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Vol.3 No.7 / July 2014

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Champion for a Day

A tornado-damaged Acey Deucy is reborn

Kids and the WOW Factor

Fostering youth participation in aviation starts with an attention-grabber

BY JACK J. PELTON

OUR MISSION IS TO preserve and promote all forms of personal and private aviation. It's a big job. And the most fundamental task in preserving private aviation for the future is to attract the next generation to flying.

EAA's Young Eagles program leads all of aviation in introducing youngsters to the joy of flight. Soon we will have given 2 million young people an airplane ride. But the Young Eagles program is actually the second step in attracting kids. The first job is to get their attention.

With social media, television, and movies all competing for young peoples' often short attention spans we need something that really stands out. Something that delivers the WOW factor to grab a kid's attention. And that's a primary reason we devote so much effort to the air show at our annual fly-in and convention at Oshkosh.

Pilots of every experience level can enjoy an air show and be impressed by the flying skill of the performers. But to grab kids' attention we need a show that is loud, fast, and thrilling to watch. We've put on those shows for decades here at Oshkosh, but this year for the first time the Air Force Thunderbirds will perform in our show Friday, Saturday, and Sunday.

When it comes to WOW, nothing beats the Thunderbirds or the Navy's Blue Angels. Flying in close formation in frontline jet fighters just can't be beat for high-speed action and thrills. It's been that way since the early 1950s when the jet teams were formed.

None of this is news to the Air Force and Navy. They created and support the teams primarily as a recruiting tool. They know an air show by the teams is one of the best ways to get young people's attention and interest in joining the service. We want to attract the same group to all types of flying.

The reason the Thunderbirds or Blue Angels haven't flown at Oshkosh before is because our air show aerobatic "box" hasn't been large enough. Because the jets fly faster than propeller airplanes more airspace, and space on the ground, needs to be protected. Businesses and residences to the east of Runway 18/36 at Oshkosh are located in the larger aerobatic box needed for the jet show. I'm happy to say that the nearby businesses and homeowners have been pleased to cooperate so the Thunderbirds can fly.

The jets also require more of a safety buffer on the show side, the west side of Runway 18/36. The required safety zone from the runway centerline to the closest spectators is typically called the "burn line," and all of us will need to move back to the west several feet on the days when the Thunderbirds fly. We won't need to move airplanes that are tied down near the runway, but people won't be able to be in the first couple rows of parked airplanes during the show.

It has been a big project for the EAA staff and volunteers to work out the details to bring the Thunderbirds to Oshkosh, and we very much appreciate the cooperation of our neighbors who live and work close to the airport. I think the effort is absolutely vital.

If we don't succeed in enticing the next generation to join us in our love of flying and personal aviation, all will be lost. The average age of people who fly and participate in private aviation goes up each year. The Thunderbirds can't solve this problem by themselves, but they will add new excitement to our air show, and EAA supports all air shows across the country where attendance remains strong. Nothing grabs the attention of young people faster than an exciting air show, and this year Oshkosh promises to bring the most WOW ever. EAA

On the cover: Ed Marreno flies his Acey Deucy following it's rebuild. (Photography by Jim Koepnick)

Photography by Jason Toney

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Departments

Columns

EAA homebuilding volunteers at Oshkosh 2013 gathered in front of Homebuilders Headquarters. Charlie is at the far right in a bright blue EAA staff shirt.

Oshkosh 2014

I hope to see you here!

BY CHARLIE BECKER

THE BEST WEEK OF THE YEAR is almost here—*Oshkosh!* This will be my 21st convention in a row that I've attended, and as long as I breathe air and take nourishment, I won't miss it. If you have never made it to your annual membership convention, there is still time to make some plans, and I guarantee you'll love it. The campground always has room for one more, and private housing is a good alternative if you feel you must have a roof over your head. It may sound a little odd to rent a room from a private homeowner whom you don't know, but there aren't any areas of Oshkosh I would worry about staying in. And the Oshkosh Convention and Visitors Bureau has a great listing of available homes (*www.VisitOshkosh.com/eaa-lodging*). (My advice: Forget about hotels; they charge too much.) My first visit was a somewhat spur-of-the-moment decision to fly in for a day, and it literally changed my life.

For my fellow homebuilders who are coming to Oshkosh this year, I thought I might review some of the homebuilding highlights for you to put on your list of things to do.

Homebuilders Headquarters: If you fly your aircraft in, this is where you can get your showplane mug, your "I Flew My Homebuilt" patch, and register for judging. You can also purchase your weekly (or daily) admissions pass, tiedowns, camping credentials, etc. The Homebuilders Store is located here with the latest gear, such as this year's commemorative Breezy T-shirt.

Homebuilts in Review: Twice each day, we will interview the owners of special homebuilt aircraft and have the aircraft on display in the Homebuilders Hangar. It's a great opportunity to learn from a fellow builder, get an up-close view of the aircraft, and ask the owner questions.

Perseverance Awards: If you make the pilgrimage to Oshkosh for the first time in your newly completed homebuilt, you qualify for a Perseverance Award. Receive your award at Homebuilders Headquarters.

Workshops: Every day at 8:30 a.m. and 1 p.m., we offer structured, hands-on training in the basic skills you need to get started in homebuilding. These sessions take place in the newly reconstructed Workshop hangars just south of the Forums area. Participate in a Workshop and light your homebuilding fire. One Week Wonder: EAA volunteers, with guidance from the staff of Zenith Aircraft, are building a Zenith CH 750 during the show. Want to learn what's involved in building an aircraft? You'll see the entire process unfold in seven days at the EAA Square in show center on the Plaza.

Forums: Every day we have some of the smartest people in aviation presenting on every topic in aviation. Do not overlook this opportunity to learn. You can view a complete listing of all forum presentations online.

Aircraft Judging: This competition has been a part of the convention since 1953. If you want to try to take home the coveted gold "Lindy," just let the volunteers at Homebuilders HQ know when you register your aircraft. The awards ceremony will take place on Saturday at 6 p.m. int he Homebuilders Hangar.

Donut Day: On Wednesday, July 30, at Homebuilders Headquarters, stop by 7:30 a.m. to 8:30 a.m. and enjoy some free coffee and donuts with your fellow homebuilders.

Homebuilders Corn Roast: On Wednesday, July 30, from 5 p.m. to 7 p.m., make the short walk west of the Forums area to Homebuilt Camping and enjoy some fresh cooked sweet corn. (Try the Cajun seasoning on your corn; it sounds weird, but it tastes great.)

Homebuilders Dinner: On Thursday, July 31, 6 p.m at the Nature Center, our guest speakers this year will be Chris and Sebastien Heintz. Chris is a member of the EAA Homebuilders Hall of Fame and has provided the homebuilt movement with many different aircraft designs to build over the years. Tickets must be purchased in advance at Homebuilders HQ.

Of course, we can always use a few more volunteers to make the fly-in happen. All of the activities noted above simply would not be possible without the help of our volunteers. So if you can't volunteer yourself, at least express your thanks to the many volunteers who make this wonderful event happen.

Hope to see you here! EAA

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PHP Tribute: The Heart of EAA's Welcome Center

THE EAA WELCOME CENTER features a lineup of special programming and perks for EAA members. The oasis will have member-only perks such as use of desktop computer workstations, charging stations, and a place to cool off with a drink and rest during busy days at the convention.

But the focus of the center will be a grand, weeklong tribute to EAA Founder Paul Poberezny. The Paul H. Poberezny (PHP) tribute will include a looping video on Paul's life; photo mural and time line tracing EAA's history; special display of his first aircraft, the Waco Primary Glider; his trademark "Red One" VW Bug; and a signing board where members can share personal memories.

"We're eager to welcome all to our Paul Poberezny tribute area, which will use his own words to describe his life and the growth of EAA," said Eric Cernjar, Membership marketing manager. "We've also brought together many different elements of EAA, such as Young Eagles, homebuilding, advocacy, chapters and more, into a cohesive story encompassing all of EAA."

Daily Themes Established for EAA AirVenture Oshkosh 2014

WITH THE WORLD'S Greatest Aviation Celebration opening in three weeks, EAA AirVenture Oshkosh 2014 is developing features and activities organized around daily themes. Beginning with our opening day salute to EAA Founder Paul Poberezny and ending with Family Day on Sunday, August 3, the 2014 AirVenture daily themes reflect the diversity we all enjoy in aviation.

Here are the EAA AirVenture Oshkosh 2014 theme days and related activities:

Monday, July 28: Salute to Paul Poberezny—Throughout the week, visit the EAA Welcome Center's outstanding tribute display to Paul Poberezny. The opening of the afternoon air show will feature a missing man formation flight in Paul's honor. Monday evening's Theater in the Woods program will be about memories of Paul, hosted by EAA Young Eagles Chairman Sean D. Tucker.

Tuesday, July 29: Space Day—Enjoy the Theater in the Woods evening program hosted by astronauts Joe Engle and Charlie Precourt. Also recognized will be the 10th anniversary of the successful SpaceShipOne flights for the XPrize.

Wednesday, July 30: Salute to Homebuilding—Located on EAA Square, EAA's One Week Wonder project will build a Zenith CH 750 airplane in seven days. Perseverance awards will be presented on Wednesday to recognize the work that each and every builder invests to complete a homebuilt project. Flying demonstrations of unique or historic homebuilt aircraft will precede the afternoon air show that will include flights by Breezys, a design that celebrates 50 years in 2014; the SubSonex Personal Jet; and Lieutenant Colonel Jerry Kerby's RV-8. AirVenture will also focus on a new homebuilder workshop area.

Thursday, July 31: Century of Airpower—A focus on the history of military advancements will include air show performances by the Great War Flying Museum's World War I fighters, warbirds featuring early jets, and the arrival of the U.S. Air Force Thunderbirds. Thursday's evening program at Theater in the Woods will be on the Millionaires Unit of World War I.

Friday, August 1: Salute to Veterans—Yellow Ribbon Honor Flight II will depart Oshkosh at dawn with 100 Vietnam veterans bound for Washington, D.C., returning to a hero's welcome at the close of the day's air show. The veteran's parade at midday runs from Warbird Alley to the Plaza, with programming from Warbirds of America and the Disabled American Veterans. The evening program at Theater in the Woods will feature Thunderbirds pilots past and present.

Saturday, August 2: Thunderbirds Day—Get ready for the Air Force Thunderbirds flight demonstration team's incredible performance highlighting the afternoon air show.

Sunday, August 3: Family Day—Enjoy special pricing on AirVenture's final day, which will include a full air show, including the final performance of the Thunderbirds.

Photography courtesy of EAA

Aeromedical Legislation, Rulemaking Continues

LEGISLATION TO ALTER the third-class medical certificate requirement for private pilots continues to work its way through Congress, while the aviation community awaits an announced rulemaking proposal from the FAA to reform aeromedical certification.

HR 3708, the House version of the General Aviation Pilot Protection Act filed by Rep. Todd Rokita (R-IN), has so far garnered the co-sponsorship of over a quarter of the chamber and is currently before the House Subcommittee on Aviation. The bill would allow pilots of aircraft less than 6,000 pounds gross takeoff weight, with six seats or fewer, and flying VFR under 250 knots and under 14,000 feet MSL, to fly with a valid driver's license in lieu of an FAA medical certificate. EAA, AOPA, and other associations continue to lobby vigorously for the measure on the GA community's behalf.

At the same time, the FAA has announced a "rulemaking project" to modify third-class medical requirements. The specific language of this proposed rulemaking is not yet known, but a public announcement is expected in the near future. This follows the EAA/AOPA petition for exemption to the third-class rules for many pilots, which has been under evaluation by the FAA for more than two years.

"We are eager to see what the FAA's proposed rulemaking offers the GA community," said Sean Elliott, EAA vice president of Advocacy and Safety. "That said, we are leaving open all options for bringing needed reform to aeromedical certification, and we will diligently pursue all possible avenues for change until we have an acceptable end result."

AirVenture Camping Guide Now Available

CAMPING IS ONE OF THE most popular ways to experience EAA AirVenture Oshkosh, and those who plan to do so this year—whether at Camp Scholler or under the wing of an airplane—can find a multitude of resources in the recently released *EAA AirVenture Oshkosh 2014 Camping Guide*.

The eight-page guide includes information essential for any AirVenture camper, including detailed maps, hours of operation, local weather resources, locations of on-site Wi-Fi, a phone directory, and descriptions of every available amenity the event has to offer. It also shows ATM locations, provides information on bus and shuttle schedules and routes, as well as locations of all other facilities on the EAA AirVenture camping grounds, and much more.

A three-day minimum is required to camp, and at least one person in each party must be an EAA member. Download the AirVenture Camping Guide today!

Celebrating 10 Years of Sport Pilot/ Light-Sport Aircraft at Oshkosh

A PAIR OF GROUNDBREAKING new categories of aircraft and pilot certification are celebrating 10-year anniversaries at EAA AirVenture Oshkosh this summer, as dedicated events focused on sport pilot and light-sport aircraft (LSA) will be highlighted through the week at Oshkosh.

"After a decade it is still a work in progress," said Timm Bogenhagen, EAA's ultralight and lightplane community manager, citing EAA's continuing efforts to include training in low-mass, high-drag aircraft, and opening possibilities for electric aircraft.

"This rule, however, has allowed more than 100 new ready-to-fly aircraft designs to enter the market, representing one of the greatest bursts of aircraft introductions over the past half-century," he said. "The sport pilot/LSA approach to aircraft certification is also being used as the model for FAR Part 23 reform."

More than 4,000 people have become new sport pilots, and thousands of existing pilots have chosen to fly under the sport pilot rules, which allow use of a valid driver's license for medical certification in lieu of a third-class medical certificate.

EAA is working with the Light Aircraft Manufacturers Association (LAMA) on 10th anniversary activities during AirVenture. Some of those include:

- a display of LSA that highlights the history and contributions of the sport pilot and light-sport aircraft rules
- a forum with major players in the development and growth of the LSA community on Tuesday, July 29
- recognition for Oshkosh LSA arrivals and sport pilots
- flying demonstrations from the ultralight airstrip. EAA

Photography by Craig VanderKolk

First Flight for Solar Impulse 2

SOLAR IMPULSE 2, the solar-powered electric aircraft Bertrand Piccard and André Borschberg intend to fly around the world next year, made its first successful flight on June 2 at the Payerne aerodrome in Switzerland.

"This inaugural flight is an important stage—a step closer toward the round-the-world flight," Borschberg said. Professional test pilot Markus Scherdel was at the controls for the maiden flight that lasted 2 hours and 17 minutes. Highest altitude reached was 5,500 feet AGL, and the average ground speed was 30 knots.

Several more flights will take place in the coming months to achieve aircraft certification, followed by training flights for Piccard and Borschberg later in the season. Plans are to begin the solar-powered world flight in March 2015 from the Persian Gulf area with a route including flights over the Arabian Sea, India, Myanmar, China, the Pacific Ocean, the United States, the Atlantic Ocean, and Southern Europe or North Africa before closing the loop by returning to the departure point.

GoPro Offers 'Go Fly' Scholarship for Flight Training

POPULAR HIGH-DEFINITION video camera maker GoPro has announced the "Go Fly" $7,500 flight-training scholarship that will be awarded at EAA AirVenture Oshkosh 2014.

GoPro encourages anyone 16 years of age and older to apply by submitting a video on why you want to "Go Fly." To apply, e-mail your video as an attached MOV or MP4 file to *scholarships@EAA.org* and indicate the name of the scholarship, "Go Fly," as the subject line. Include name, address, date of birth, and EAA member number (if applicable). But hurry; application deadline is July 15, 2014.

The winner will also receive a GoPro Aviators camera package and a one-year EAA membership. EAA will award the scholarships in $2,500 increments to the winner and a flight school.

Boeing Employee Glasair Project Nears Completion

WHILE YOU'RE WALKING the flightline at EAA AirVenture Oshkosh this year, be on the lookout for a unique Glasair SII kit plane built over the past three-and-a-half years by a team of Boeing engineers looking to learn about the challenges of building airplanes.

The "Opportunities for New Engineers – Build, Certify, and Fly" (ONE BCnF) project team is made up of about 30 to 40 Boeing volunteers, in conjunction with the Boeing Employees Flying Association, said Brad Walker, structural stress engineer at Boeing. Several EAA technical counselors and a previous Glasair builder who also works at Boeing provided assistance.

"We're all pretty excited to be at this point," Walker said after the plane was rolled out in late May.

If you can't locate the tail number, N110NE, in honor of Boeing's Opportunities for New Engineers organization that facilitated the project, the airplane's paint scheme should be a dead giveaway.

Rosen Sunvisor Systems Announces Van's RV 6-7-9 Multi-Axis Sliding Canopy Aircraft Sunvisor Assembly

ROSEN SUNVISOR SYSTEMS (RSS) announces availability of the ARC® Sunvisor Assembly for Van's RV 6-7-9 sliding canopy aircraft. Based on Rosen's innovative ARC sunvisor design, the sunvisor system provides Van's RV 6-7-9 aircraft owners flexible, multi-axis sun attenuation, stowage, glare reduction, and pilot comfort during standard cockpit flight operations.

The ARC sunvisor system is specifically designed to mount onto the tubular airframe of Van's RV 6-7-9 sliding canopy. A custom-designed swivel mount provides stable support, secure positioning, and multiple deployment and stowage options.

On average, installation of the visor system is under 30 minutes. The sunvisor assembly is available in black anodized finish and is interchangeable for all Van's 6, 7, and 9 sliding canopy models.

A product demonstration video of the Van's RV 6-7-9 ARC Sunvisor Assembly is available on YouTube.

The sunvisor system includes pilot/co-pilot assemblies and mounting hardware. The system is available for $440/set and can be purchased direct through Rosen Sunvisor–authorized distributors, Van's Aircraft (*www.VansAircraft.com*), and Rosen Sunvisor Systems.

Flight Testing Completed for SD-1 Minisport

SKYCRAFT'S SD–1 Minisport has completed its flight testing, meeting all the performance requirements needed for special light-sport aircraft (S-LSA) approval. The plane was found to have good longitudinal and latitudinal stability and exhibited no issues with flutter, vibration, or dangerous stall/spin tendencies. SkyCraft was able to verify the performance specifications for the SD-1 achieved by its Czech designers. Updated specifications are now available on the SD-1 Minisport page.

In addition to ensuring the aircraft's compliance with ASTM standards, SkyCraft's flight test program focused on the pilot experience of flying the SD-1 Minisport. Based on flight testing reports, SkyCraft will be updating the interior layout of the aircraft prior to delivery to customers. The most significant change will be the elimination of the MGL gauges for a more fully integrated Dynon setup to make the SD-1 more user-friendly and take advantage of more of the Dynon glass cockpit capabilities.

For more information, contact Paul Glavin, director of Marketing, by calling 801-704-7110 or 585-406-7497, or e-mail *paul@skycraftairplanes.com*.

Samson Motors Switchblade Update

SAMSON MOTORS RECENTLY finalized a new tail design and completed its "final" wind tunnel testing at the University of Washington in April. The new VT tail reportedly increased pitch stability by 14 percent. Besides being lighter, the new tail also lowered the Switchblade's overall drag by 7 percent, which should equate to less fuel consumption and better economy.

Samson also took receipt of the U.S.-made MOTUS V-4 engine chosen for the first-flight vehicle because of its horsepower-to-weight ratio and its ability to develop high torque at low rpm, two characteristics that make it ideal for the Switchblade. Crews are now in the process of preparing the engine for dynamometer testing and computer chip design. It will then be outfitted with a supercharger, A/C unit, and redundant fuel and electrical systems for safety. Simultaneously, Samson is using its ground test vehicle to test performance, handling, and roadworthiness of a new torsion-bar suspension system and other components.

For more information, visit *www.SamsonSky.com* or "like" Samson Motorworks on Facebook. EAA

Champion for a Day

A homebuilt phoenix rises from the ashes!

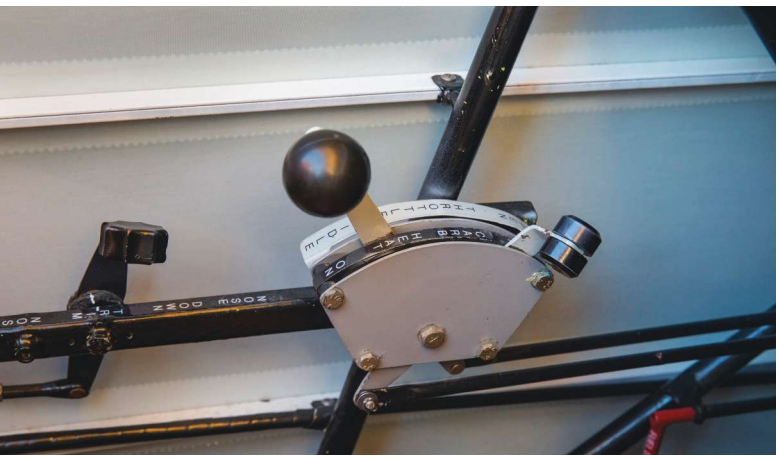
BY BUDD DAVISSON

Ed Marrero took over an Acey Deucy project from his late father with the fuselage on its gear and finished it from there. He never dreamed he'd win Plans-Built Grand Champion at the Sun 'n Fun International Expo and Fly-In...or that he'd spend the next two years rebuilding it after a tornado significantly damaged it.

Photography by Jim Koepnick

ONCE IN A WHILE, you run across a homebuilt airplane that teaches us so much about life, in so many ways, that it's hard to know where to start telling its tale. Such is the case with Edgar "Ed" Marrero and his Acey Deucy. The man, the airplane, and their history together combine to tell us all something about sport aviation and the people who populate one of the most unique communities on the planet.

Just telling Ed's life story is complicated because the only constant throughout was that it was continually changing. Born and raised in Puerto Rico, he came to the United States specifically to join the U.S. Army, where in the beginning, he spent seven years crewing M-60A1 tanks before going on to flight training. However, that's an over-simplification because it glosses over what was happening in the background: a growing fascination with airplanes that was inspired by his father.



The tornado destroyed all the stringers and the standoffs.

As Ed remembers it, "I was 10 or 11 years old when I saw a *Popular Mechanics* magazine with the headline 'Build Your Own Airplane at Your House.' My dad wanted to have an airplane, but having four sons made money tight; so all he could do was dream about it. Just about every Saturday he would take us to the airport in San Juan to 'rub airplanes.' I thought that maybe we could build an airplane because my dad was very mechanically inclined. So, I saved my daily 5 cents allowance until I could buy the magazine. When I showed him the magazine, his first comment was 'You're crazy,' but after reading the article, he said that he would give it some thought. He ordered the brochures for the Jungster I and Cavalier, both all-wood aircraft. When the brochures arrived, they gave my dad a couple of contacts for people building Jungster II airplanes in the island. These guys basically convinced him to build a Starduster Too, so he ordered the plans.

"As we started to work on the airplane, he involved everyone in the family, including my mom. He would make you feel really good when you came up with a solution to a problem as we were building. This is probably the reason why all of my brothers and me became pilots."

The instrument panel and its detail are not something normally associated with an open-cockpit parasol; that's one of many reasons the airplane has won so many awards.

Back to its former grand champion plans-built glory; it's hard to believe the airplane had been cartwheeled across six rows at Sun 'n Fun.

Money was hard to come by, and finding parts on the island was not easy. Plus the shipping and handling was killing his father, but the airplane got built piece by piece, moving slowly but steadily forward.

Ed found a way around the money; he joined the Army, and when he finished tank training, he flew home to give his dad the $2,500 signing bonus to finish the airplane. Soon thereafter, a 160-hp Starduster Too took to the air. He said, "It was a nice feeling knowing that after all the hard work, that project was done and flying. I wasn't able to fly and enjoy that airplane because I was away from home. But I knew that without a doubt it was the most beautiful airplane in the Caribbean."

While airplanes were being built at home, Ed added a dimension to his military career when he graduated from tanks to helicopters. "I flew mostly UH-1Hs and some OH-58s for 17 years in the military, retiring in 2000 after 25 years of military service," he said.

Although technically he was out of the Army, his life didn't change much, because he began a long-term period in which he cycled between the United States and Colombia, where he was flying as a certificated flight instructor on a contract instructing in UH-1H Hueys. His background in the Huey had him in constant demand, and various years found him instructing at Fort Rucker, Alabama, then in Colombia, and finally spending four years in drug interdiction flying UH-1N Twin Hueys in the jungles of Colombia.

THE POWELL P-70 ACEY DEUCY

Although the Acey Deucy is sometimes mistaken for a Bakeng Deuce, they are entirely different airplanes, although both borrow from the time-proven homebuilt parasol equation. This same recipe has given birth to enjoyable airplanes since the beginning of homebuilt time (Pietenpol, Heath, Ace series, etc.).

The Acey Deucy was the brainchild of John C. Power. He started building it in 1967, and the first model took to the air in the mid-1970s. Plans have been available for it off and on since.

The airplane was designed to use 65- to 90-hp engines, so it is much lighter than the Bakeng Deuce, with the prototype weighing in at 750 pounds versus the 1,000-plus pounds of the Bakeng design. Predictably, the Acey Deucy's performance is much lower, being aimed at the J-3 crowd, which it surpasses in performance. Better yet, if built to the plans, its gross weight of 1,275 pounds allows it to fit into the light-sport aircraft category, making it one of the few scratchbuilt, Cub-simple homebuilts that fits that niche. Plus, at $60, the plans may just be one of the best buys in the homebuilt marketplace.

Plans are still available, through the mail, from Margaret Powell or Robert Rushton at 394 Daggett Avenue, Pawtucket, RI 02861, or via e-mail through *Aceydeucy@outlook.com*. For more information, call Robert Rushton at 508-840-8725.

"I came back more times than I want to remember with bullet holes in the airframe," Ed said. "But that's another story.

"During my service in the military, my dad, with the help of my brothers, continued with sport aviation, restoring a Citabria, a Colt, and his friend's Jungster II that had

Photography by Jim Koepnick

been damaged after an engine failure. Then, tragically, one of my brothers was killed in an airplane accident, which devastated my father. He decided to sell the airplanes and stop working on them altogether. He wanted nothing to do with airplanes.

"About six years later, I came home on leave, and he showed me a brochure of an Acey Deucy. I then realized that he was planning on building one. By then he was retired and wanted to do something rather than sitting around doing nothing all day. Soon after that, he started construction on an Acey Deucy.

"He moved to Florida, next to the Winter Haven airport, and brought the project with him. Unfortunately, shortly after that, he was diagnosed with cancer. I was stationed at Fort Rucker teaching in the UH-1, so I started going home as often as I could.

"During one of those visits, dad asked me, 'What do you think is going to happen with the project after I'm gone?' I told him that he needed to be more positive about his illness, and he said, 'We have to be realistic. I'm not pulling out of this one.' I said, 'We have to finish it. No question about it.' He smiled and immediately said, 'Good! That's what I wanted to hear. It's yours. I think you're the only one that can finish it.' He passed shortly after that, and the airplane stayed in his garage for three years until 1995, when I brought the project to my home in Alabama. However, because of the Army, progress was very slow until I retired in 2000."

Even though retired from the military, Ed was still heavily involved in rotor wing training and traveling a lot. Plus he said, "When I started building the wings, it was obvious I just didn't know enough and needed help. I went to Wingnuts Inc., a local company that specialized in restoring airplanes, and talked to the owner, Mike Haynes. He said that labor alone was $48 an hour. Even though that was a lot of money, I figured that he could start working on the wings and get them to a point that I could take over.

"When I told him to go ahead and do it, he said, 'It will be about a year before I can touch them because we have too many airplanes to work on.' I replied, 'It looks as if you need help. What if I come to work for you for free just so I can learn what I need to learn?' That's exactly what I did. And it was terrific on-the-job training because I got involved in all areas of building and rebuilding on everything from a DR.1 triplane to Skybolts, J-3 Cubs, and Aeroncas. I was with them for more than two years, going over as often as I could.

"To this point, nobody in the shop had even seen my airplane. Then one Christmas, Mike asked me when I could bring the airplane over. I said, 'Right now.' He said, 'Okay, we'll go get it in the morning. No big deal.'"

But the "no big deal" became a very big deal for Ed shortly after the airframe arrived in the shop. Mike looked over at him and said, "Well, what are you waiting for? Go work on your airplane."

By this time, both the airplane and Ed were local to Fort Rucker, where he was shuttling back and forth between Alabama and Colombia on contracts. "I'd spend 21 days in Colombia and come home to spend 11 days at the airport working on the airplane," he said. "With Mike's help, I finally got the airplane flying in October of 2008."

Using a Continental C-90 for power, Ed started taking it to local fly-ins and received the Grand Champion Plans-Built at the Southeast Regional Fly-In in 2009.

"I tried to make it to Sun 'n Fun in 2010 but couldn't, so I went in 2011," Ed said. "A lot of people looked at my airplane, and I received many positive comments. Even the judges were like ants on candy looking at *Daddy's Dream*. Then the next day the tornado hit!"

The 2011 Sun 'n Fun International Fly-In & Expo became every airplane owner's worst nightmare and will long live in the memories of those who were there.

Ed said, "I was in an exhibit building when the tornado hit, and they closed the doors for protection. That was a good thing because I would have been out there on the flightline trying to save my airplane and could have been seriously hurt.

"Being locked in the buildings was almost a surreal experience. People were crying, the noise was like being under a passing freight train, and you could only imagine what was going on outside. It was frightening and frustrating in the extreme.

SPECIFICATIONS OF ED'S ACEY DEUCY

Engine: C-90-12
Hp and rpm: 90 and 2,475
Gross weight: 1,600 pounds
Empty weight: 913 pounds
Useful load: 687 pounds
Seating: Two tandem
Wingspan: 32 feet, 6 inches
Wing chord: 5 feet
Wing area: 155 square feet
Wing airfoil: 4,412
Aileron area: 9 square feet
Fuselage length: 20 feet, 9 inches
Height (three-point): 81 inches
Fin area: 5 square feet
Fin airfoil: Flat
Rudder area: 5 square feet
Stabilizer area: 13 square feet
Stabilizer airfoil: Flat
Elevator area (including tab): 10 square feet
Trim tab type: Variable
Propeller diameter: 71 inches
Power loading (one passenger): 15.5 pounds
Power loading (gross weight): 19.5 pounds
Wing loading (one passenger): 6.3 pounds
Wing loading (gross weight): 7.9 pounds
Baggage capacity: 50 pounds
Fuel capacity: 14 gallons
Fuel grade: 100 LL
Tire pressure: 20 pounds per square inch

The Continental C-90 engine helps the airplane perform nicely, even with two people on board.

At one point, someone peeked through a crack in the door and said something about a yellow airplane being slammed around. Even though my airplane was yellow, I knew it couldn't be mine because my airplane was in Row 16 and he was looking far to the right. When the tornado passed and they finally opened the doors, even though it was still raining hard, I bolted out of the building. I couldn't believe it when I found my airplane six rows from where I had tied it down. It was lying on its belly, the right wing on the ground and the left pointing to the sky. For the first time in my entire life, I didn't have the slightest idea what to do. Everyone was walking around like zombies, me among them. The shock was overwhelming."

The airplane had been picked up and cartwheeled across the ground, pretty much destroying the outer six feet of both wings and turning the struts into spaghetti. The right landing gear was collapsed, and it had hit the ground so hard that the tail wheel spring was snapped in half. The next day, the insurance company immediately totaled the airplane, but Ed bought it back for $2,500. He just couldn't let it go like that.

"I called a friend in Alabama, and he came down with a trailer to help disassemble it," Ed said. "As we were loading the wreckage in the trailer, I couldn't help but think about all the blood, sweat, and tears that had gone into it. I was past being depressed. It was a long ride home, and every mile I kept thinking that I couldn't let my dad down and I needed to fix it. But it was like starting all over again, and at that moment, I didn't have the strength.

While Ed doesn't plan to fly the airplane at night, he's prepared if the situation arises.

"We piled all the junk up in the hangar. I closed the door and walked away with my brain whirling. I just didn't want to look at it again; I needed a break from airplanes. Then about three weeks later, I received a plaque in the mail from Sun 'n Fun—I almost couldn't believe it. I had been awarded the Grand Champion Plans-Built. Funny how things happen. I was grand champion for one day. Seeing that award gave me the strength to go back to the hangar, assess the damage, and see what could be salvaged.

Photography by Jim Koepnick

It was two years from when the tornado damaged the Acey Deucy to Sun 'n Fun 2013 where Ed's airplane was awarded its second trophy—the Outstanding Homebuilt award. He thanks his friends for helping him gain the motivation to rebuild his father's dream.

"When I opened the hangar door, you could have knocked me over with a feather. Mike Haynes had already been there. He had straightened out the right gear leg that was totally trashed, so the fuselage was standing on its gear and looked like an airplane, not a pile of junk. The airplane was showing signs of life. That sight surprised me so much that it literally gave me the strength to go on with the rebuild. I can't begin to thank Mike enough for that. He'll never know how much that meant then and what it means to me now. He's what sport aviation is all about!"

STARTING THE REBUILD

The first move was to strip all the fabric off and spread the parts out to figure out what had to be done. It wasn't as bad as Ed had feared, but it was still going to be a complete rebuild. "I started with the fuselage, which hadn't been badly bent except where the step had been attached," he said. "The longeron in that area needed to be replaced. However, all of the stringers were destroyed and their standoffs were bent and twisted. Almost all of those had to be rewelded.

"The sheet metal, with the exception of the cockpit combing, was pretty beat up. I replaced much of it, but the bottom cowling only needed a strip of metal removed and replaced."

The wings took a real beating during the cartwheeling and required considerably more TLC. "The tips were totaled six ribs in, so they had to be reconstructed," Ed said. "The ailerons had to be rebuilt as well, and one of the rear spars was badly cracked. None of this was too bad. The nice thing about a homebuilt airplane is that if you can build it once, you can build it twice."

After going through every square inch of the airframe with a fine-tooth comb, repairing as he went, it was time to put new clothes on the little airplane. Ed chose Ceconite with butyrate and Randolph enamel. And like the first time around, the colors used were Insignia White and Lemon Yellow.

The entire rebuilding process took 14 months, the shortness of which was undoubtedly due to Ed's newly retired status, although he still flies for the Army as a contract CFI.

Ed is quick to add, "I couldn't have done it without my wife of 38 years, Arlene. Although she has never been crazy about airplanes, her attitude is 'If you're in the hangar, you're not out getting in trouble.'"

Now that Ed's Acey Deucy is back in the air, it's once again in the winner's circle. Although he'd rather not repeat what he had to go through to qualify for the two Sun 'n Fun 2013 awards, he's grateful for them, anyway. He was awarded Outstanding Homebuilt Tornado Restoration and a 2013 Perseverance Award.

Somehow, we're certain his dad would approve. EAA

Budd Davisson is an aeronautical engineer, has flown more than 300 different aircraft types, and published four books and more than 4,000 articles. He is editor-in-chief of *Flight Journal* magazine and a flight instructor primarily in Pitts/tailwheel aircraft. Visit him at *www.Airbum.com*.

Photography by Jim Koepnick

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Flying an e-Gull

And building an electric motor, too

BY LYNNE WAINFAN, EAA LIFETIME 504081

Photography courtesy of Earthstar Aircraft

Earthstar Aircraft owner and designer Mark Beierle has criss-crossed the country for years flying his aircraft from California to Florida, Washington, and Wisconsin...and he flies every time. No trailering for these flying machines…though he did trailer the e-Gull to AirVenture 2013.

Mark flies the e-Gull at EAA AirVenture Oshkosh 2013 powered by a Zero Motorcycles electric motor with a Rotax re-drive system. Its quietness and rate of climb impressed onlookers.

This is the electric motor on Mark's 2013 machine; while it flew acceptably well, Mark wanted more performance for the aircraft so began designing a second motor...and that's when serendipity entered the process.

While not a thing of beauty, the instrument panel for Mark's e-Gull provides all the information he needs...including information in the upper right gauge on the electric motor's performance and the state of its batteries.

LIKE MANY OF US, Mark Beierle had "the dream" when he was five years old. He flew with absolute control, reliable power, and unlimited visibility. He was soaring quietly and smoothly and free as a bird.

Unlike most of us, Mark took the old saying "follow your dream" literally. He committed himself to re-creating the flying experience of his fantasy. "It has been very difficult to achieve," he said, "but the process has been educational." A self-taught engineer, Mark's first aircraft was a twin-engine hang glider. The powerplant, however, was not nearly as reliable as the one in his dream had been.

Mark continued to think about airplane design, realizing that the number one design principle is safety. "If you don't feel safe, then you're not going to want to go do it," he observed. "Having a plane that has the ability to land in small spaces in case you need to certainly gives a lot more pleasure to the experience, because you won't say, 'I'm not going to go flying today because I might have some problem, and I don't know how to deal with it.'"

One of Mark's important design features for safety is big windows, "because if you do have any problems with your power system, you can pick out good places to land..." Other safety features of Mark's airplane designs include the ability to land in tight spaces, steel-tube construction "to help me mitigate the problems caused by my mistakes," and provisions for a ballistic recovery system.

In the early 1980s, Mark designed and engineered his Laughing Gull ultralight. It improved on the hang glider's safety record and was the second Mark would build. The Laughing Gull was a tricycle-gear, high-wing airplane in the pusher configuration. The Laughing Gull was later renamed the Thunder Gull, and Mark started Earthstar Aircraft. He was in the airplane business.

Earthstar Aircraft's Gull series then grew into several ultralight machines, including the single-seat, 17.6-foot wingspan Thunder Gull; the 20-foot wingspan Thunder Gull-J; the staggered, two-seat, 24-foot wingspan Thunder Gull-JT2; the two-seat, 26-foot wingspan Thunder Gull Odyssey; the single-seat Soaring Gull with a 28-foot wingspan and powered by a Hirth F33 engine; and the Gull 2000. Although the product line was successful, the airplanes didn't quite capture the flying experience of Mark's dream. For one thing, the engines weren't exactly quiet.

So it shouldn't be surprising that when electric motors became mature enough for aviation purposes, Mark became very interested. He bought different motors so he could study them and evaluate their performance. Mark realized that existing motors didn't meet his requirements, much less the aviation community's wildly varying needs for horsepower or physical size. "They would fly," he explained, "but they weren't ready for prime time."

Most designers of electric airplanes start with an off-the-shelf motor and build or modify an existing airframe. Mark worked the other way. He started with an airplane and built his own electric motor around it.

Photography by Jim Raeder and Mary Jones

Mark wasn't completely new to the powerplant design world. A dozen years ago, he invented the Rad-Cam, a two-cycle, 65-hp gasoline rotary engine. The Rad-Cam's design was quite different; its novel cam shape held the piston at the top dead center of its stroke. The cylinder would then hold a confined, lean mixture under high pressure. Thus, the engine would produce a complete burn of the lean mixture. The engine was predicted to lower emissions, lower vibration, and increase efficiency over conventional engines. The concept demonstrated one thing that is quite striking about Mark: his obsession with efficiency. It started when he was five and he became interested in how much fuel airplanes burned. Now Mark talks about thermal efficiency, explaining that if you can feel heat coming off a machine, there is some lost energy and the machine could be made more efficient. Similarly, if you can hear a vehicle, then the sound vibrations are costing efficiency. Perhaps that is why Mark is so soft spoken.

Mark's approach to the Rad-Cam emphasized both technical efficiency and cost efficiency. He anticipated the engine would greatly improve ultralight performance, but it would also be attractive for other, bigger markets as well—motorcycles, personal watercraft, recreational vehicles, electric generators, and—take that, Rotax—snowmobiles. With this approach, a third party would manufacture the Rad-Cam engine in large volumes, making the engine affordable for all.

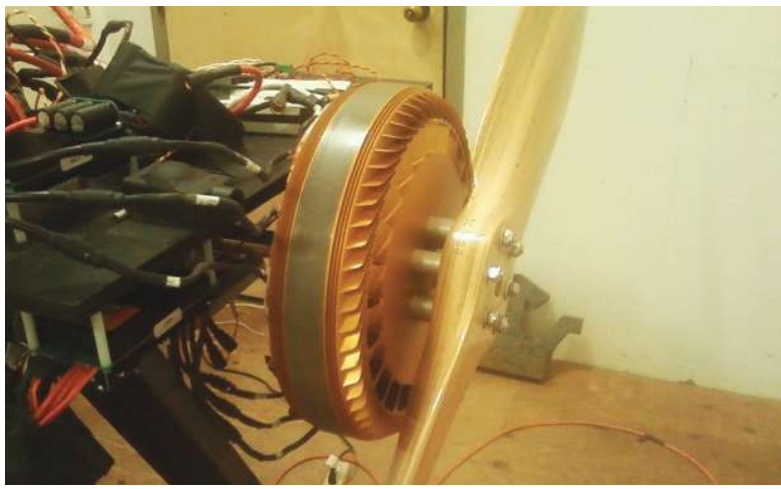
Ultimately, the Rad-Cam was a victim of the recession. Although the engine had flown, Mark no longer had the money to develop the concept further. He switched his focus to electric flight.

The airplane he would "electrify" was the company prototype Gull 2000 ultralight. It had an empty weight of 248 pounds and a 20-foot wingspan, and it flew with a 28-hp Hirth F33 engine. Mark used off-the-shelf motor system components for the early flights. The motor was a PMG 132 model weighing 25 pounds. The controller was a 72-volt Kelly 72401, and the batteries were Rhino model airplane packs weighing about 25 pounds.

The only modifications made to the Gull 2000 airplane were the mounts for the batteries, controller, and motor. The electric ultralight's public debut was at the 2009 Arlington (Washington) Fly-In. Mark flew several demonstration flights at the fly-in, and then he had to replace a high-amperage connector that was causing a heating problem.

The Gull 2000 had served its purpose as a test bed, but its endurance was less than hoped for. Mark decided to switch Gulls in midstream. The obvious candidate for an airframe more suited to electric flight was his single-seat Soaring Gull. Its longer wings (28 feet versus 20 feet on the Gull 2000), similar empty weight, and stall speed meant the Soaring Gull would offer better overall efficiency than the Gull 2000 with the electric motor. Mark made the change and renamed it as the e-Gull and also experimented with different motors. The brush-type

Mark plugs the motor in to charge during AirVenture 2013.



This is the Joby motor that resulted from Mark's collaborations with Thomas Sankel of Germany that's now produced by Joby Motors. It weighs 26 pounds, has a 20-kilowatt output and produces 27 hp. He will likely fly this motor at AirVenture 2014.

motor he flew at Oshkosh in 2013 didn't generate enough power for his needs.

Mark sat down and laid out the motor he would want. It would be around 10 inches in diameter to fit into a variety of cowlings, turn low enough to not need a gear box, have about 20-kilowatt output, and be driven by at least 100 volts. Like many other aircraft electric motors, Mark's would be a brushless outrunner configuration, where the 36 inner coils remain stationary while the casing rotates. This design cools well and provides an easy mount for the ground-adjustable propeller. He searched for a motor like the one he envisioned and found none.

Mark describes the coincidence that happened next. "About a week later, I got an e-mail from Thomas Sankel, who is a German physicist and a freelance motor designer," he said. Sankel sent Mark a 3-D model of the motor he had been designing for aviation use. It was very similar to Mark's concept: a brushless outrunner and 15-kilowatt output. (Mark had wanted 20.) Mark replied to the e-mail and told Sankel exactly what he had in mind. Sankel had access to MotorSolve, a program for detailed motor design. MotorSolve models and analyzes several configuration variables, including the key one: the design of the windings. There are many choices in the winding specification: fill factor, convective area, winding area, angular spread, winding factor, and gauge parameters. The program computes motor torque, efficiency, and loss.

Using this MotorSolve program, Sankel worked until he honed in on the desired performance. He e-mailed Mark an updated 3-D model of the motor. Sankel's price for doing the detailed design on Mark's concept was attractive—flight lessons. In addition, Sankel required that he himself wind the coils. Sankel came to northern California for three months to help with the motor; Mark produced the motor, hiring out some of the components. The motor worked well on the bench. Sankel stayed on in northern California to evaluate the motor's flight characteristics and make some modifications. Mark flew the airplane again to the Arlington Fly-In.

This electric airplane had performance similar to the Hirth-powered Soaring Gull: 65 mph versus 63 mph top speed; 22 mph versus 25 mph stall speed; 115-foot takeoff distance; 70-foot landing distance; and 245- versus 254-pound empty weight.

In the past few years, Mark has experimented with 10 electric motors and modifications. Since he had achieved acceptable performance, he turned his attention to affordability.

Mark had imagined that a diverse market for his Rad-Cam engine would keep the cost down. This time he approached JoeBen Bevirt. Founder of Joby Energy Inc., Bevirt has a passion for renewable energy. Five years ago, Bevirt started developing airborne wind turbines that required a new type of motor and controller for airborne applications. Mark recognized an opportunity to collaborate. He wanted inexpensive motors, controllers, and batteries; Bevirt wanted to get into electric airplane propulsion.

Mark made Bevirt an offer he couldn't refuse: He would give Joby the design for the motor. Joby could sell the motors to anyone as long as Mark could buy them also. Bevirt agreed. Joby Energy Inc. tested the motor and refined it. It weighs 26 pounds and has a 20-kilowatt output, producing around 27 hp. Mark flew the plane full throttle to 9,000 feet without any cooling problems.

In June 2013, Zero Motorcycles approached Mark. Zero produces electric motorcycles, with their own 16-pound motor, 170-pound battery, and Sevcon controller. The system was reliable, integrated, and rugged. The only non-Zero component was a 2.58-to-1 Rotax gearbox. It was this configuration that Mark chose to fly to EAA AirVenture Oshkosh 2013, although he intends to fly the Joby this year and offer both motors for sale.

At AirVenture 2013, Mark flew often in the "beehive"—the morning and evening parade of airplanes in the Ultralight area. The crowd was mightily impressed with how quiet the airplane was and also with the e-Gull's rate of climb, which was most certainly above the 500-fpm performance in the company literature.

Two questions are commonplace for those who bring electric airplanes to AirVenture. The first is the flight duration. The e-Gull can fly an hour with a 10-minute reserve. Squeezing out more reserve time could be difficult; the batteries are heavy and expensive.

Which leads us to the other common electric propulsion question: How much does it cost to fly electric? Recharging the batteries costs $1. Mark says the batteries will cost $10,000 to replace. Since batteries are good for 3,000 hours, the battery replacement cost is a little more than $3 per hour. But Mark points out that the used batteries can be repurposed for golf carts or as solar-panel backup batteries.

What is the future for Earthstar Aircraft? Mark currently sells five types of ultralights as kits or ready-to-fly aircraft. But his interest is clearly in advancing the electric e-Gull. Just as he envisioned the Rad-Cam engine to have applications in motorcycles, personal watercraft, RVs, electric generators, and snowmobiles, he knows that adapting a mass-market motor will make electric flight more affordable. He is forging a path to low-cost electric airplanes. He envisions solar panels on hangars to further reduce the cost and increase a flier's freedom.

We may not be as free as Mark was in his childhood dream, but he's helping more of us get into the air.

For more information about Mark's projects, visit www.ThunderGull.com. EAA

Lynne Wainfan is a private pilot. An aerospace engineer and former manager at Boeing Space, she now teaches at California State University, Long Beach.

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Ultralight Fun

Exploring the options available

BY DAN GRUNLOH

Editor's Note: This month we're kicking off our expanded coverage of ultralight activities with this photo essay highlighting some of the fun options that ultralighting offers aviation enthusiasts. Thanks to Dan Grunloh, James Lawrence and Jim Raeder for capturing these images.

This Mosquito helicopter offers a rotorcraft option for ultralight and homebuilt enthusiasts. The Mosquito is produced by Mosquito Aviation, www.innovatortech.ca.

The e-Spyder is one of several electric-powered ultralights in development at this time. The e-Spyder is based on the original Flightstar ultralight design. www.greenwing.aero

The Legal Eagle ultralight offers a build-your-own option, with plans and some parts available for builders. www.betterhalfvw.com

This VJ-24W SunFun is now an antique ultralight, having been designed by Volmer Jensen in the late 1970s.

Single-seat powered parachutes are great for fun flying early in the morning and later in the evening when winds are less of a problem.

The Aerolite 103 is an example of a tube-and-fabric ultralight that's offered as a ready-to-fly machine. A variety of engine options are available. www.uflyit.com/aerolite103main.htm

An aerial view of Paradise City, the place for ultralight and light-sport aircraft enthusiasts to gather at the Sun 'n Fun International Fly-In and Expo each spring.

The new Belite ProCub, flown by designer James Wiebe, features extensive use of carbon fiber and foam construction to stay under the ultralight weight limit of 254 pounds. www.beliteaircraft.com

The last step of a powered paraglider takeoff run as a childhood dream comes true. Learn more about paragliding, or paramotoring as some call it, in this month's "Ultralight World" column on page 32 of this issue.

Jonathan Amundsen of Winter Haven, Florida, is flying this SNS-8 Hiperlight, a negative-stagger biplane ultralight design introduced by the Sorrell brothers of Washington state. EAA Founder Paul Poberezny also built and flew a Hiperlight. www.hiperlightaircraft.com

A Kolb Aircraft FireStar flying at Sun 'n Fun 2014. Homer Kolb first designed the Kolb Flyer in the early 1970s and put it into production in the early 1980s. Kolb went on to design a number of ultralight-like designs. www.kolbaircraft.com

John Moody, first to fly an Easy Riser ultralight in 1975, is seen here in 2014 doing a pre-takeoff static engine check with a mouth-controlled kill switch, a carryover from the early days of foot-launched ultralights.

Paul Mather's 2008 M-Squared Breese has logged 900 hours of flight and given more than 1,000 introductory rides. It's seen here awaiting a soggy sunrise at the 2014 Sun 'n Fun Fly-In. www.msquaredaircraft.com

The 244-cc Polini Thor single-cylinder, liquid-cooled, two-stroke engine comes from the powered paraglider field, but at 37 hp it also powers ultralights such as the Belite ProCub. www.polini.com

Roy T. "Gypsy Pilot" Hanon just seconds before landing his Powrachute Airwolf powered parachute (PPC) with a passenger in the rear seat. Two-seat ppcs are not ultralights, but rather operate in the light-sport aircraft category.

A tandem, foot-launched powered paraglider; a single-place, foot-launched powered paraglider; and a single-place powered paraglider on a tricycle cart represent the three forms available for this type of flying while sharing some premium air time.

United Kingdom–built Quik trikes are now available in the United States with a sparkling metal-flake finish. The British are very serious about competition and speed, and their trikes are built for it. www.pmaviationusa.com

This Maverick powered parachute sports a "My car is an airplane" slogan exemplifying the design concept behind the Maverick light-sport aircraft, which is a very capable and sporty ground vehicle that also functions as a powered parachute. www.mavericklsa.com

This Rivals trike is a more advanced handling trike offered by Evolution Aircraft. Because it's a two-place design, it operates in the light-sport aircraft category. www.evolutiontrikes.com

The Sky Cycle trike is billed as the "the perfect soaring trike." Weight-shift trikes round out the variety of machines available as ultralights in the United States. The Sky Cycle is produced by Fly Hard Trikes. www.flyhardtrikes.com

While the CGS Hawk is no longer offered as an ultralight, it was another of the very early ultralights. Designed by Chuck Slusarczyk, the Hawk was introduced in 1982 as the first fully enclosed ultralight. www.cgsaviation.com

ABOUT ULTRALIGHTS

What determines whether a machine qualifies as an ultralight? Here's a quick a look at the parameters outlined in FAR Part 103, the regulation that governs ultralight activity:

Seats	1
Max. empty weight (powered aircraft)	254 pounds
Max. empty weight (unpowered aircraft)	155 pounds
Max. fuel capacity	5 Gallons
Max. speed @ full power	55 knots (63 mph)
Max. stall speed (power off)	24 knots (26 mph)

No pilot certificate is required to fly an ultralight and the machine is not required to meet any particular aircraft design standard.

A computerized sketch of the production EMG Glider. For updates on the project's progress, visit the electric motorglider progress site: http://www.electricmotorglider.com/Progress/Current_progress.html

Designing a Plans- or Kit-Built Electric-Powered Ultralight

Brian Carpenter decided to find a cheaper way to fly. . .electrically!

BY JAMES LAWRENCE

NATURE—AND AERODYNAMIC design—abhors a vacuum. Brian Carpenter sees a vacuum in the sport flying sector of personal aviation. He decries the current slate of too-expensive light-sport aircraft (LSA), and he's got an electrifying answer.

It's called the Quicksilver EMG-6, the acronym standing for electric motorglider. It resembles a Quicksilver ultralight, not by accident. Carpenter and his team are working closely with the venerable, rejuvenated ultralight company's new owners to develop a kit and ready-to-fly electric ultralight for the masses who want to fly but can't afford the current high tariff.

Brian has no trouble laying out his vision. During our chat a few weeks back, I asked Brian how the project was going. He started talking, I started typing, and below is the distillation.

Background: Brian's company, Rainbow Aviation (*www.RainbowAviation.com*), is where a lot of LSA folks go to get trained for their LSA maintenance and repairman certificates.

Brian Carpenter (BC): We realized the $150,000 entry price for LSA is not realistic for far too many pilots; it's just not working. We've spent our whole lives invested in aviation. I've personally built 43 airplanes—Lancairs, GlaStars, and metal airplanes. It's all fun, interesting, exciting, difficult, and enjoyable. Meanwhile, we're losing pilots at an enormous rate. The interest in general aviation is diminishing.

We need to revitalize flying. LSA was built on the back of the ultralight movement. It made flying a less massive undertaking than going for a private pilot certificate. What can you do with a private pilot certificate these days? Buy a $400 hamburger! I believe most nonpilots would love to go flying, but it's too costly for them.

We see no reason why we can't have resurgence like in the heyday of ultralights in the 1970s and '80s, which was the most wonderful thing in the world for so many people who wanted to fly.

James Lawrence (JL): Why an electric, though? Especially given the weight limitation of Part 103 ultralights?

BC: We think an electric ultralight-type aircraft, whether experimental amateur-built (E-AB) or Part 103, is really the answer. Electric power has so many benefits over gas for this type of aircraft. There are problems with the small two-stroke engine. They're unreliable, have objectionable noise levels, are difficult to maintain, and have fairly high fuel consumption. They helped give ultralights a bad reputation.

All those disadvantages disappear with a reliable, clean-energy powerplant. We should be able to push a lever forward and go flying into the sunset, powered with the same reliability of a fan on the ceiling in your living room.

It's a long road ahead. With all technology, there's a steep learning curve. There will be failures, motors blowing up, etc. It's part of what comes with any new technology.

I consider this new electric-power industry inevitable; electric motors are around 90-percent efficient whereas gas engines are about 30-percent efficient. In the model airplane industry, the *anomaly* now is the gas engine. Just about everything is electric powered.

The other key attraction is that many of us don't want or need to make 4-hour trips but rather just short-duration flights. That's so much more efficient to do with electric power. The concept of a four-place, all-electric airplane is a ways down the road. Maybe that will be the next boom for general aviation (GA). But for personal, affordable flight, it can happen right now with affordable, single- and two-place ultralight-type aircraft like the EMG-6.

JL: What about the weight challenge of batteries?

BC: First, we have to look at the weight *advantage* of electric motors. We're working with several, but let's consider the Plettenberg 40-hp Nova 30, for example. This motor has 20 percent *more* torque than a Rotax 447 standard. The 447 weighs 93 pounds. The Nova 30, including the speed controller, weighs 20 pounds. (The motor itself only weighs 11 pounds!)

That leaves a differential of 73 pounds for batteries before we're equivalent to the zero-fuel weight of the 447. Given the current state of battery technology, that's about 20 minutes of running time. So anything that flies less than 20 minutes favors electric power. Anything longer still favors gas. That's where we are today.

So here's our premise: We're building a glider with 20 minutes of electric power that we can use to get up to the lift, turn off, soar as long as we are able, then still have time to return for landing, do a go-around, shoot another approach, or extend our glide for reaching the next thermal. Just adding a little power is a big boon for a glider. Otherwise a pilot has to routinely contend with big decisions on every flight.

We want a clean, simple machine with some power. We're not anticipating this will be a cross-country machine just yet: It's a *local* machine, essentially a fixed-wing hang glider, with electric power attached.

That's our immediate goal. We're concentrating on developing the *platform*. This is an exploding new technology. There will be powerplant packages that come and go. Many will be obsolete by the time they hit the market; the technology is evolving that quickly! It's like laptops; you get a new one, and there's already a better one out there. It is going to be the same with motors, controllers, and batteries.

One approach we're considering is a modular motor mount, say, three different types for three different motors. We also have worked on mounting smaller, multiple motors to distribute power throughout the airframe.

For now our focus is on a single-engine, self-launching, 40-hp-equivalent electric powerplant. That's our end goal; right now we are finalizing the airframe portion.

JL: Are you developing your own motors?

BC: No, there are lots of really smart people working feverishly on motors. We'll be the flying test bed for several power-

The aft fuselage fairing assembly installed, which incorporates the aft motor mount. The fairing attaches with one bolt and 5 screws on each side of the fairing, making it relatively simple to remove for maintenance and or inspection.

It took a considerable amount of preplanning to figure out how to extract the nose cone's female mold from the male plug. What we ended up doing is predrilling holes down through the inlet ducts and inserting air fittings on the bottom of the male mold, which allowed us to pump air pressure in between the female fiberglass mold and the male plug. In this picture, the air hoses are hooked up to the bottom of the plug forcing air in between the two components. We were able to exert force throughout the entire component and separate the two pieces.

Photography courtesy of Rainbow Aircraft

plant packages. The ones that rise to the top, we'll offer. That will allow customers to choose the one that's best for them.

JL: How is Quicksilver involved?

BC: Rainbow Aviation has been a longtime dealer for Quicksilver. They're our partners for the airframe. The new owners are very progressive about aviation. They'll do a significant part of the manufacturing of the EMG-6 as a kit, similar to what they've always produced, plus some original components like the aluminum skin, chromoly fuselage, and aluminum boom. But the rest of the frame will be good old 6061-T6 tubing.

The anticipated quick-build kit could cost $16,000 and take 90 hours. This is without the powerplant. Maybe we can get that cost down more once it's mass produced.

We'll also offer a scratchbuild option from download plans. That would be a big boon for those who want to get started right away. We're doing everything we can to offer options to keep the total cost down and still offer a high-quality, strong machine.

JL: How's the test flying gone so far? I see your videos on YouTube. (Search *www.YouTube.com* for "Adventure Aircraft.")

BC: We're in the early stages. I can't emphasize that enough. We've made 51 flights, all unpowered and towed up behind a vehicle. We've got the tow system down well with a

Brian Carpenter sees a vacuum in the sport flying sector of personal aviation. He decries the current slate of too-expensive light-sport aircraft (LSA), and he's got an electrifying answer.

1,400-foot rope. We don't live in thermal country (Corning, California, is in the northern Central Valley), but it's a great place for flight testing.

This airplane is so much fun to fly! It's a complete success. It has a totally soarable sink rate of 280 fpm. The glide ratio is not that good, about 13-to-1, same as a current middle-performance hang glider. It has 174 square feet of wing area.

As an E-AB airplane at 750 pounds gross weight and a 40-hp motor, we'd have enough battery capacity for 2 hours sustained flight. But that's $15,000 of battery cost. But that's not the primary goal for this airplane; it's not meant to be a two-place aircraft at this point.

JL: Have you got an electric motor in mind for the first powered flights?

BC: Danal Estes has his own aviation company in Texas. He's our electric consultant for this series. He just sent us a Plettenberg Predator 37 he developed for us. We haven't even run it yet. (This 20-hp, 15-kilowatt motor is a German product that weighs 5.3 pounds, including controller, prop, and carbon-fiber spinner!)

Danal is smart and passionate. He comes from the giant-scale, radio-controlled (RC) ranks. The German Plettenberg is an off-the-shelf motor. We're starting with proven, reliable technology from the RC industry.

JL: Who do you see buying this aircraft once it's available?

BC: We talked with Malcolm Jones of Wallaby Ranch at Sebring, Florida, this year. (Wallaby Ranch is a hang-gliding, tow-to-altitude mecca in central Florida.) "That's exactly what I need," he said. "I get all these old guys whose 'landing gear' doesn't work so well anymore. I'd love to help them to land with just a bit of power, then be able to taxi the airplane a bit after that."

These older boomer pilots have money but can't fly hang gliders comfortably anymore. Malcolm said even 5 minutes worth of power would be more than he needed for his customers. He saw the reality of what this is: a fixed-wing, fixed-gear hang glider–type of activity that doesn't require our legs to be the landing gear anymore." Malcolm even thinks the aircraft will still be a hit for his operation, even without a motor. He uses Dragonfly towplanes to get hang gliders up to the thermals.

Even so, the EMG-6 doesn't need much power to dramatically improve its sink rate; make it perform like a glider, even with just a *10-hp* motor. We think of this as the equivalent in price of a motorcycle or three-wheeler at around $10,000 to $20,000. At that price level, we believe thousands of people around the world will want to own it.

JL: See my hand in the air, waving!

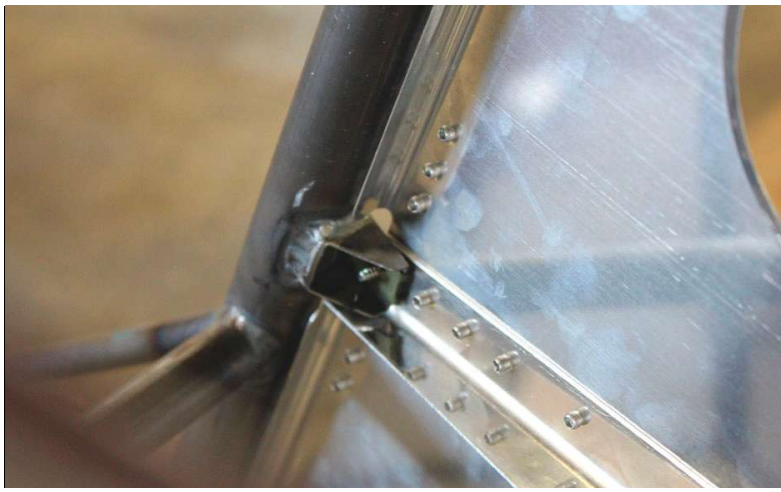
BC: We're hoping to get three done in time for (EAA) AirVenture (Oshkosh) 2014. We may fly at the show, but there are rules we have to meet first. We hope to have our first airframe-only kit for sale by January 1, 2015.

Then we have the whole FAA electric power thing to deal with because FAA doesn't think at this point they'll allow batteries as legal "fuel," though we hear that may change.

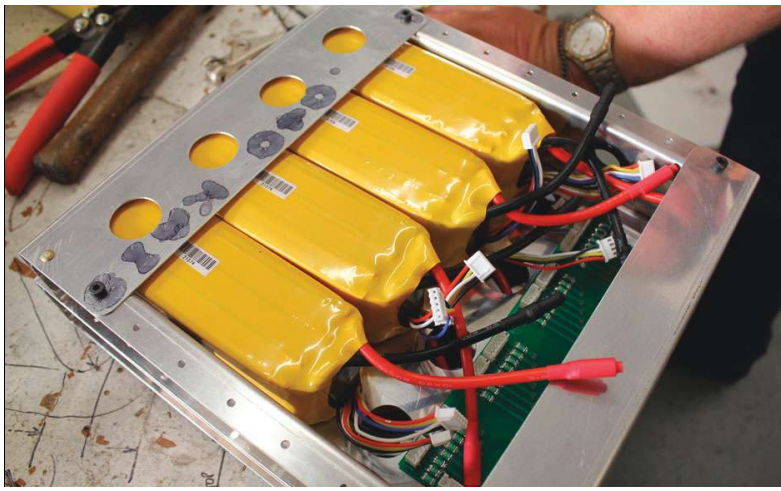
The pre-World War II German aircraft industry was built on gliders. Now they're world leaders. This low-cost flying segment of aviation is so critical to the overall aviation infrastructure. We need to start new pilots off at a basic, affordable level. Then they'll move up. History proves this is how it works.

As it stands now, at $150,000 per LSA, GA is not going to sustain itself. There were around 250 new special light-sport aircraft (S-LSA) purchased and registered in 2012. That just doesn't work. We need to get the cost of fun aviation down to save it. It's that simple. And get the regulatory environment on board so the industry can create viable low-cost aircraft.

I can't imagine politicians will sustain opposition to green technology, more reliable engines, more students, and higher safety. They need to help us, not stand in the way. EAA



An example of how the fairing is attached to the 4130-steel fuselage frame; ¾-inch square tubing is cut and profiled to make clips to which the Tinnerman nuts attach. These attachment clips were made large enough to be able to incorporate machine screw net plates or Rivnuts.



An example of one of the battery boxes that will supply energy to the motor.

The prototype EMG Motorglider on an early taxi-tow test. We used a two-place Quicksilver Sport as the tow vehicle.

Photography courtesy of Rainbow Aircraft

Discover Paragliding

More fun than you imagined!

BY DON MCNIVEN

JULY 2001

I LOVE INSTRUCTING AIR Force Reserve Officers' Training Corps (ROTC) cadets. My student, Philippe will be in Air Force Undergraduate Pilot Training in a few months flying T-37s, then T-38s and F-16s if he gets his way. I'm jealous.

We are both still college students, but chances are that in a couple of years I'll still be instructing from the right seat, putt-putting my way up the freeway at 6,500 feet from Provo to Ogden, Utah, at 120 knots while my now student is off flying fighters! Awww! I need some stick time! How am I ever going to be able to afford my own plane? The paragliders are down below me to the right on the south side of the Point of the Mountain (aka Traverse Mountain), cruising back and forth in the ridge lift. I think to myself, "Hmmm, that looks fun."

JUNE 2003

I have been learning to fly paragliders with Chris (*www.SuperFlyInc.com*), and the big day has finally arrived when I will fly a paramotor! You would think a pilot with hundreds of hours in small planes and several flights in paragliders wouldn't be so excited about soloing, but I'm stoked! We are out on a salt flat by Great Salt Lake near the old Salt Palace, a dilapidated old turn-of-the-19th-century resort shaped like the Taj Mahal.

It's late afternoon and there is a smooth, ocean-like breeze coming in off the Great Salt Lake, perfect conditions for launching a powered paraglider. Preflight check complete and off I go! Just like every other well-planned and well-instructed solo, it's so easy it's almost anticlimactic. Perfect reverse inflation, stabilize the wing overhead, turn and accelerate, keep running, and off into the air!

I follow the flight plan to the tee, and we accomplish everything very rapidly; then it's time to just enjoy the flight. Chris even hits the transmit button on his handheld radio and holds it up to the car radio so I have a few tunes to fly by. Up and down the beach I go: First high, then low and slow into the wind. It's so amazing to be sitting in a harness that allows 360 degrees of vision!

The best description I have ever been able to come up with for someone who has never been paramotoring is the Disneyland ride called "Soarin' Over California"; just imagine that instead of being taken on a ride that you decide where to fly! Yes, you can smell the fruit trees on a calm morning flight or kick your feet through the water at the end gun of a pivot irrigation sprinkler.

My memory stores that first paramotor solo in the same company as my first solo in a Cessna 150 at age 17 in windy Cody, Wyoming. It is up there with the first leg I flew as a newly

minted first officer from Chicago O'Hare to Bradley International Airport (Hartford, Connecticut) on top of the clouds on a moonlit night. It's even up there with the first flight in the RV-4 Fastback I finished building from a kit. My first paragliding solo was the beginning of my love for paramotoring, and along the way I've learned a few things that I would like to share to make your entry into this amazing sport go as smoothly as possible.

I call what you need to know to get started in paramotoring the "big three."

THE BIG THREE

There are three major challenges to successful paramotoring: training, reliability, and safety.

Training

Much of the Internet "wisdom" you read will lead you to believe that anyone can paramotor—it just takes finesse. Don't believe it. Not all landing gear (that is, legs, backs, ankles, knees, etc.) are created equal. Running around with 45 to 80 pounds on your back is just not possible for everyone. Trikes are a solution, but like most solutions, trikes come with tradeoffs. *Try out whatever you like before you buy!* Even if you only take an introductory lesson or a tandem ride, you will have a much better idea if you are physically able to participate in the sport of paragliding.

Unfortunately a big problem is that many, if not most, paramotor dealers and instructors do not provide enough training for you to become a safe and proficient paramotor pilot. When you hear the words "free training" or "three- to five-day beginner courses," realize that what you are really going to end up with is a quick introduction to paramotoring, followed by self-training—an expensive (because of broken props and gear) and dangerous combination. Before you agree to any training and gear package, make sure you know how many powered flights (Insist on 25!) your instructor is going to supervise before he sends you off on your own! R*emember, the number of days of*

One more step and they're off on a powered paraglider tandem training flight.

A trike-equipped powered paraglider...for those whose legs aren't great landing gear anymore.

Photography courtesy of Dan Grunloh

training are meaningless; experience and progress are measured by the number of logged powered flights.

Fortunately, over the last several years the number of quality and thorough paramotor instructors has gone up significantly, and training has become much more standardized, thanks to the U.S. Powered Paragliding Association (USPPA). If you don't log at least 25 powered flights under the direct supervision of your instructor and complete the USPPA PPG2 syllabus, you are setting yourself up for failure and you won't get the training you paid for and deserve.

How can you know which instructor will be the best? Assuming the instructor agrees to help you log 25 flights and follow the syllabus, *pick the USPPA instructor who is closest to you*. Don't be one of the many people who have traveled all over the country looking for a magic bullet when they could have learned right in their own backyard. When these people realize that the three- to five-day "wonder course" with "the best instructor in the country" located in some faraway place isn't going to do anything but introduce them to paramotoring, they seek out their local instructors and pilots. Unfortunately by that point, the training, travel, and gear budgets have already been spent, and new pilots are understandably very reluctant to pay more to finish up with someone else. They usually end up storing their new gear in the garage for a few years and then selling it for a huge loss.

Realistically, you will need to plan for one to two weeks of full-time training, assuming no weather delays. If you train on weekends, plan on your training taking from one to three months or longer with the various weather and scheduling delays that will inevitably pop up.

Quality paramotor instruction that includes supervision for 25 flights will cost around $1,500 if you buy gear from your instructor, or $2,500 if you learn on gear you provide. If you already have a USPPA P2 or higher paraglider pilot rating, you can expect to cut the time and cost to learn to paramotor in half.

The biggest factor that causes people to fail or give up paragliding is misinformation and unrealistic expectations about how much training costs in time, effort, and travel expenses. On the other hand, those who take the time to do it right are almost always successful.

Reliability

Paramotor engine failures are so common that I can't even remember all the times I've had an engine-out landing. The good news is that paramotor engine-outs are generally not a huge safety problem because you are landing at walking or jogging speed; but they sure are annoying!

If it wasn't for the necessity of using high power-to-weight-ratio two-stroke engines (because you carry the weight on your back), the paramotor would be the most reliable aircraft in the world. The paraglider frame is very simple and robust and repairs are rarely needed. If you do need a paraglider repair, there are lots of glider shops to sew you a new line or repair a hole in the fabric. The frame and harness of the paramotor are also very reliable. About the only time you will have a problem with them is if you fall down and bend or tear something.

The wait time for parts for your engine can be the most frustrating part of paramotoring. Paramotor engines come from Italy or some other foreign country, and typically there

is only one importer who has dealers that almost never stock parts. That means you can easily put yourself at the mercy of one guy halfway (or all the way) across the country to get parts, and he may or may not answer the phone. The best solution to the parts and support problem is to choose an engine that has several importers (not "dealers") around the country that stock parts.

I remember trying to get a part one summer; I called the only U.S. importer for the engine I had at the time and was told something to this effect: "I don't have it, and the factory takes the month of August off. Call back in September and maybe I can get you one then." Flying with an engine served by several importers will pay for itself in time saved over and over again.

Safety

The sales information you will read often tries to make paramotoring seem like the safest thing since walking the dog. That's just not true. Paramotoring has its dangers just like every other flying sport. Pilots love to argue about who has the safer flying machine, but no matter how you slice it, the potential for death or serious injury exists with every flight in any aircraft. The fact is everyone I know who's been paramotoring for any substantial amount of time has suffered some serious injury or has done

It's late afternoon and there is a smooth, ocean-like breeze coming in off the Great Salt Lake, perfect conditions for launching a powered paraglider.

something so stupid that they probably should have been hurt. Can paragliding be done safely? Of course. It's risk management just like every other aircraft. What is the best way to manage the risk? I like to use the *three P's* when managing the risk of the next flight in any aircraft.

- *Pilot:* trained, healthy, and *thinking* safety first
- *Plane:* quality aircraft in good condition; safety gear; thorough preflight and postflight inspection
- *Prognosis:* weather, regulations, other air traffic, topographic, and environmental considerations reviewed.

Bottom line: If you know what are the challenges to successful paramotoring, it's easy to minimize their impact. Minimize the negative effects of the big three and you will be on your way to a successful and rewarding paramotoring experience. And it's more fun than you even imagined! EAA

Slips

Is your airspeed indicating accurately?

BY ED KOLANO

THE FORWARD SLIP. Ah, the solution to a high start on final approach. This handy way of increasing descent rate and angle without changing airspeed is also a method of testing an airplane's lateral and directional static stability. Big "but" here—before you stomp in full pedal, you should make sure your airspeed indicator is telling you the truth in the sideslip.

The airspeed indicator determines airspeed by mechanically subtracting the static pressure, sensed through the static port, from the total pressure, sensed through the pitot tube. A change in pressure from either source will cause a change in the indicated airspeed reading.

Imagine an airplane with a single static source located on the right side of its fuselage. If that airplane is in a nose-left sideslip, the relative wind is approaching from the right. The air is no longer flowing purely past the static port, parallel to the fuselage; some of it is forced into the static port. This ram effect raises the pressure in the static system. If there's no change in total pressure sensed through the pitot tube, the erroneously high pressure in the static system results in an airspeed indication that is slower than the plane is actually flying.

The opposite effect occurs if this airplane is in a nose-right sideslip. The sensed static pressure would likely be lower, and the indicated airspeed would be erroneously fast. Return the airplane to sideslip-free flight, and the airspeed indication returns to its correct value immediately.

You don't notice the difference in airspeed when you perform a forward slip maneuver because you adjust the plane's pitch attitude to maintain the original indicated airspeed, whether it's erroneous or not.

One reason you see a static port on each side of an airplane's fuselage is to help ensure a truer static pressure in the system. Airplane designers take a lot of care locating the static ports. It's often a trial-and-error process finding that sweet spot where the air flows parallel to the port during most of the flight envelope.

The pitot system can experience similar errors. Ideally, the pitot tube would be pointed directly into the relative wind to achieve the most accurate total pressure, but this occurs at only one angle of attack. In a sideslip, the pitot tube is at an angle of attack, just from the side. The errors caused by pitot tube orientation are typically small for reasonable angles of attack and sideslip when compared with the static pressure error potential.

AND ANOTHER THING

Even if there are no pitot or static errors in the sideslip, you may notice a change in airspeed upon releasing the pro-slip flight controls. Picture an airplane with its pitot tube near the left wingtip in a nose-left sideslip. So, we have left pedal, right stick, and whatever forward or aft stick is necessary to maintain a particular airspeed. The relative wind is approaching from the right of the airplane's nose.

Re-center the flight controls, and the plane yaws nose-right toward the relative wind. During this yawing motion, the left wing momentarily moves forward faster than the rest of the airplane. The total pressure in the pitot tube is now the sum of the airplane's forward speed plus the increment of speed at the pitot tube as the left wing swings forward. Add the likely decrease in pressure sensed at the static port on the right side of the fuselage as the ram effect is removed, and you'll likely see a jump in indicated airspeed.

Perform this mental experiment from a nose-right sideslip, and you'd see the airspeed drop when the pro-slip controls were released. In this case, the total pressure in the pitot tube would be the airplane's forward speed minus the speed of the retreating (relatively speaking) pitot tube at the left wingtip.

Airspeed variances due to yaw rate most easily can be observed during slow speed flight in an airplane with a long wingspan and a pitot tube located near its wingtip. The longer wingspan means the tip travels faster through the air for a given yaw rate. The slower the airplane is flying, the greater the influence of yaw rate on airspeed indication, because it's a bigger fraction of the airplane's forward speed.

Let's get back to that "but" mentioned earlier. Determining airspeed error in a sideslip should be approached cautiously. If the error is such that the indicated airspeed reads erroneously fast during the sideslip, the plane is actually flying slower than indicated. Because we're most interested in the sideslip, or forward slip, maneuver on final approach, you're probably flying low and slow with landing gear down and flaps deflected. Now consider that flying out of balanced flight can increase stall speed. And consider that one wing is more likely to stall before the other in a sideslip. In addition, don't forget the two ingredients for a spin are a stall and a yaw rate. So be careful.

HOW TO CHECK FOR AIRSPEED ERROR

Apply a little pedal and countering opposite stick while maintaining the original indicated airspeed—just a little. Stabilize there. Then abruptly return the flight controls to their pre-slip positions while watching the airspeed indicator. You may notice the airspeed needle bounce a little due to the yaw rate, but if it quickly settles back to its pre-slip indication, there's no airspeed error.

Repeat the test with a little more pedal and stick. Continue this incremental buildup until you've checked the airspeed error for the amount of sideslip you think necessary. If you intend to use full-pedal forward slips, clear the envelope to full-pedal sideslips, if it's safe to do so. If you can achieve all the forward slip benefit you want with less than full pedal application, you can stop there, but be sure to honor that limit from then on.

If you noted an airspeed error as you performed your incremental sideslip increases, apply that error when performing your next sideslip. For example, let's say the original trim speed was 65 knots. You performed a half-pedal sideslip while maintaining that 65 knots, but when you returned to balanced flight, the airspeed indicator read 60 knots. If you performed the check correctly, you were actually flying at 60 knots in the sideslip even though the airspeed indicator read 65 knots.

Repeat the test by starting at 65 knots in balanced flight. As you increase the sideslip, adjust the plane's pitch attitude to maintain 70 knots with half pedal applied. You're really flying at 65 knots here. Note: Just because there was a 5-knot error at half pedal, that doesn't mean the error will be the same at full pedal. Continue your testing, making adjustments for the airspeed errors until you've mapped the errors for the various sideslip conditions. Ensure you apply these airspeed corrections whenever you perform forward slips.

IMPORTANT CONSIDERATIONS

There are a few more things to consider before embarking on this test procedure. First, make sure your airplane is structurally able to handle whatever sideslips you plan to evaluate. Some airplanes have powerful rudders. You don't want to damage the vertical tail. Ensure there's no prohibition against sideslips in a particular configuration. Some airplanes have limits on sideslips with the flaps beyond a certain setting. This may be for structural considerations or due to the flaps disrupting airflow over the vertical tail. If the airplane doesn't feel right as you increase the sideslip, stop and investigate why. Some rumbling, buffeting, and changes in wind noise may be normal, but they could also signal that the plane is approaching an aerodynamic cliff. You don't want to stall the vertical tail or precipitate a stall or directional departure.

Once you've cleared the sideslip envelope, you can begin exploring your airplane's lateral and directional stability characteristics.

Stay tuned. EAA

Learn, Build, and Fly...

A new plans-built emphasis at Oshkosh

BY KEVIN CONNER, EAA 700293

ELEVEN YEARS HAVE PASSED since I began building my Hatz CB-1 from plans. During this time I've never grown tired of working on my project or lost motivation. After the building process started, I began to clearly understand the passion for homebuilding that was shared by those who came together and organized the Experimental Aircraft Association (EAA).

I've always been fascinated with the simple designs and construction techniques that were used to create safe, low-cost airplanes. My interest grew more and more and I couldn't wait to start building. I am now down to final assembly on my Hatz biplane and preparing for the airworthiness inspection. I have developed so many good friendships with other builders who have given a tremendous amount of advice and support.

This is the spirit that causes EAA to thrive and grow every year. EAA has been the pathway for millions to get involved in sport aviation by either building or flying. It is paramount that we preserve the history and heritage of EAA and celebrate its early beginnings each year at EAA AirVenture Oshkosh.

The Hatz Biplane Association and I are proud to participate in EAA AirVenture Oshkosh 2014 and support the positive changes coming to the homebuilders' community. Thanks to Homebuilt Community Manager Charlie Becker, there will be an area where we will focus on early homebuilt designs that were popular in the early years of EAA. The idea is to focus on grassroots, low-cost, in-your-garage homebuilding. We will be focusing on early designs such as the Fly Baby, Pietenpol, Wittman Tailwind, Baby Ace, Hatz biplane, Acro Sport, Breezy, and so on.

We invite other homebuilt type clubs and supporters of these designs to join with us to display drawings and provide information to potential builders. A builder will be able to see examples of finished and flying airplanes that were built using skills that can be learned in the Workshops area. The new display will be in the Aeroplane Factory (the former North Exhibit Building).

Our goal is to develop and grow a common area that brings back to life the early, nostalgic, plans-built airplanes and provides technical help to those who want to get started building. Many people who are considering building come to Oshkosh to gain knowledge and search for resources as they begin, and later, throughout the building process. We will be there to offer information and support.

Please stop by the Aeroplane Factory and visit our display. If you would like to volunteer to help promote this grassroots scratchbuilding effort, please e-mail me at *Kevin.Conner@Williams.com*. EAA

Kevin Conner is the president of the Hatz Biplane Association.


Aircraft | Personal Non-Owned | Powered Parachute & WSC Trike | Accidental Death & Dismemberment | Flight Instructor | Hangar | Airport
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