

Vol.4 No.5 | May 2015



EXPERIMENTER

The Spirit of Homebuilt Aviation | www.eaa.org

An Arizona Escapade «

A delight of details

A 1,000-Hour AirBike «

Lots of low and slow flying

Honoring Paul's
Legacy



Drones and Us

EAA will be vigilant

BY JACK J. PELTON

A MEMBER SENT ME a clipping from his small hometown newspaper. The headline at the top of the front page reads, “Ferrysburg to discuss park drone ban.”

According to the article the leaders of this small Midwestern town have become concerned that drones could be a risk to others using the city parks, and that the cameras many drones carry could interfere with citizens’ ability to relax and enjoy their parks.

Whether the civic leaders’ concern is warranted or not it’s clear to me there is a public issue with drones. And by drones I mean the multi-rotor copter unmanned aircraft system (UAS) that can hover and often carry high-resolution cameras.

Model airplanes and the people who build and fly them have a very long history of uneventful and peaceful coexistence with normal air traffic and the public. Model airplane enthusiasts keep their radio-controlled airplanes in sight, below 400 feet, and away from airports and public gatherings. And now that many in the traditional model airplane community have begun flying the multi-rotor copter drones they operate those the same way.

But the advanced electronics of the drone have the potential to change everything. The electronic stabilization eliminates the need to understand flying speed or turn radius and maneuvering envelope that are essential to fly a conventional radio-controlled airplane. It does take some practice to expertly control a copter-type drone, but nothing like the aeronautical knowledge required to handle a conventional RC airplane.

That means the copter type of drone can be bought and flown right out of the box by people who make no effort to learn about airspace, aerodynamics, and flight control. With no intention to add risk or annoyance to anyone the copter drone operator can unknowingly do both.

The unique capabilities of the multi-rotor drone also create vast opportunity for never before seen commercial uses. Everything from monitoring highway traffic to high tension power line inspection to agricultural analysis is suddenly possible at a very low cost. And those, and many, many more uses

for drones, are worthy and make great economic and even safety sense.

But commercial drone operators need some sort of authorization and regulation to smoothly enter into the airspace system. We who fly all must demonstrate a level of safety and competence for our activities, and so should a commercial drone operator.

So at EAA our position is that the traditional restrictions on model airplane flying work just fine for the recreational drone flier. We support the “Know Before You Fly” online program created by the Association for Unmanned Vehicle Systems International (AUVSI), the Academy of Model Aeronautics (AMA), the Small UAV Coalition, and the FAA. That site can educate the new drone pilot on acceptable model airplane operation and also introduce him to the model airplane community. But for the commercial operator, and the operator of larger drones, we at EAA believe a minimum level of certification for both the aircraft and operator are necessary to preserve flying safety.

Is the risk of drones to our flying in conventional airplanes overblown in our own minds? I’m not sure. But on a recent evening as several of us gathered at a hangar on my home airport in Wichita we saw a copter-type drone fly right down the centerline of our runway at about 100 feet. We searched but couldn’t see where the drone went, or spot an operator.

Most personal airplanes would probably survive a collision with a lightweight drone. But not all. And what about the pilot who spots the drone at the last minute and makes an aggressive avoidance maneuver close to the ground? Or what about a student on a solo flight? And what if...the list goes on.

At EAA we support the recreational flying of all types of model aircraft and recognize the long history of responsibility and safety of the model airplane community under the umbrella of an organization like the AMA. But you can be sure we are vigilant and ready to react to any and all threats as new technology changes the traditional relationship between UAS and our airplanes. **EAA**

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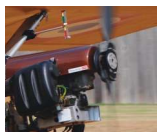
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*On the cover: EAA Founder Paul Poberezny welds a fuselage cluster.
(Photography courtesy of EAA Archives.)*



Onward and Upward...

The future of *Experimenter*

BY CHARLIE BECKER

AS I HOPE ALL of you have heard by now, this will be the last digital-only issue of *EAA Experimenter*. We will not publish *Experimenter* in June. Starting with the July issue, *Experimenter* will be incorporated into EAA's flagship publication, *EAA Sport Aviation*, so that every member of EAA will receive this excellent content.

I see this as a very positive step for the homebuilding community. This change will address the most common request we have had after the publication of each and every one of the digital *Experimenter* issues: How can I get this in print? It will realign our flagship publication to provide more homebuilding content. In fact, *Sport Aviation* will be gaining about 16 pages to make room for *Experimenter* content. Combined with the trimming of some formerly recurring columns in *Sport Aviation*, you can be assured of getting 20-plus pages every month of *Experimenter*.

Moving this content into *Sport Aviation* also will allow all EAA members to read these great articles. Although we had more than 40,000 subscribers to the digital *Experimenter*, that is less than a fourth of the current EAA membership of 189,000. This move will help educate more of our members about how to build an aircraft and, we hope, convince more of them that building

their own aircraft is something for them to put on their bucket list.

To me this move is just one more demonstration of the renewed commitment to homebuilding that is taking place at EAA. With Jack J. Pelton's leadership, I believe EAA is on a great path. I hope you feel the same way.

A THANK YOU TO MARY JONES

I would like to personally recognize Mary Jones, the editor of *Experimenter*, for her excellent work in putting out this magazine for the last few years. This issue of *Experimenter* magazine will bring to a close her work as an EAA editor. Jim Busha, our new EAA publications editor-in-chief, will be handling the editorial duties for *Experimenter* as part of the monthly publication of *Sport Aviation*. The good news is Mary will continue to contribute articles for *Sport Aviation/Experimenter*. She is one of the best people I have worked with during my 15 years at EAA. On behalf of the EAA membership, for your many years of service, thank you, Mary Jones!

With that, just like you, I look forward to holding the July issue of *Sport Aviation* in my hands and flipping straight to the *Experimenter* section.

Onward and upward! **EAA**

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EAA AirVenture Cup Race 2015

APPLICATIONS TO ENTER the 18th annual AirVenture Cup Race are now available online. The race is scheduled for Sunday, July 19, with the starting line in Mount Vernon, Illinois, and the finish line in Wausau, Wisconsin. Pilots interested in participating in this year's event are encouraged to apply as soon as possible at www.AirVentureCupRace.com.

Pre-race activities at Mount Vernon Outland Airport include media day on Friday and an airport open house and EAA Young Eagles rally on Saturday.

The race will launch at 9:30 a.m. Central time Sunday. Since this is a timed race, participants compete against the clock divided into categories based on their certification, landing gear configuration, and engine size. Each class has first-, second-, and third-place awards. All event activities are subject to the weather.



SportAir Workshops Return to AirVenture

WOULD-BE AIRCRAFT BUILDERS can get the best of both worlds at EAA AirVenture Oshkosh this year as three two-day SportAir Workshops are scheduled during the week. Electrical Systems & Avionics and Van's RV Assembly will both be held Sunday and Monday, July 19-20, while the RV course will be repeated Tuesday and Wednesday, July 21-22. Workshops run

from 8 a.m. to 5 p.m. and will be held in Paul's Aeroplane Factory located adjacent to Camp Scholler.

The RV Assembly course teaches the skills necessary to build the popular Van's RV series of kit aircraft. The main portion of the workshop is hands-on learning of the techniques necessary to assemble the airplane.

Electrical Systems & Avionics in-

volves antenna mounting, coax cable installation, wiring of radio systems, soldering and crimping components, alternator and electrical system requirements, installation of electrical systems, and more.

EAA SportAir Workshops are proudly sponsored by Aircraft Spruce & Specialty Company. Sign up today at www.EAA.org/SportAir.

EAA Ultralight Day Is June 20



EAA'S PIONEER AIRPORT will be transformed into a fun fly zone on Saturday, June 20, as up to two dozen ultralights and light aircraft fly to the grass airstrip for EAA Ultralight Day 2015.

Members of EAA Ultralight Chapters 1 (Southern Wisconsin), 75 (North Central Wisconsin), and 1331 (Central Wisconsin) will fly their ultralights and lightplanes to EAA's Pioneer Airport to show the public what fun flying is all about.

Two group arrivals will take place between 9 and 10 a.m., with each chapter led by a designated flight leader. At about 1 p.m., pilots will conduct several proficiency events like accuracy landing, torpedo runs, and bean bag drops. Those scoring in the top three of each event will receive a special plaque.

Admission to Pioneer Airport is included with regular museum admission. As always, there is no charge for EAA members.

EAA Seeks Homebuilt Council Volunteers

ARE YOU A HOMEBUILDER? Are you willing to donate your time and talents to advance the homebuilt movement? EAA is seeking candidates to serve on the EAA Homebuilt Aircraft Council. Terms are three years, and the council typically meets twice annually in

Oshkosh in addition to monthly teleconferences. EAA's Homebuilt Aircraft Council ensures that the organization continues to focus on vital programs of benefit to current and future homebuilders.

This council of EAA volunteer lead-

ers also provides direction for programs, services, and activities that add value for members who are dreaming of building, buying, and flying homebuilt aircraft. If you would like to volunteer, send an [e-mail Charlie Becker](#) for an application.

Valdez STOL Demos Are Back

MORE THAN A DOZEN specially modified short takeoff/landing (STOL) aircraft will be back at Wittman Regional Airport showing their unique capabilities to EAA AirVenture Oshkosh 2015 attendees.

The STOL aircraft, including homebuilts and specially modified production airplanes, are based on aircraft that provide supplies to the rugged and far-flung outposts throughout Alaska whose demanding terrain requires takeoffs and landings on rough runways often less than 500 feet long.

The Valdez STOL activities will include flight competitions during the afternoon air shows on July 20-21, competition finals prior to the July 22 night air show, and fun flying at the ultralight airstrip on July 23 (mid-day) and July 24 (evening).

These flying activities are made possible with support from CubCrafters, one of the nation's leading backcountry aircraft manufacturers.



Milestone: Hints for Homebuilders No. 400

EAA'S HINTS FOR HOMEBUILDERS video series, which recently marked its 400th episode, has been one of EAA's most popular offerings for members since launching about seven years ago, garnering millions of views along the way.

"I think the Hints for Homebuilders (video) series is the most significant thing that EAA has done to advance the art of homebuilding since Tony Bingelis," remarked EAA member Russ Erb, EAA 349454. Drew Harteveld, EAA 699738, added, "They are, quite literally, the single most valuable asset I have ever received from EAA. These tactical little web-based videos have already been invaluable to me. I'm watching them each several times, and hanging on every word."

Charlie Becker, EAA director of communities and homebuilt community manager, thanked the many knowledgeable members who have gone on camera to share their experience and ideas.

"At the start of this I wondered if we would run out after 40 hints, let alone 400, but we've managed to keep it going," he said. "When members compare the Hints to the body of work that Tony Bingelis did many years ago, that's the kind of high praise that really means a lot."

Brian Carpenter of Rainbow Aviation has contributed the most featured hints with 72, followed by Dick Koehler with 65, and Joe Norris with 31. *EAA*

Cub Crafters Introduces Carbon Cub EX-2

CUB CRAFTERS HAS announced an upgrade of its kit aircraft based on the popular Carbon Cub. The new Carbon Cub EX-2 improves on the company's Carbon Cub EX, an experimental amateur-built (E-AB) kit which features a lightweight airframe and powerful engine that provides formidable off-airport performance.

Cub Crafters' original Carbon Cub EX advanced the legendary Cub architecture into the 21st century. The airplane combines modern design methods with lightweight materials, a

180-hp engine, and a useful load of more than 900 pounds.

The EX-2 revision includes an extensive series of improvements and upgrades to the kit, but the primary components are the new G-Series ailerons, flaps, and tail feathers. The G-Series control surfaces of the EX-2 improve controllability in all aspects of the flight envelope.

The roll authority of the Carbon Cub EX-2 has been improved by redesigning the aileron airfoil and relocating the hinge point. Cub Crafters' G-Series ailerons deliver markedly lighter and crisper roll response compared to legacy aircraft. Control harmony is even better than that of the original.

The G-Series flaps are the first truly slotted flaps available from Cub Crafters. With the G-Series, the stall speed of the EX-2 with flaps extended is reduced, thus improving the low-speed manners of the Carbon Cub. The G-Series flap features repositioned pivot arms that, when deployed, lower the flap's location relative to the wing, forcing high-pressure air from below the wing over the flap and helping airflow to remain attached to the flap surface for increased lift.

The G-Series tail feathers feature new adjustable elevator stops and allow greater down-elevator trim, providing the pilot with greater trim authority when operating at either the forward or aft limits of the CG envelope.

The new Carbon Cub EX-2 is now available from Cub Crafters certified sales centers around the world. For more information, visit www.CubCrafters.com/csc.



Modified Rotax to Power Rutan SkiGull

SKIGULL, THE NEW AMPHIBIOUS airplane Burt Rutan is building in his garage in Coeur d'Alene, Idaho, will be powered by a 130-hp modified version of a Rotax engine, according to antennaFILMS, which is filming a documentary titled *Looking Up, Way Up! The Burt Rutan Story*.

The design reportedly uses a modified version of a certified Rotax engine (turbo, e-fuel injection, flight-adjustable prop, 130 max bhp).

SkiGull, which will be Rutan's 47th manned aircraft design to fly, also will have a docking system consisting of two "off-the-shelf" 5-inch-diameter electric motors used for giant remote-controlled aircraft, each driving a 27-inch-diameter folding propeller mount on each wing. The motors will provide forward or reverse thrust to allow backing up or rotating when docking/beaching in winds, Rutan said.

"Since the SkiGull has a lift-to-drag ratio of 23, its electric docking system can fly it about 8 miles, which greatly reduces the risk of an engine failure, particularly when operating out of small tree-lined lakes," the press release states. The docking system also gives it an extra 150 pounds of thrust.



Just Aircraft SuperSTOL Now Comes in XL

JUST AIRCRAFT JUST “up-sized” its popular SuperSTOL airplane, adding 2 feet aft of the fuselage and 6 inches up. Called the Stretch XL, this version can now handle the new ULPower 520 engine series as well as Lycoming O-320 engines.

The original SuperSTOL is powered by the 100-hp Rotax 912 (approximately 165 pounds with accessories) or the 115-hp Rotax 914 (175 pounds). The Stretch XL can accommodate engines weighing up to 315 pounds. Appropriate engine mounts and redesigned cowlings will accompany the SuperSTOL Stretch XL kits.

Harrison Smith, who completed Phase 1 flight testing in the Stretch XL, said increases in rate of climb and cruise speeds are the result. “The additional length in the Stretch XL provides handling similar to a high-horsepower Super Cub,” he said.



Merlin LSA Makes Maiden Flight



GLASAIR AVIATION'S NEW special light-sport aircraft (S-LSA), Merlin, made a successful maiden flight at Arlington Municipal Airport, Washington, on April 7. Merlin is a composite high-wing, tri-cycle-gear aircraft built to LSA certification requirements based on ASTM consensus standards.

Powered by a Rotax 912 iS engine, the airplane is equipped with Dynon's Sky-

View glass panel and has an optional BRS parachute system available. Flight testing will continue throughout the coming weeks. Merlin will be the first certificated aircraft by the traditional kit maker.

According to the company, Merlin's 45-inch-wide cockpit offers ample side-by-side seating, outstanding forward and side visibility, and one of the largest windshields in the category.

Garmin Offers ESP Safety Aid to Experimentals for Free

GARMIN IS NOW OFFERING its Electronic Stability and Protection-Experimental (ESP-X) system to owners of experimental airplanes as part of its G3X or G3X Touch avionics system.

The system continuously monitors airplane attitude and airspeed, looking for unusual pitch and bank angles, or airspeeds closing in on stall or the redline limit. When the preselected limits are exceeded, indicators appear on the G3X flat-glass display showing the pilot how to recover.

ESP-X also uses the servos of the integrated G3X autopilot to “nudge” the controls. The pilot easily can overpower the servo input if he is intentionally flying an unusual maneuver or airspeed, but the stick movement provides subliminal commands that help a distracted pilot recover.

If after ESP-X detects an unusual attitude or airspeed and the pilot makes no input for 15 seconds, the system assumes he has become incapacitated and engages the autopilot to hold wings level. The autopilot will raise the nose automatically to slow from an overspeed and will gradually trade altitude if necessary to keep low airspeed above the stall. The system disengages within 200 feet of the ground.

Because ESP-X is designed for experimental airplanes, each owner can program the limits that he is comfortable with instead of using a preset bank angle or airspeed to trigger the warnings. ESP-X can be turned off for training or intentionally unusual attitude maneuvering.

ESP-X is a free software update for owners who have installed the G3X or G3X Touch flat-glass avionics system with the Garmin autopilot. *EAA*



Paul's Planes

Reviewing his legacy

BY BUDD DAVISSON

IN THE BEGINNING, there was Paul Poberezny. Or was it Bernie Pietenpol? Or Ed Heath? Or Wilbur and Orville, Otto Lilienthal, ad infinitum? The truth is that the homebuilding movement *is*, and always *has been*, the very essence of aviation from the beginning. All of the pioneers were homebuilders. For that reason, the sport aviation/homebuilding movement has dozens of founding fathers spread out over as many periods. However, when we think about sport aviation, homebuilding, and EAA, we trace everything back to Paul, his dedicated friends, and a small group of aircraft.

Homebuilt airplanes, even kit airplanes, predate World War I, but only a few of those survived the economic and technological waves of change to resurface after World War II. That's when Paul, still an active-duty military pilot with a driving passion for grassroots flying, re-established the homebuilt kit plane market and simultaneously founded the EAA. It is somehow lost to history that Paul, along with Carl Walters and Cliff DuCharme, was a kit plane manufacturer. More important, through his original designs and redesigns of earlier homebuilt aircraft, Paul actually helped to initiate the second (or third) rebirth of the homebuilt movement.

The postwar homebuilt community relied heavily on 1920s and 1930s designs. The 1932 *Flying and Glider Manual* was nearly a bible, with Gere Sports, Heath Parasols, and the ever-present Pietenpol among the mainstays. Paul knew those designs intimately, and when designing his one-off Little Audrey (using the Howard "Pete" fuselage) and Little Poop Deck, he borrowed heavily on their technology. However, it was the Corben Ace series of aircraft that really caught his eye.

Paul was in the process of deploying to Korea in 1952, when he heard that the Corben Sport Plane tooling and plans were in storage in Madison, Wisconsin, and might be for sale. When he returned from Korea in 1953, he flew to Madison, inspected what was available, and two hours later was the proud owner of the rights and two tractor-trailer loads of tooling and parts. For the princely sum of \$200, he was in the homebuilt plans business, which quickly saw him and his partners offering materials, tack-welded fuselages, and completely pre-welded kits. The plans sold for \$13.

Initially, Corben Aircraft (which became Ace Aircraft and assorted other names) concentrated on the Ace and Jr. Ace, but as originally designed in the 1930s, those designs had their shortcomings. Paul, in conjunction with Stan Dzik as the draftsman/engineer, set about bringing them into the postwar era. More important, he set the goals that were to remain his trademarks as a designer and as EAA founder: The airplane had to be easy to build, easy to fly, and easy to afford. His lifelong goal was to give aviation to the common man and that

started with the Baby Ace, which incidentally is light-sport aircraft (LSA) compliant.

BABY ACE MODEL C

Among the modifications made while re-engineering the Ace to be a Model C and conform to existing Civil Aeronautics Authority (the precursor to the Federal Aviation Administration) regulations, Poberezny made use of some of the most common aviation parts in existence at the time: J-3 Cub components. Just less than 20,000 J-3 Cubs had been produced before Paul started redesigning the Baby Ace; so spare parts were plentiful and cheap, and Paul made good use of them. The original Ace outrigger landing gear was replaced by the bungee V-gear from the J-3. Ditto for the cowl and fuel tank—all difficult-to-fabricate parts.

To make his airplanes economical to operate, Paul usually defaulted to the ever-present 65-hp Continental A-65 or 85-hp C-85. The A-65 was and is plentiful and relatively inexpensive. To make his airplanes easy to build, the airframes are totally traditional: The entire Ace series relies upon wood wings with truss ribs and a welded steel-tube fuselage. After Poberezny and his partners sold Ace Aircraft and the original designs, those which he redesigned became known as "Pobers," that is, the Pober Ace, etc. He and his companies retained the rights to those versions.

One of the events that gave the homebuilt movement a tremendous shot in the arm was in 1955 when *Mechanix Illustrated* magazine asked Paul to write and illustrate a major three-part article in which he chronicled building a complete Baby Ace. It's possible that no single event had as much impact on the growth of the homebuilding movement.



Corben Jr. Ace

POBER JR. ACE

Bringing the prewar Jr. Ace into modern times, the modifications included all of those included in the Model C. Plus the wing was extended to 34 feet to keep the stall speed low and climb performance up. The fuselage was widened to make the airplane a true two-place, and there was an option on the ailerons: the original hinged type or the Frise ailerons that gave snappier performance.



Pober Jr. Ace

POBER SUPER ACE

The Super Ace recognized the need to use larger engines, which in this case starts at 85 hp and goes all the way up to 150 hp. The larger airframe was designed specifically to mount the heavier engines, so the smaller ones require additional weight ahead of the firewall to maintain the same lines and have the CG in the proper place.

INTO THE 1960S

By the late 1950s, sport aviation had discovered the biplane, and little birds like the Smith Miniplane, LittleToot, and Mong Sport were magazine cover favorites. Their unabashed good looks meant they also scored heavily with builders. However, the extreme small size of some of the aircraft and the design parameters meant they not only couldn't be flown by larger pilots, but their landing characteristics might be beyond the reach of the average pilot. So, Paul and EAA went looking for a solution. Or two.

EAA BIPLANE

Paul laid out the design and put together a team of engineers and designers, led by Jim Stewart, who were tasked with designing a homebuilt aircraft for the average man. It would be larger (20-foot wingspan) and powered by at least an 85-hp Continental with many being powered by the then-inexpensive 125-hp Lycoming O-290G ground power unit. Its larger-than-normal cockpit easily fit a 6-foot 2-inch pilot, and its wide gear



Pober Super Ace



EAA Biplane

and ample controls made landing a simple matter. The first prototype was built from the plans by students at St. Rita of Cascia High School in Chicago, Illinois, and flew for the first time in 1960. Hundreds of the airplanes have been built and flown.

ACRO SPORT

By 1970 aerobatics had become an established sport in which the go-to airplane was the Pitts Special, an airplane that still has a reputation (however unearned) of challenging the pilot both in building and on landing. So, in typical Paul Poberezny fashion, he sat down at his drawing board (not his computer) and was determined to design an airplane that was not only both easier to build and land but also would still give the pilot true three-dimensional freedom. It wasn't designed to be a g-bustin' competition machine but rather an airplane that would let the pilot explore most of the aerobatic envelope in safety. In addition, with its straight, Hershey-bar wings, it would be much easier and quicker to build than the Pitts.

The results of his efforts were—and are—exactly what he was looking for: a nimble aerobat that's built hell for stout but wouldn't cause the pilot's mouth to dry out on final.

ACRO SPORT II

As the "II" indicates, this is an Acro Sport built for two full-sized people. It starts where the Acro Sport leaves off but is an entirely new airframe aimed at achieving the same goals: easy build, easy flight, easy to afford. The three-piece upper wing is



Acro Sport

straight and rectangular, which is another way of saying that, as biplane wings go, it goes together faster. The ribs are all the same size, and the lack of sweepback means all the internal corners of the wing structure are square.

The performance of the airplane belies its benign appearance. With four ailerons and 180 hp to push its 1,520 gross weight pounds around, the airplane is a more accomplished aerobat than it is sometimes given credit for. It is, however, one of the easier taildraggers in its class to land.

POBER PIXIE

Paul's response to the 1973 oil crisis was to create a design for getting into the air that used as little fuel as possible but was still a "real" airplane. No two strokes. His "pre-LSA" LSA was the Pixie. Standing somewhere between a Baby Ace and the 1920s Heath Parasol, the hyper-simple Pixie was first flown in late July 1974, just in time to debut at EAA Oshkosh that year. With full-span ailerons, a 29-foot wing, and a stock VW engine, performance was lackluster, but it really came alive when equipped

with a 60-hp Limbach 1,700-cc VW conversion. In theory, a Continental A-65 could be used, but the VW was much lighter and only burned 3 to 3-1/2 gallons of auto fuel an hour. A two-place Pixie II was designed. But only two were built and plans were never released.

THE MAN'S WORK JUST KEEPS ON GIVING

Although Paul is revered as the founder of the most vibrant aviation community ever, it's easy to forget that he was a practitioner of his own sermons. He lived to fly and he lived to build. Besides the aircraft he designed and built, there were so many others that he built that it's difficult to keep track of them. He was a grease-under-the-fingernails kind of guy that led from in front.

The only thing Paul loved as much as flying was his family, and then the extended family of aviators he drew into the EAA. He did everything humanly possible to give flight to those who couldn't afford it. His long string of designs is the result of that effort. The sky is still there; his designs are still available. His legacy is that the two can be mixed by the application of a little effort. That's the ingredient only we can apply by putting our hands and mind together. *EAA*

Budd Davisson, EAA 22483, is an aeronautical engineer, has flown more than 300 different types, and has published four books and more than 4,000 articles. He is editor-in-chief of *Flight Journal* magazine and a flight instructor primarily in Pitts/tailwheel aircraft. Visit him on www.AirBurn.com.



Acro Sport II



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An Arizona Escapade

An Oshkosh 2014 Silver Lindy Winner

BY DAN GRUNLOH



A BEAUTIFUL AMATEUR-BUILT airplane called *El Eze* landed on Runway 36 at Wittman Airport with little fanfare two days before the beginning of EAA AirVenture Oshkosh 2014. The builder, Dennis Crowley, had flown the Just Aircraft Escapade 1,600 miles from his home in Tucson, Arizona. His plan was to arrive early and stay

late to avoid the mad rush of arrivals and departures. He had been to AirVenture before but never with an airplane. During the week, the Escapade was displayed in the Fun Fly Zone next to the Ultralight runway; it was mobbed every day by spectators who couldn't help but admire the style, finish, and appointments.



Dennis and his wife, Barb, love vintage cars and have restored and customized a 1954 Porsche 356 Coupe that has been winning awards since 1987. Figuring they might build only one airplane, they decided to do it all the way. Leather seats, extensive woodwork, and attention to every detail give the airplane the feel and aura of a custom, vintage automobile. EAA judges awarded it a Reserve Grand Champion – Silver Lindy, the highest award given that year in the light-sport category.



Hooker seat belt hardware with handmade wood inserts.

ESCAPADE FACTS

The Just Aircraft Escapade is a two-place, side-by-side aircraft designed by Troy Woodland for recreation and training in the sport pilot category. The steel-tube-and-fabric airplane was jointly developed in 2003 in the United States and the United Kingdom, where it earned British Civil Airworthiness Requirements approval. An expanded version, the Just Aircraft Highlander, uses the same airframe as the Escapade. The newer Highlander and the newest SuperSTOL get more publicity than the Escapade. The SuperSTOL is a completely different airplane. The Highlander is an Escapade designed to fly slower with slightly longer wings, bigger flaps, an enlarged tail, and a more robust landing gear. Both come with quick-folding wings and have either conventional or tricycle landing gear.

The heritage of the Escapade goes all the way back to Dean Wilson's Avid Flyer, the Ridge Runner, and many other related offspring. Its immediate predecessor is the Just Aircraft Summit, a tandem design. The Escapade's cabin is 44 inches wide (5 inches wider than a Cessna 172) and features see-through Lexan side doors. A large, 32-cubic-foot baggage compartment can hold up to 100 pounds and stay within center-of-gravity limits. Engine options include either Rotax, Jabiru, or Viking engines. The Escapade cruises at 90 knots, stalls under 35 knots, and can fly with the windows open or closed. The wings fold against the sides in 2 minutes by removing the turtle deck. Visit www.JustAircraft.com for more information.



Dennis and Barb Crowley with their Silver Lindy trophy at AirVenture 2014.



Unique custom rear windows inspired by the vintage 1949 Volkswagen.

THE BUILD

The decision to build an airplane in your garage, especially your first airplane, is no small step to take at the age of 63 years. Dennis Crowley always wanted to fly, but eyesight and other factors kept him on the ground until 2006 when he earned a sport pilot certificate. Traveling to fly or rent an airplane was never a good option, so Dennis reserved the N-number N356AZ for a light-sport aircraft he had not yet chosen at the time. It was to honor his much loved Porsche 356. Dennis and Barb are both retired educators. Dennis had a lifetime of experience teaching mostly fifth- and sixth-grade elementary school kids. Surely that would strengthen and build one's sense of patience, determination, and dedication.

After studying all the options, he decided on the Escapade partly because of the style of the rounded tail feathers as compared to the Highlander. He purchased an early quick-build kit, No. 17, secondhand for a bargain price. Dennis and Barb took 3-1/2 years and 2,240 hours to complete an airplane that can be built in 700 hours according to the manufacturer. Much of the extra time was the attention to detail and customization and the fact that they painted it themselves. The project took over their three-car garage, with many of the rooms in their six-level desert hillside residence used for construction or storage.

Painting took six months using the nontoxic, water-based Stewart Systems, an obvious choice if one is working in your

residence. Barb helped to build the airplane and picked out the colors to reflect the Porsche 356 colors that have been so popular at car shows for decades. She did much of the first coats of primer and designed the hand-painted trim scheme that wraps around and under the airplane. The colors are white, cream, camel, and brown. The use of such warm colors to get a southwestern tone could end up murky, but when done with the right amount of solid white area, it looks classy yet understated.

Painting required five coats of primer with sanding between each coat. The first three coats were brushed on by Barb and the last two were sprayed. Spraying was done in the garage with a double booth made of PVC pipe covered with 6-mil plastic sheeting. Three fans with filters exhausted any fumes. The four-color scheme required extensive taping and masking of the complicated design. Each piece had to be completed with all the colors before the airplane could be assembled. The entire airplane was sprayed a base white coat followed by the cream, camel, and then the brown in the designated areas (with appropriate masking). Two clear topcoats finished it off. The results are a beautiful, natural-looking finish. It's not as glossy as modern urethanes but more like what would have been seen on a classic fabric airplane in 1953. The finishing touch is a nose art graphic depicting the couple's beloved deceased cocker spaniel named "Ese." The airplane's name, *El Ese*, translates as "my buddy" or "my friend" and is pronounced a little like L-S-A. Get it?



Escapade and the Porsche 356 at the 2013 Copperstate Fly-In.

N356AZ is powered by a 100-hp Rotax 912 ULS and a three-blade Kiev prop from the Ukraine. The prop looks big at 74.8 inches but weighs only 8 pounds. Two 13-gallon wing tanks feed a central header tank. The Escapade kit was upgraded to include newer details related to the bungee suspension and nose-gear shock system. The windscreen was upgraded to a thicker molded acrylic version by Steve Dentz. As a sport pilot, Dennis can't fly at night, but he installed a powerful landing light by Aero LED to improve visibility in the airport traffic pattern as well as Aero LED's nav and strobe wingtip lights. The only major airframe change he made was to replace the spring system that holds the flaps in the retracted position while on the ground with a small hydraulic lift strut.

Dennis said the engine installation and wiring was the most complicated part of the project. He had some local assistance, and his engine work was checked by a certified Rotax mechanic. An avionics instructor from the local Pima College Aviation Technology program checked out the instrument wiring. Throughout the project, he got advice from the Just Aircraft builder community by way of the Wings Forum at www.WingsForum.com. The section of this website for Just Aircraft builders, which covers the Summit, Escapade, Highlander, and SuperSTOL, has more than 15,000 posts and more than 1,900 subject threads.

The Crowley Escapade *El Ese* first flew on September 11, 2013. Its empty weight came in at 770 pounds, about 100 more

than expected because of the paint and custom additions. In October 2013, Dennis flew the Escapade to Casa Grande, Arizona, for the Copperstate Fly-In where it won Best Custom Tube-and-Fabric and the Copperstate Grand Champion Award. It was there the judges planted the idea that he should take the airplane on the 1,600 miles to EAA AirVenture Oshkosh. When he arrived at Oshkosh in July 2014, the airplane had flown only 68 hours, including the 22 hours to get to Wittman Airport. Dennis started his journey with just a little more than 120 hours in his logbook.

CUSTOM MODIFICATIONS

When his plane was judged at Copperstate, the judges asked to see Dennis' builder's book. A newcomer to custom-built aircraft, he had never heard of having an album of photos and documentation to chronicle the construction. Having a comprehensive builder's album can influence the judges, and there are a few points to be earned in the scoring for a well-done builder's book. Thankfully, Dennis and Barb had taken many photos during construction. When they arrived at AirVenture 2014, their documentation was unrivaled. It began with a two-page detailed listing of at least 40 unique, custom features on the airplane. Some were obvious and so unusual as to lead the viewer into thinking not of an Escapade but rather some rare, classic light plane. Others were the small details seen everywhere throughout the luxury interior. Here is a sample:

- The unique quarter side windows and the split oval rear window give it a very different look.
- The side window was inspired by the Crowleys' favorite automobile, the Porsche 356 pre-A Coupe, and the split rear window reflects a vintage 1949 Volkswagen.
- Entering the cockpit, you settle into leather seats with color-matched Hooker seat belts with rotary latches and handmade wooden inserts. Clever matching brown elastic cords suspend the harness strap out of the way and are linked to keep the belts in place.
- The beautiful "wood" interior side panels with wood railings and the "wood" behind the firewall are actually Kydex, a fireproof synthetic sheet material designed for aircraft interiors. Visit www.sekisui-spi.com for more information.
- Overhead are custom cellular retractable "block-out" accordion shades—a must in Arizona. Custom wood is contoured to the roof with clear Lexan tracks (for visibility when the shades are retracted) screwed into the wood mounts. Either side can be adjusted for full, partial, or no shade.
- The interior color matches the upholstery, and the exterior matches the exterior white paint. Most of the cockpit control knobs, such as the flap handle, trim control, parking brake, air vent knobs, and throttle, are custom wood. The throttle knob is a carving of a gourd by a native Indian artist. You can tell right there that Dennis and Barb had fun with this project.
- Up front, hidden behind fabric and curly maple-veneered wood, is a carbon-fiber prototype instrument panel originally built by Stan Foster. Dennis went with a 10-inch Dynon panel instead of two 7-inch panels so he could have moving-map, primary flight instrumentation and engine instruments all on the one display while still allowing enough room for backup analog steam gauges. In addition, he uses an iPad with ForeFlight for secondary navigation. The panel



Leather seats in colors to match their 1954 Porsche 356 interior.



Dennis shrinking the fabric tight on the right wing.

features a drop-down tray for easy access to the wiring and avionics.

- Ahead of the panel is a custom-designed and built glare shield covered with brown leather. It produces no glare whatsoever.
- Custom-fabricated storage bins prevent items from falling on the floor. Custom storage pockets were built for the required onboard documents and for checklists.
- Interior accents in red oak include items such as garnish rails along the lower edge of window frames for use as armrests when flying with the windows open.

Are we having fun yet?

A FLYING ADVENTURE TO AIRVENTURE 2014

The trip to Oshkosh, planned on an iPad, was supposed to be 1,600 miles each way and take four or five days, flying mostly in the morning before the heat and turbulence kicked up in the afternoon thermals. The first day out yielded a very rough ride, and by the second day, Dennis was still in New Mexico. Kansas should have been better, but it was bumpy and more than 100 degrees. He made a mistake and forgot to update Barb who was waiting for news back home when he made a dash to the southeast to get around a storm on his way to Iowa. She was following his route on radar on her home computer, saw storm cells, and when he hadn't checked in after 7 hours, feared he was down in a cornfield in Kansas. Later she found out he had tried to call her, but there was no cell coverage. Always update your flight plan or notify someone of your destination for every takeoff when on any cross-country flight. Your life could depend on it. When Dennis finally made it to Wisconsin, Barb took a commercial flight and joined him at the convention.

Oshkosh summer weather can be challenging, with rain showers popping up quickly and unexpectedly. The Crowleys had a watertight cover for the cockpit, which they installed during one of the light showers when they left Wittman Airport for the day. Visibility became so poor that

The heritage of the Escapade goes all the way back to Dean Wilson's Avid Flyer, the Ridge Runner, and many other related offspring. Its immediate predecessor is the Just Aircraft Summit, a tandem design.

they pulled off the road as hail began to pelt their car. But what about the airplane?

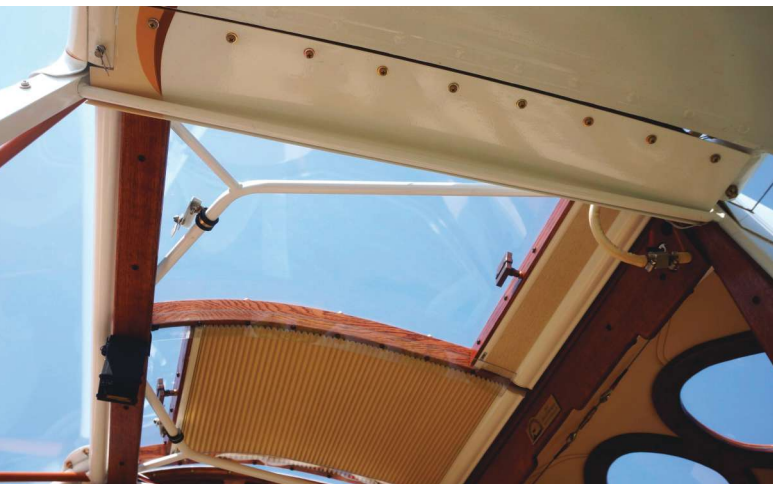
Incredibly, a video called "Oshkosh 2014 Hail" was posted on YouTube by Fun Fly Zone exhibitor Les Homan that shows the hail falling on the aircraft. Thankfully, it was light hail and there was no damage. A much heavier storm came through the day before Dennis was to leave that caught Barb alone with the plane, and she was unable to get the cockpit cover in place. Rain got inside the cockpit and caused radio problems prior to his departure. That detained him a full day, allowing just enough time for a strong weather front to wreak havoc with the flight home.

The return flight to Tucson took seven stressful, bumpy days, including stopping two days outside of Chicago because of bad weather. Dennis eventually headed toward Canada, stopping short of Minnesota and South Dakota in northwest Iowa. Later, near Omaha, after waiting all day for wave after wave of storms to pass, he made a run to the southeast (to go west), and he swears he watched the last wave on his iPad stop, change direction, and chase him into Kansas!

Dennis wrote it was a trip of a lifetime, a dream come true, and an accomplishment he will never forget—and never duplicate. He flew that little plane 3,618 miles and 47 hours in the air to join a rarified club of very lucky people. To build your first airplane, fly it across a continent in the face of difficult weather, win the top prize, and fly back home safely is a rare experience you can't buy. You have to earn it!

Back home in Tucson, Dennis presented a program about his trip to the members of EAA Chapter 82. Bob Miller, the chapter secretary, described the trip in the chapter newsletter and observed that planning a 1,600-mile trip when most of your previous cross-country flights were around 50 miles is like preparing for a marathon by walking the dog. By now Dennis knows the secret shared by all cross-country pilots—that a long trek is simply a succession of small flights strung together, and that true adventure comes from not knowing exactly how it will all turn out. Aviation is always an adventure.

Please send your feedback to dangrunloh2@gmail.com. **EAA**



Pleated retractable sunshades in the skylight.

Dan Grunloh, EAA 173888, is a retired scientist who began flying ultralights and light planes in 1982. He won the 2002 and 2004 U.S. National Microlight Championships in a trike and flew with the U.S. World Team in two FAI World Microlight Championships.



Grand Prize: Piper J-3 Cub

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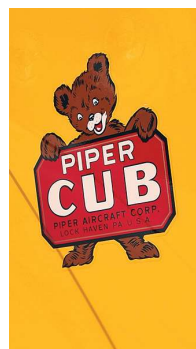
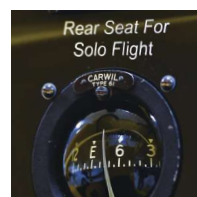
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AirBike achieves 1,000 hours

Around the world?

BY PAUL FIEBICH

IN JULY 1998, my plans-built experimental amateur-built AirBike, N61453, received its experimental airworthiness certificate, and I began the 40-hour flight testing period. It took me 18 months to build the single-place AirBike from plans, and it cost \$5,600. The first engine was a used Rotax 447 that I flew behind for about 400 hours. I then replaced it with a used Rotax 503 DCDI engine.

Since then, this little 50-hp plane has opened up an entirely new world I never dreamed existed. In addition to flights all over Kansas, it has taken me on a 1,500-mile round-trip to EAA AirVenture Oshkosh and back twice, as well as multiple weekend trips to Oklahoma, Texas, and Missouri. En route I have made new friends, had marvelous experiences, and became enmeshed in the EAA.

The plane was displayed on the EAA AirVenture Oshkosh ultralight field one year and in the Affordable Flying hangar another. Both times, I was a forum speaker during AirVenture. One visitor said my plane looked like so much fun that I should rubber-stamp the word “fun” all over it!

I have flown an average of 60 hours a year for the past 16 years. On January 27, 2015, I reached a milestone of 1,000

hours total time on the airframe! I believe this to be the highest time for an AirBike on record; 1000 hours total time airframe (TTAF) at 50 mph is equivalent to a flight around the world—twice!

The plane was built to take me places, and it has certainly done that. On multiday trips, I carry food, two-stroke oil, a



Paul Fiebich

tent, bedding, and a few extra clothes. I fly to destinations with no ground support.

About half of my total flight hours are considered cross-country (50 miles or more), for which I always file a flight plan. These trips often provide the seed for the magazine articles I write, often under the guise of my moniker "AirBike Ace." The stories range from the whimsical World War I pilot protecting the Western Front from the Huns to serious shop tips and repair articles.

The 340-pound experimental AirBike cruises at 55 to 60 mph, often at 3,000 feet AGL or lower depending upon wind direction. The only concession to the normal complement of steam gauges is a handheld GPS used to set my initial course, then it is turned off. Pilotage is my primary navigation method.

Compared to general aviation planes, I travel quite slowly, so much so that I am often the butt of speed jokes. When telling another pilot of my 1,000-hour achievement, he responded by saying, "So you finally covered 500 miles."

That's okay; I can take it. I love flying and always say that I fly for fun.

I am a member of EAA Chapter 88 in Wichita, Kansas, having held most elected positions and performed many

chairmanship duties. All of my aviation activities have come about because of building my AirBike in 1998 and joining EAA that same year. **EAA**

Paul Fiebich is an occasional contributor of articles pertaining to AirBike Ace's adventures, humor, and shop tips. He can be contacted at fiebichpv@aol.com or his website www.paul.fiebich.org, or he can be found on Facebook.



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Palm-Held Die Holder

A special tool

BY PAUL FIEBICH

SOMETIMES STANDARD tools just don't work in certain situations and must either be modified or replaced with a shop-made one. Such was the case when cleaning (chasing) Loctite from the cylinder stud threads on my Rotax engine during an overhaul.

A standard die holder was unusable in my situation where the studs remained in the case. When turning a standard die holder's handles, I found they interfered with an adjacent stud and were stopped. Turning the die alone by hand required effort beyond that which I could muster. Using a socket wrench or similar stock tool proved to be overkill and equally awkward. Being a woodworker as well as a pilot, I devised a palm-held die holder that proved effective. Others may find this tool useful, too. Here is what I did:

1. Draw a circle approximately 2 inches in diameter on a piece of solid wood. Center the die by eyeballing, and trace its outline. Drill an access hole within the hexagon boundary, insert a scroll saw blade, remount it in the saw, and cut out the hexagon.
2. Although the outside dimensions of all the dies in a set are identical, their thread-cutting teeth are different. I made two identical hexagon cutouts for the two common thread sizes I needed. The die holders are identical except for the hole diameter in their backing plates.
3. From thin plywood, cut two circular backing plates a bit over 2 inches in diameter, one plate for each die holder. Drill a clearance hole in the center of each that matches the

thread diameter to be chased. The backing plate serves as a die holder guide.

4. Slide the backing plate over the stud and then screw on the die. Spread glue on the mating surfaces of the backing plate and wood die holder and assemble them. Let this assembly dry; 5-minute epoxy works well in this application. By assembling the backing plate and die holder in this manner, the die will be centered on the backing plate's clearance hole.
5. Unscrew the assembly from the stud, and sand the backing plate and wood die holder until they are the same outside diameter. Break the edges and spray with a protective coating such as clear plastic or shellac. When dry, the tool is ready to be used. Total time should be less than an hour.

In use, the die holder should be threaded onto the stud with the backing plate going on first. The backing plate's purpose is to guide the die holder and keep it aligned.

The palm-held die holder is intended to be used where other studs would interfere with a die holder's handles when chasing the threads. However, I find it so handy that I also use it when chasing bolt threads when the head is clamped in a vise and no obstructions exist. *EAA*

Paul Fiebich is an occasional contributor of articles pertaining to AirBike Ace's adventures, humor, and shop tips. He can be contacted at fielichpv@aol.com or his website www.paul.fiebich.org, or he can be found on Facebook.

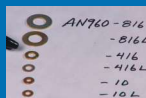
HINTS FOR HOMEBUILDERS VIDEOS

HERE ARE SOME OF THE LATEST HINTS FOR HOMEBUILDERS ADDED TO THE MORE THAN 450 HINTS CURRENTLY AVAILABLE HERE:



Holding Nuts and Washers

Dick Koehler demonstrates the use of tape, super glue, and EZ Turn lubricant to install nuts and washers in difficult to reach places.



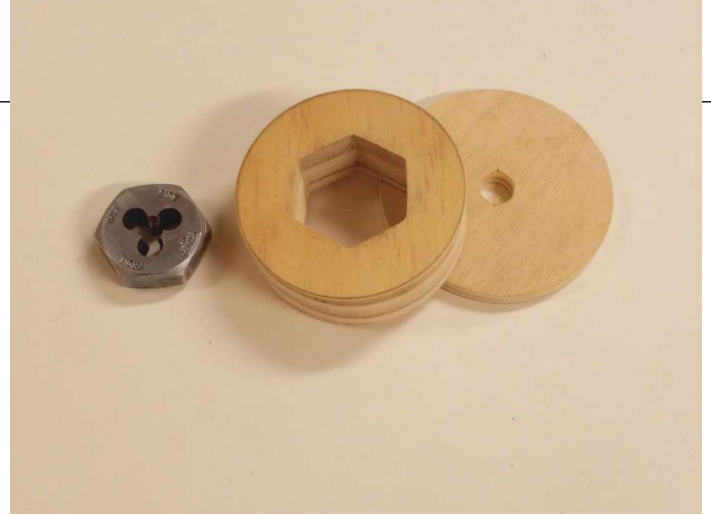
All About Washers

Dick Koehler discusses different types of washers including tips for where to use different types and the nomenclature designations.



Welding by the Numbers

Dr. Joe Maj, an EAA AirVenture Oshkosh volunteer in the gas welding workshops and a SportAir Workshop instructor, shares his three key numbers for gas welding success. If you adopt these three key numbers, you will learn to gas weld much quicker and easier.



Replacing Aircraft Cables

A short primer

BY EARL LUCE

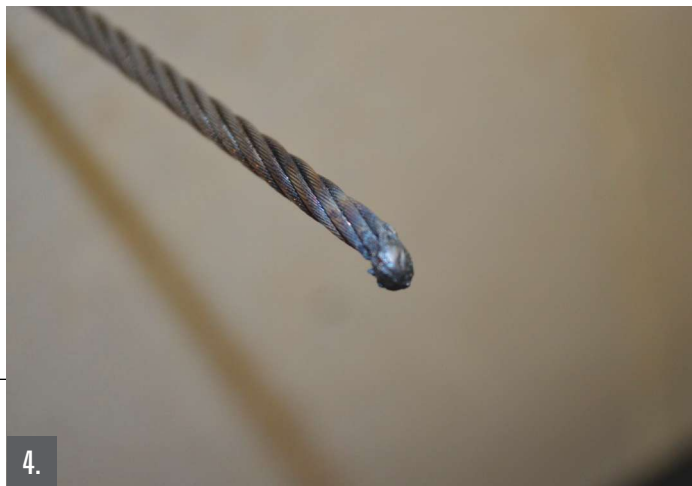
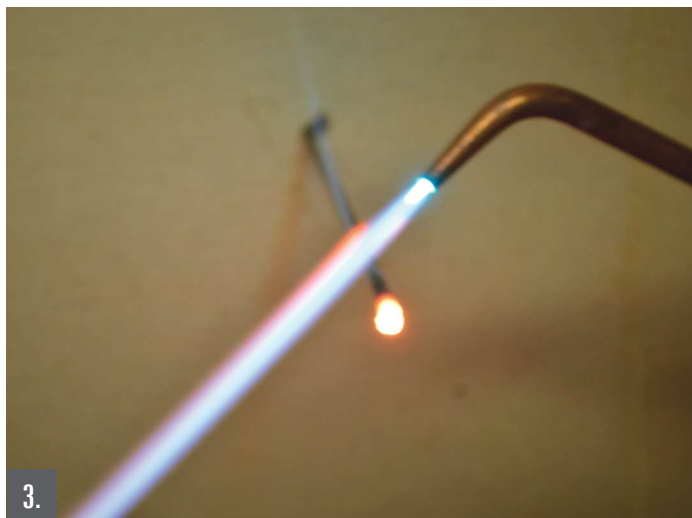
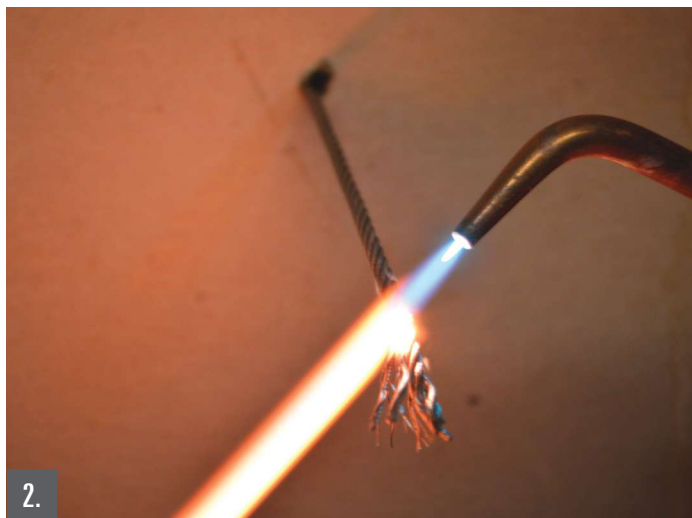
IF YOU HAVE HAD to replace a cable on your aircraft, did you wonder where to start? Most cables go throughout the fuselage between bulkheads and around pulleys, fairleads, and guides of many descriptions. Not to mention, cables are also located inside the wing, where it is almost impossible to access them.

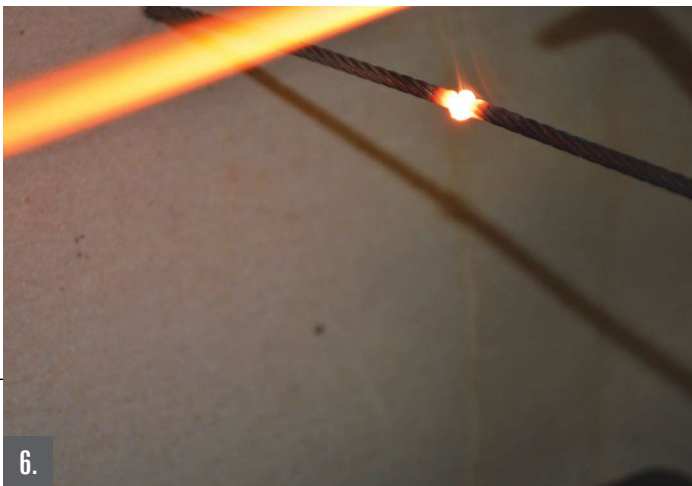
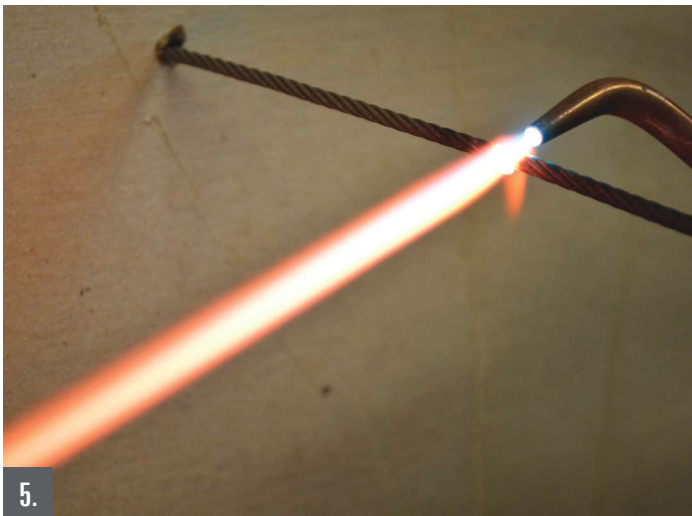
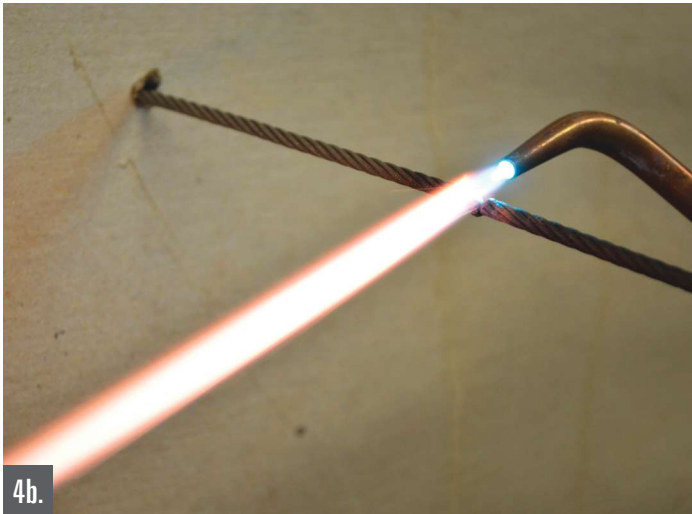
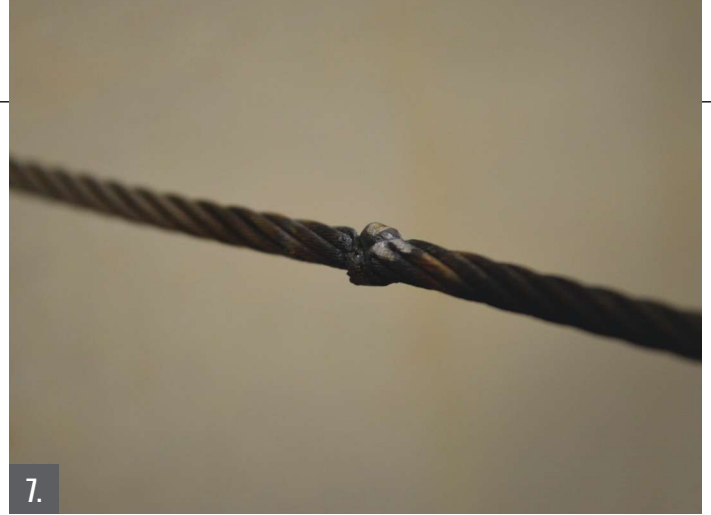
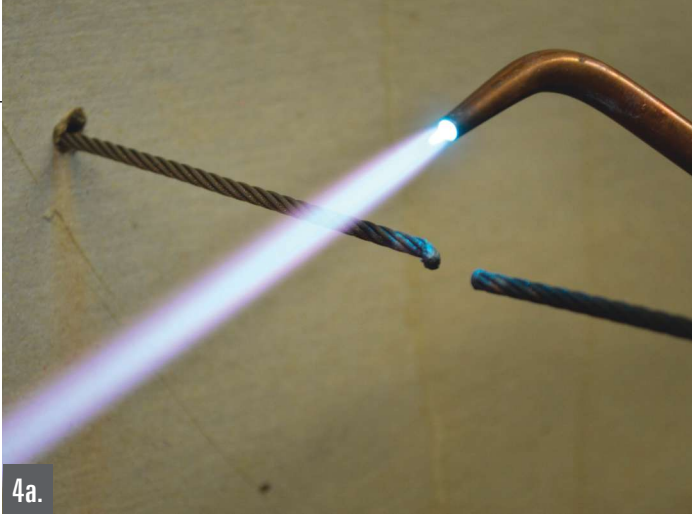
At some point, all taildraggers will have to have their rudder cables replaced because of rust and wear and tear on the exposed portion that exits the fuselage to the rudder horn. I've seen cables that have been repaired by tying or taping them together only to have them come apart halfway inside. Now you have a real problem. The method shown here is the best way to solve this problem.

The first thing to do is to melt the cable off at the bad part with an oxyacetylene torch. (See Photos 1 through 4, 4a, and 4b.) The cable end will form a small ball, which has all the strands melted together, similar to melting a nylon rope with a flame. Take the new cable and melt the end of it the same way, with the end forming another ball. Next, with a steady hand, touch the two ends of the cables together and attach them to one another with a neutral flame from your torch. You will see the two ends melt together almost instantly. (See Photos 5 through 8.) Now tug on the cable and make sure it is properly fused.

It is a simple task to pull the new cable in with the old one. You will want to cut back the joint you have just made to get fresh cable, because when you heat aircraft cable, you burn away the graphite lube. (That is the difference between aircraft cable obtained from an aircraft source and cable purchased from your local hardware store.)

You also can use this method to terminate the end of a cable, such as doing a loop with a Nicopress fitting. Here are before-and-after photos of doing just that. (See Photos 9 and 10.) I did this on my own aircraft at the rudder pedals. After several pairs of torn socks from cable strands hooking them and several tries to corral the loose cable ends using glue and shrink tubing, this solution was final. Remember to re-lube the cable after heating it and...*do not start your aircraft on fire!* **EA**





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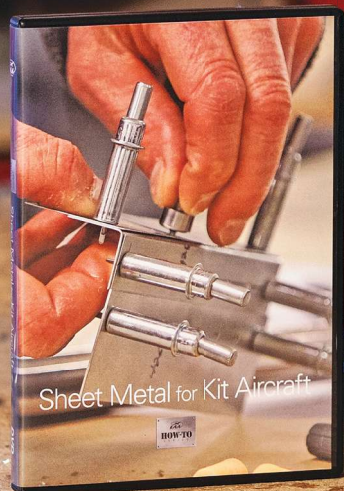
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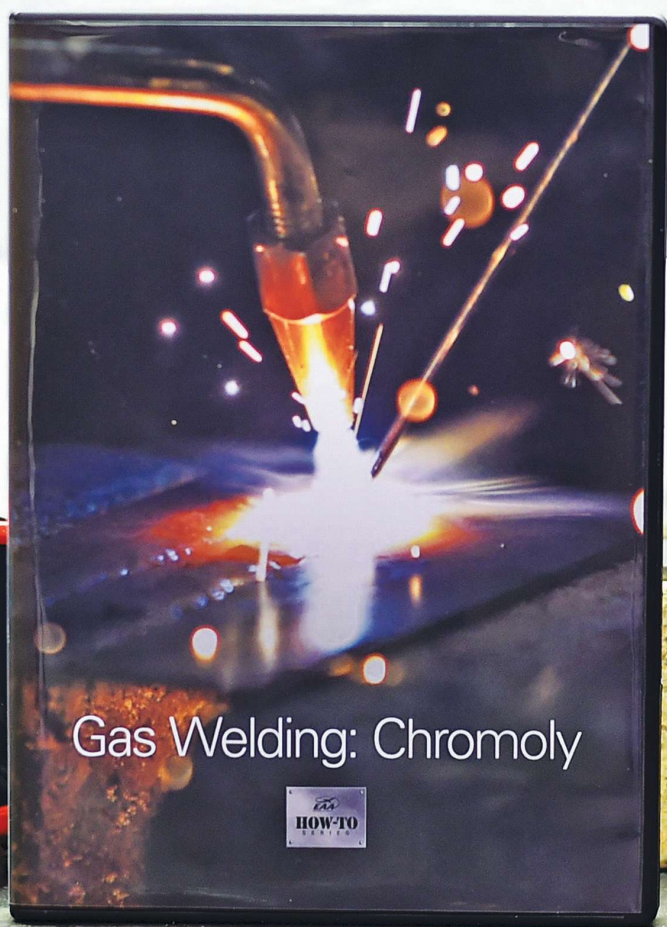
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