

NEW THIS MONTH—INCREASED ULTRALIGHT COVERAGE!

Vol.3 No.7 | July 2014



EXPERIMENTER

The Spirit of Homebuilt Aviation | www.eaa.org

Discover Paragliding! «

Some training advice

Meet the e-Gull «

An electric-powered ultralight

Champion

for a Day

A tornado-damaged
Acey Deucey is reborn

EAA PUBLICATIONS

Founder: Paul H. Poberezny

Publisher: Jack J. Pelton, EAA
Chairman of the Board

Vice President of Marketing:
Rick Larsen

Editor-in-Chief: J. Mac McClellan

Homebuilding Community Manager:
Charlie Becker

Editor: Mary Jones/EditEtc. LLC

Senior Graphic Designer: Chris Livieri

News Editor: Ric Reynolds

Copy Editor: Colleen Walsh

Multimedia Journalist: Brady Lane

Visual Properties Administrator:
Jason Toney

Contributing Writers: Charlie Becker,
Kevin Conner, Budd Davisson, Dan
Grunloh, Ed Kolano, James Lawrence,
Don McNiven, Lynne Wainfan

ADVERTISING

Display
Sue Anderson

Mailing Address:

P.O. Box 3086, Oshkosh, WI 54903-3086

Phone: 920-426-4800

Fax: 920-426-4828

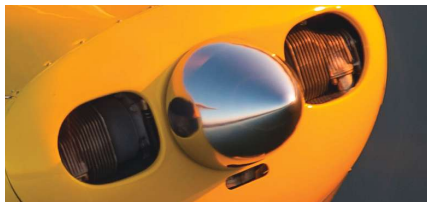
E-mail: experimenter@eaa.org

Website: www.EAA.org

**Need to change your address or have
other membership questions?**
Call 800-564-6322 (800-JOIN EAA).

EAA® and SPORT AVIATION®, the EAA Logo® and AERONAUTICA™ are registered trademarks, trademarks, and service marks of the Experimental Aircraft Association, Inc. The use of these trademarks and service marks without the permission of the Experimental Aircraft Association, Inc. is strictly prohibited.

Features



10 Champion for a Day
A homebuilt phoenix rises from the ashes!
BY BUDD DAVISSON



18 Flying an e-Gull
And building an electric motor, too
BY LYNNE WAINFAN

24 Ultralight Fun
Exploring the options available
BY DAN GRUNLOH

Departments

02 Tower Frequency
BY JACK PELTON

06 News from HQ
NEWS FROM EAA

04 Homebuilder's Corner
BY CHARLIE BECKER

08 Flightline
INDUSTRY NEWS

Columns



28 What Our Members Are Building
Designing a Plans- or Kit-Built Electric-Powered Ultralight
BY JAMES LAWRENCE



32 Ultralight World
Discover Paragliding
BY DON MCNIVEN



36 Flight Testing Techniques
Slips
BY ED KOLANO

38 Hangar Debrief
Learn, Build, and Fly...
BY KEVIN CONNER



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.

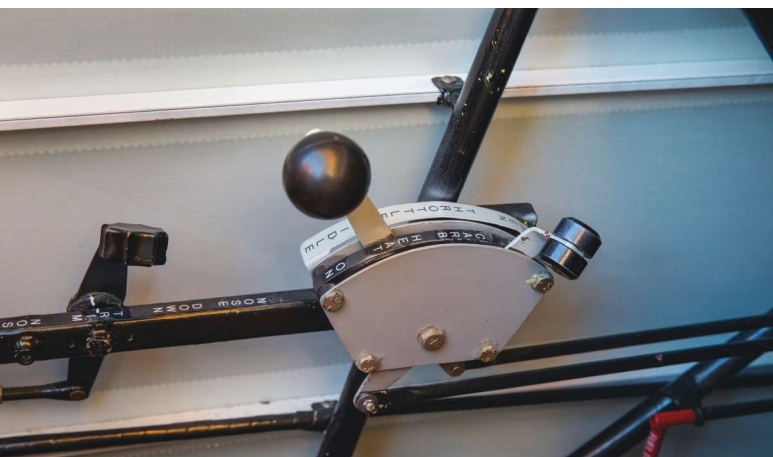
ONCE IN A WHILE, you run across a homebuilt airplane that teaches us so much about life, in so many ways, that it's hard to know where to start telling its tale. Such is the case with Edgar "Ed" Marrero and his Acey Deucey. The man, the airplane, and their history together combine to tell us all something 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.

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 tornado destroyed all the stringers and the standoffs.



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 DEUCEY

Although the Acey Deucey 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 Deucey 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 Deucey'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 Aceydeucey@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

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 Ala-

bama. 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.



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 cowlings 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. *EA*

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.