA 1057675), Eagan, Minnesota
John Peters (EAA 1059305), Monticello, Indiana
Brian Reitz (EAA 865157), Auburn, Alabama
James Shelby (EAA 1010942), Mitchell, Indiana
Mark Shepard (EAA 853813), New Albany, Indiana
Donald Smith (EAA 782989), Rockford, Michigan
Anthony Trettin (EAA 332615), Mason City, Iowa
Chris Van Gaalen (EAA 1058468), Lethbridge, Alberta, Canada
David Van Gaalen (EAA 542077), Lethbridge, Alberta, Canada
Marilyn Van Gaalen (EAA 857357), Lethbridge, Alberta, Canada

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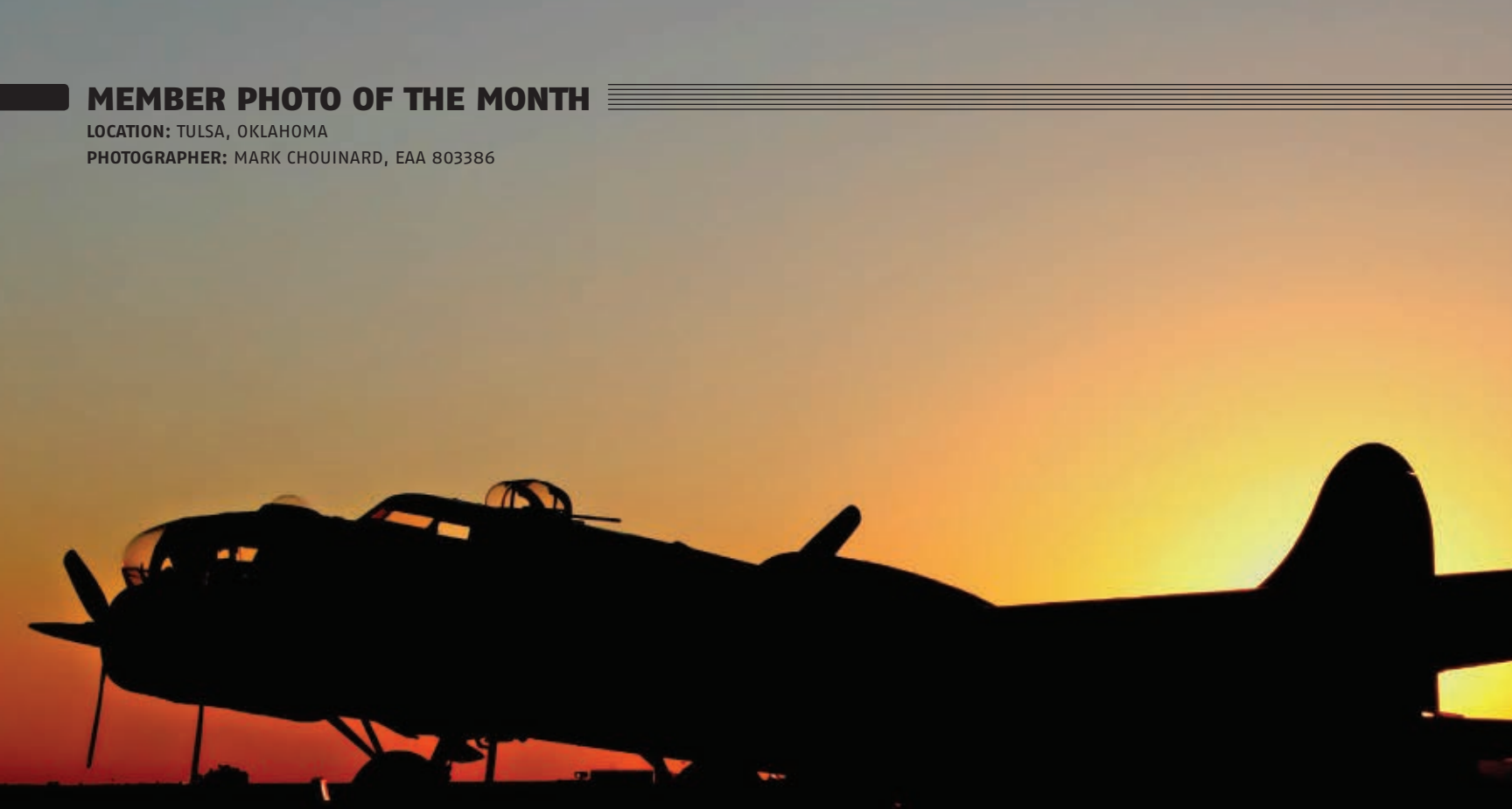
MEMBER PHOTO OF THE MONTH

LOCATION: TULSA, OKLAHOMA
PHOTOGRAPHER: MARK CHOUINARD, EAA 803386



LIBERTY BELLE

Fond memories of a fallen Fortress

MARK CHOUINARD TOOK THIS pre-dawn photo of the B-17 *Liberty Belle* in October 2010 with a Canon EOS 40D. After a tour stop at Jones Riverside Airport in Tulsa, Oklahoma, the warbird stayed at the Tulsa International Airport, just across the street from the company at which Mark works. A change from the usual commercial and corporate traffic, the Flying Fortress stirred up much discussion among Mark and his coworkers and drew a steady stream of onlookers, as it always did everywhere it stopped.

EAA is saddened by the loss of Liberty Belle*, which was destroyed by fire after an emergency landing in an Illinois cornfield on June 13, 2011.*

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