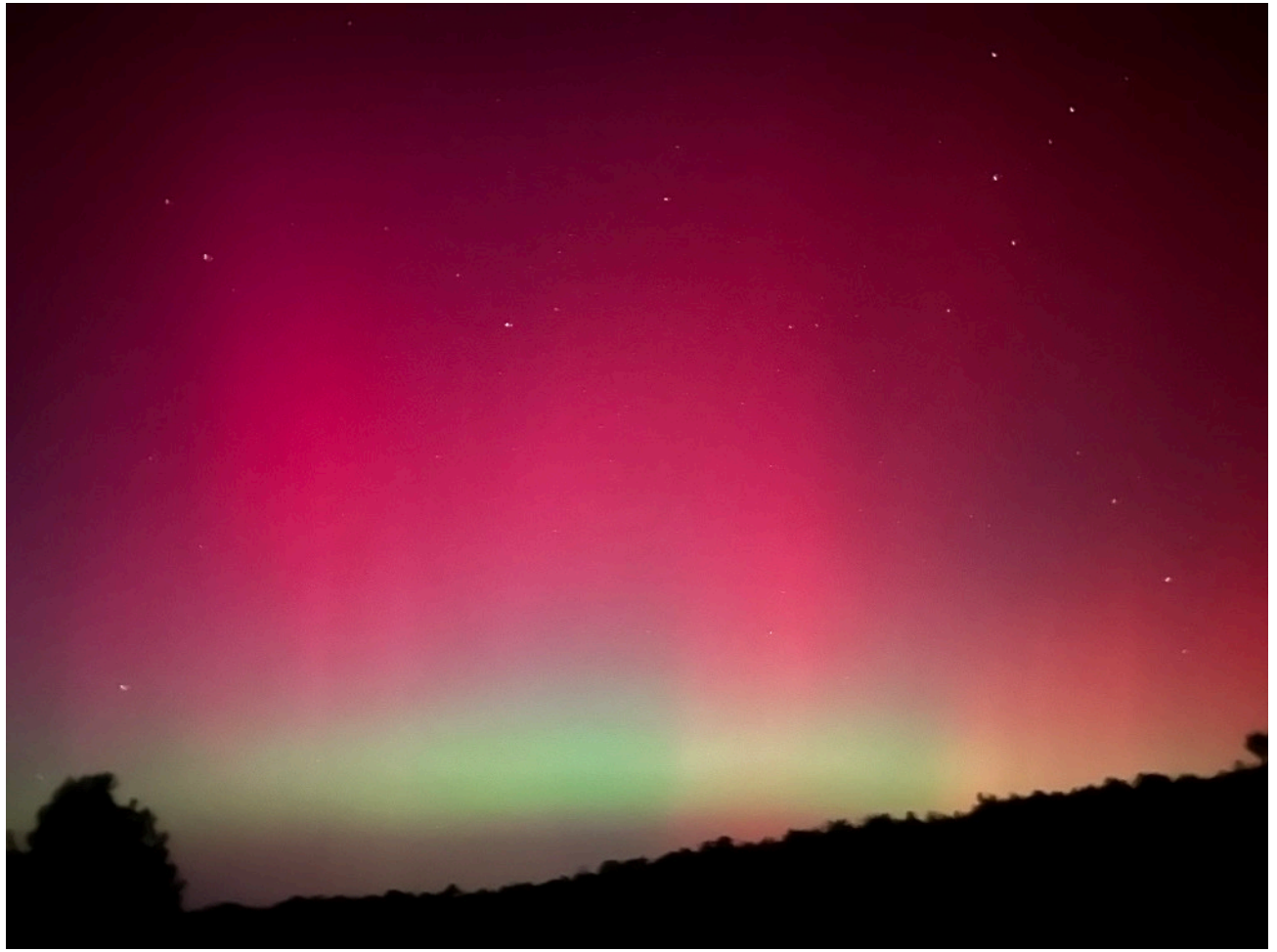


Northern Lights in Sandía Park

EAA Chapter 691 Newsletter
February 2025

On the Web @ eaachapter691.org

EAA 691 is:

President: Will Fox

Vice President: John George

Secretary: Pierre Levy

Treasurer: David Young

Board Member: Andrew Devecchio

Web Editor: Marilyn Phillips

Newsletter Editor: April Fox

Young Eagle Coordinator: April Fox

Table Of Contents:

Upcoming Events

Meetings Schedule (unless otherwise noted)

9:30am - social time

10:00am - business meeting

10:30am - speaker/workshop/ training

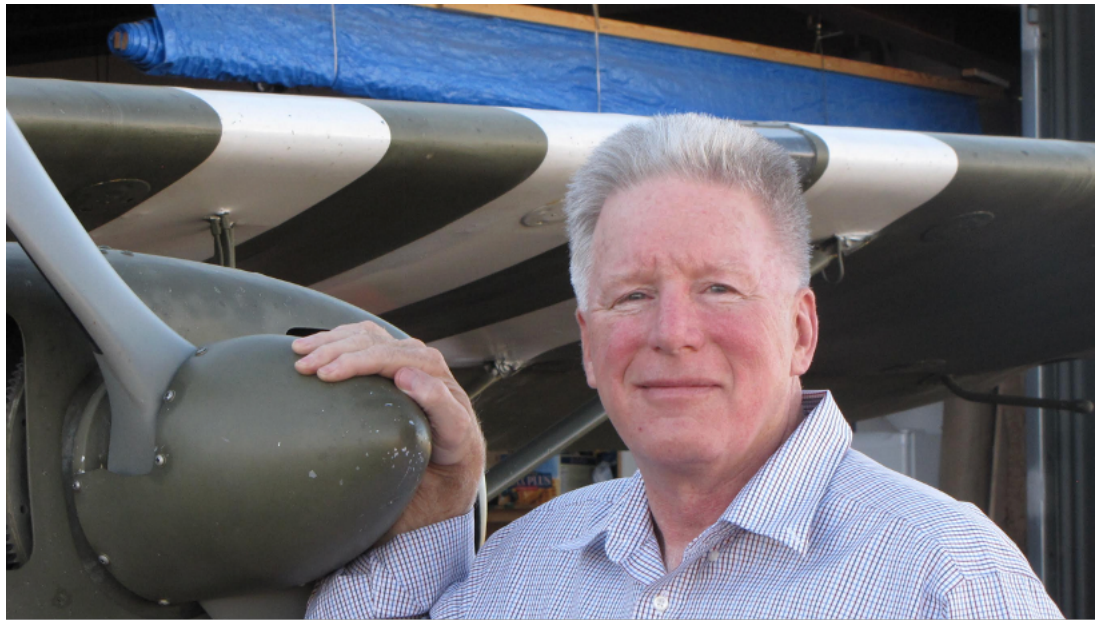
Upcoming Events

Check out our Chapter Website at https://www.eaachapter691.org for more information about upcoming activities.

On Saturday February 15th , Northern New Mexico Chapter 691 of the Experimental Aircraft Association (EAA) will meet at the Santa Fe Jet Center pilot's lounge, and will feature a presentation by John Lorenz entitled "Flying New Mexico's Back Country". The meeting, open to all interested, will begin at 9:30 with coffee, pastries, and informal discussion, followed by a short business meeting at 10:00 and the presentation beginning at 10:30.

This Saturday,
February 15th
@ KSAF

John Lorenz is a CFII/MEII with a glider rating, an interest in sand-lot acrobatics, and over 2500 hours of being scared witless while giving instruction in tailwheel airplanes. He has taught the New Mexico Pilots Association (NMPA) Back Country Clinic and helped with the NMPA Mountain Flying Clinic. He had a 26-year career as a geologist for Sandia National Laboratories, followed by another 17 years as a consulting geologist. He is currently incompletely retired from consulting but still teaches flying. The presentation "Flying New Mexico's Back Country" covers some of the techniques needed to successfully fly into and out of remote/back-country airstrips, as well as overviews of 1) strips in NM that can be used to practice back country flying, 2) more challenging strips that are within the Gila National Forest in southwestern NM, and 3) dirt strips in NM that are available to pilots once a year for hosted breakfast fly-ins.



President's Report

by Will Fox

Check out our Chapter YouTube channel at https://www.youtube.com/@eaachapter691 for the latest videos. For a schedule of upcoming events, go to the Chapter website at https://www.eaachapter691.org/upcoming-events/

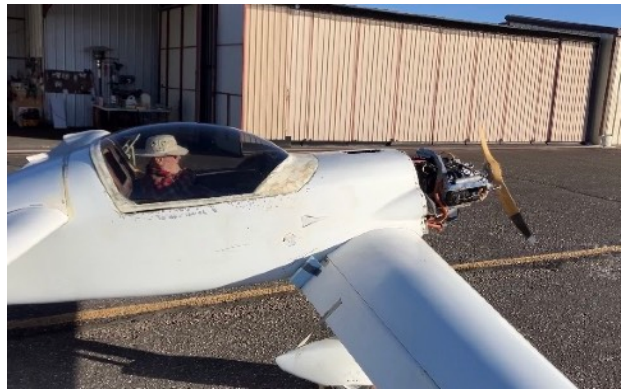
Cold Weather Flying

Hi Folks, it was 6 degrees in the morning the other day when I hopped in the Pegazair for a flight. The density altitude at the Los Alamos airport was around 4000' (the airport elevation is 7272'). That rascal got off the ground in 300' and climbed at over 1100 fpm. When I leveled out it was truing out at 130 knots and air was smooth as Buddha's belly. With the New Mexico sun shining in through the skylight and my heated vest turned up, it was toasty warm. That's what I call a Rocky Mountain High!

We have a great talk coming up this Saturday. John Lorenz will be talking about Back Country Flying. John is a CFI and periodically teaches a course about it for the New Mexico Pilots association. He is also a great speaker, so please join us in Santa Fe in the Jet Center Pilot Lounge for the fun. The Social starts at 9:30AM with donuts and coffee, followed by a short meeting at 10:00AM and then John's talk which will start at 10:30 AM.

We are revving up the Dragonfly project by revving up the old 75 hp RevMaster engine that is on the plane. The plan is to drain the oil, pickle the engine, pull it off the airframe, and sell it to help fund the project. The engine started right up the other day after we figured out we needed to turn on eight switches and one breaker to get it going. Then as the header tank began to fill with fuel, the old gal got so excited that she started spewing100LL into the cabin. "Luckily" Skip was on the inside of the plane and I was on the outside taking a movie of the action. By that I mean that Skip has more lives than a centipede has legs. He shut down the engine and hopped out to help me mop up the gas and drain the remaining fuel out of the header tank. We found the leak was coming from the sight glass that shows the fuel level. Repairs are in progress.

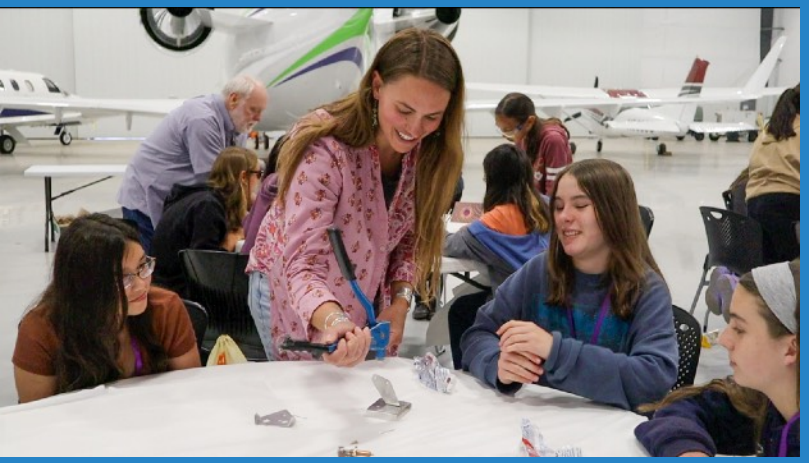
See you all at the meeting on Saturday.



Firing up the RevMaster on the Dragonfly and looking for fuel leaks. We didn't expect to find a big one coming out of the sight glass for the header tank. It's good that Skip had his fireproof hat on just in case. We are getting ready to pickle the engine and pull it off the plane so we can sell it to raise some money for the project.

Letter from the editor

by April Fox



Hello Aviation Enthusiasts!

We have an exciting year lined up and are looking for motivated aviation enthusiasts to assist us in our aviation STEM program for youth (hosted at LAM in April), a collaboration with STEM Santa Fe for their Girl's Aerospace and Aviation Summer Camp (June), and installing a new engine on the Dragonfly (2025). EAA 691 is going to need your help!

Please consider volunteering your time for upcoming youth events and/or dragonfly workshops. For more information please reach out to myself, or our STEM Coordinator Walt Atchison. We look forward to hearing from you!

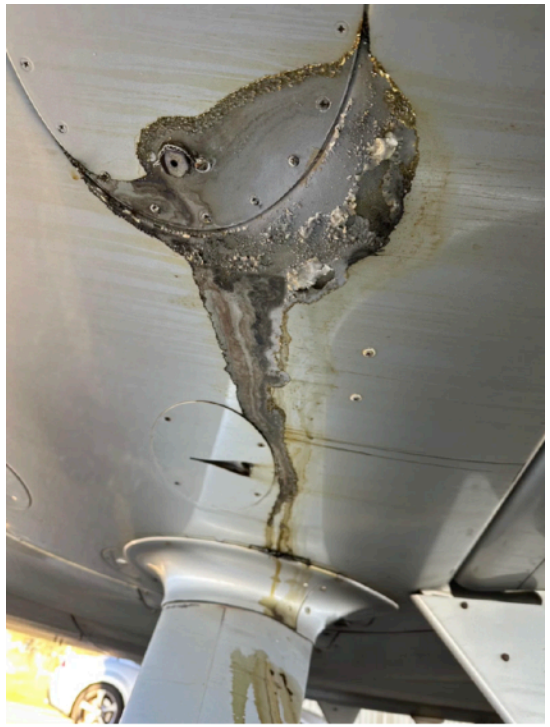
Tech Corner

by Will Fox

Unleaded Avgas

You just landed at the Reid-Hillview Airport (RHV) in Santa Clara County, California. You need to fuel up the plane and notice that they sell some of that new fangled unleaded avgas. It is supposed to be good for your engine because there is no lead in it to gum up the works. As you wonder if you should give it a try or not, another pilot walks up to admire your plane. You decide to ask him what he thinks of the unleaded fuel. He looks at you and with a smile and says, “If you want valve seat erosion go with the UL94, and if you want fuel leaks and paint wrinkles go with the G100UL. Oh, and you’ll need an STC to use either one, and for the UL94 you’ll need to get a mechanic to do a Form 337 for you. If you want regular old 100LL you’ll need to fly over to Los Banos which is about 40 miles southeast of here.”

Welcome to the transition from leaded to unleaded fuels in the piston aircraft aviation world. Let’s start with a little update with what is going on and, then I can tell you more about erosion, leaks, and paint wrinkles. The US began phasing out the use of tetraethyllead in automotive gasoline in the 1970s. In October 2023, the EPA found that lead emissions from aircraft engines using leaded fuel contribute to air pollution that may endanger public health and welfare. This finding obligated the EPA to propose and implement regulatory standards to control lead emissions from aircraft engines. The FAA and the aviation industry anticipated this and set a goal to have an unleaded replacement for 100LL available by 2030. Without going thru all the history and



Paint damage on a Cirrus aircraft that started using G100UL.

bureaucratic floundering that occurred, suffice to say that two unleaded avgas fuel suppliers have emerged at this point in time with commercially available products. They are UL94 made by Swift Fuels Inc and G100UL made by General Aviation Modifications Inc. (GAMI). Here is a little background on both of these fuels.

Swift Fuels developed a 94 octane unleaded avgas know as UL94 and obtained an FAA Supplemental Type Certificate (STC) for it to be a drop in replacement for 100LL for aircraft with lower compression engines. It meets the minimum octane requirements for 70% of the US piston fleet. UL94 does not meet the 100 octane rating for higher performance engines with high compression ratios, but Swift Fuels is in the process of developing another unleaded fuel called R100 that will replace 100LL for the rest of the fleet. UL94 became commercially available in 2015. The University of North Dakota (UND) used UL94 for approximately three months in 2023 accumulating 46,000 hours of operation in its flight training program before dropping it and returning to the use of 100LL. They stopped using UL94 when they noticed significant valve seat recession in the aircraft engines that were using it. Turns out that lead helps prevent valve seat erosion and because there is none in UL94 it might have been a problem. Valve seat recession was a big deal during the conversion of automobiles to unleaded fuels in the 1970s. The solution back then was to use a harder valve seat insert made from steel and cobalt alloys with a high chromium content. Lycoming said that their analysis of UND's Lycoming engines indicated that the "aromatic concentration tolerances" in UL94 may have contributed to the problem and they are continuing their investigations.

GAMI developed a 100 octane unleaded avgas known at G100UL and was issued a Supplemental Type Certificate (STC) on September 1, 2022, that allows it to be a drop in replacement for 100LL for essentially all piston engine aircraft in the fleet. That being said, neither Lycoming nor Continental have approved it for use in their engines. Cirrus Aircraft does not approve the use of G100UL or any other unleaded avgas in their SR series of aircraft. GAMI began limited sales of G100UL at two airports in California in October 30, 2024 where the use of 100LL had been banned. Within weeks of it use, reports of fuel leaks and paint damage to the aircraft using G100UL began to surface.

Michael Luvara, who is an A&P and an engineer, inspected some of the aircraft in California that seemed to be having problems. After looking at the aircraft he decided he would conduct some tests of his own to compare the effects of G100UL to 100LL on painted surfaces . His tests indicated that G100UL caused the paint to wrinkle and come loose, and that it also caused rubber components like fuel lines and O-rings, to swell. A few weeks later the owner of an RV-6 asked him to take a look at his plane, because it was leaking fuel and the paint was wrinkling and peeling after using G100UL. That inspection resulted in Luvara conducting additional tests that indicated that G100LL also softened

Will Fox is a flight instructor and homebuilder. He also serves as a Technical Counselor and Flight Advisor for the EAA. In his spare time he enjoys working on and flying his two homebuilt aircraft, a Pegazair P-180 and a Questair Venture. He is also fascinated with solar power and electric vehicles, so his next airplane will be electric. Please feel free to contact him at tailspinfox@gmail.com if you have questions or comments.

commonly used tank sealants, and that could cause fuel leaks. He posted his results in three parts on his YouTube channel. GAMI attempted to dispute Luvara's results by conducting a poorly documented, quick test using a single sample and then published their results on YouTube saying that there was no problem with their fuel other than staining the paint. That was surprising and not in a positive way. You would expect that GAMI would have mountains of data on the effect of G100UL on all types of aircraft paints, tank sealants, fuel lines, etc. to contradict Luvara's results, and that they would want to share it with the aviation community. GAMI, where is the data?

These tests have left aircraft owners wondering if G100UL is creating problems or not. It is interesting to note that most aviation fuels are governed by an American Society for Testing and Materials (ASTM) specification that defines the properties, test methods, and performance of the fuel. ASTM 910 covers 100LL and ASTM D1655 covers Jet-A . Swift Fuels UL94 is covered by ASTM D7547 for unleaded aviation fuels. GAMI has not pursued an ASTM specification for G100UL saying it wants to protect its proprietary formula and that an ASTM specification is expensive and not necessary. This leaves questions in many peoples' minds about just how much testing and coordination with the aviation industry that GAMI has really done.

Swift and GAMI use different methods to achieve the necessary octane rating for their fuels. Swift says they use an oxygenated hydrocarbon (ethanol, MTBE, and ETBE are examples of oxygenated hydrocarbons) in their fuel to achieve a higher octane rating. GAMI increases the percentage of Xylene in their fuel (it is an old trick used by car racing enthusiasts to increase the octane of the gasoline by adding Xylene or Toluene to it). Xylene is used as a solvent in paints and rubber compounds. GAMI's Safety Data Sheet (SDS) indicates that the Xylene content in G100UL can be anywhere between 20%-40% by volume. It turns out that 100LL avgas contains no Xylene but its SDS indicates that it does contain 15% to 25% Toluene. Toluene is also a good solvent, but it has three times the volatility of Xylene, so it evaporates more quickly. Since Xylene evaporates much more slowly and is also more viscous than Toluene' it tends to sit on a surface much longer allowing more time for it to interact with the surface material. This could be one of the reasons that G100UL has more of an effect on paint than 100LL does.

I appreciate that our brave aviation brethren in California are beta testing the new unleaded avgas products. Their sacrifices will benefit all of us. At this point in time, I do not plan to put UL94 or G100UL in my fuel tanks' although I look forward to the day I can use unleaded avgas. I also want to especially caution those who fly experimental aircraft. STCs apply to certified aircraft but aren't applicable to experimental aircraft, and there is no requirement that a fuel provider do any testing on the materials or components that might be used in your aircraft. If you want to experiment with unleaded fuels, go right ahead, but do some testing first before you blast off into the wild blue yonder.

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Clickbait

G100LL Fuel Testing by Mike Luvara - Shows how G100LL is causing fuel leaks and paint wrinkling.

https://www.youtube.com/watch?v=sPeQ6T3vB2E

Flying the Shark LSA is a blast.

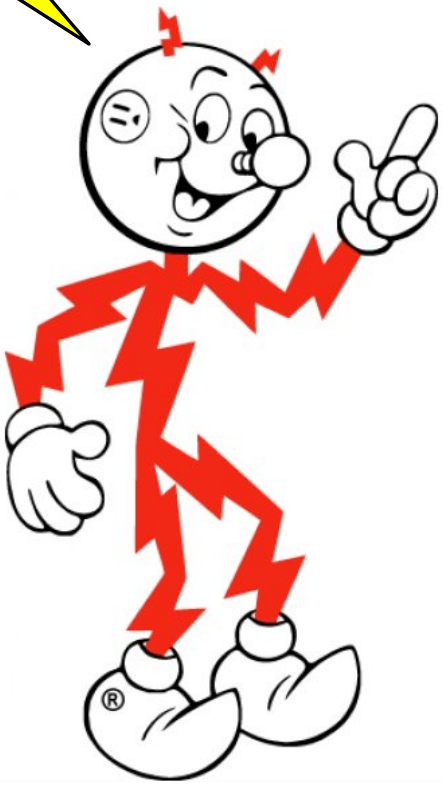
https://www.youtube.com/watch?v=cfv_KnVWLwo

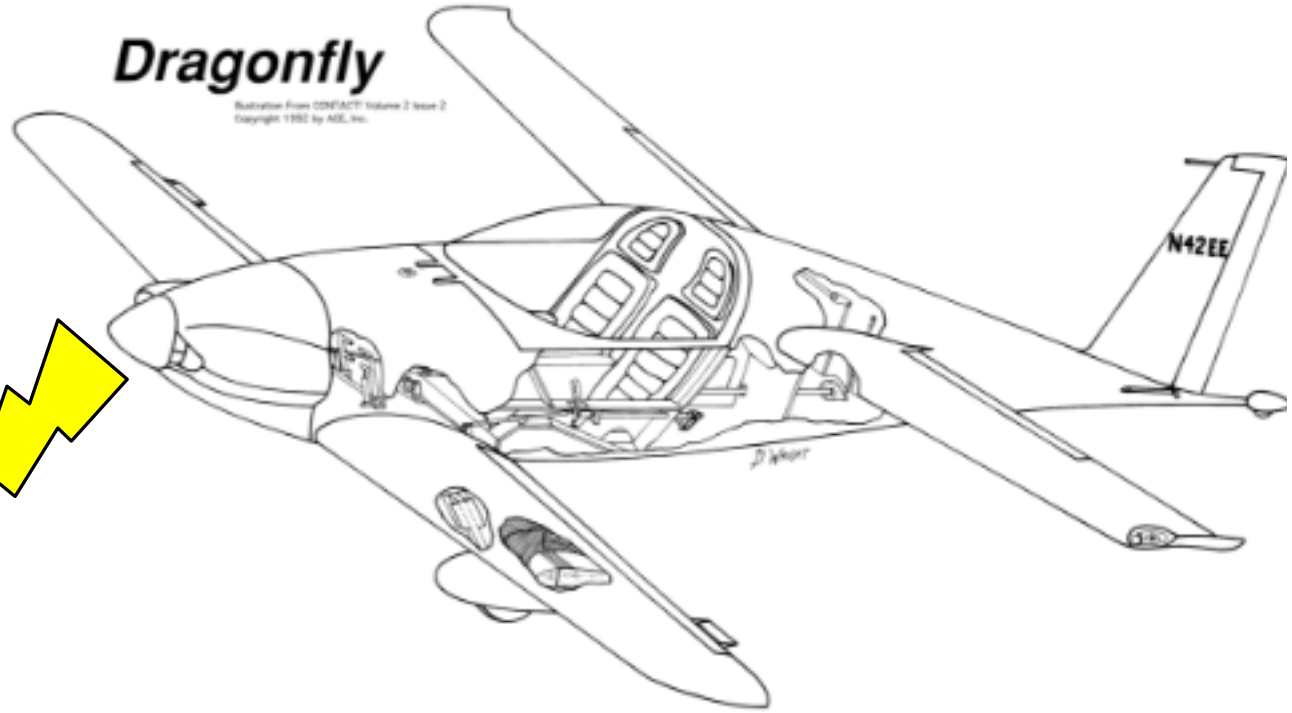
The Story of the Questair Venture

https://www.youtube.com/watch?v=VfkmvqXSwW4

https://www.mentalfloss.com/article/31341/flying-pinto-killed-its-inventor
https://www.thedrive.com/news/43549/the-tragic-story-of-the-flying-ford-pinto-ended-exactly-how-youd-expect

Hey Kids! Keep an eye out for upcoming work sessions to Electrify the Dragonfly!





EAA Chapter 691 Membership Application/Renewal Form

Please consider making a donation to our 501c(3) non-profit by mailing this form along with $35 to our Chapter Treasurer, Checks can be made out to <u>EAA Chapter 691</u>:

David Young
819 Gonzales Rd
Santa Fe, NM 87501

Name: _____
Spouse/partner's Name: _____
EAA #: _____ Expiration Date (MM/YY) _____ / _____
Address: _____ City: _____ State: _____ ZIP: _____
E-mail: _____
Home phone: _____
Work phone: _____
Cell phone: _____
Please list your currently flying A/C and any finished or in-progress projects: