Chris Trapp's 415C Ercoupe

EAA Chapter 691 Newsletter
October 2022

On the Web @ www.eaa691.org

EAA 691 is:

President: Will Fox

Vice President: John George

Secretary: Pierre Levy

Treasurer: David Young

Web Editor: Brian O'Neil

Newsletter Editor: April Fox

Table Of Contents:

Upcoming Events

- **This Saturday-** October 15- Los Alamos Young Eagle Rally @ KLAM**)**
- **Dragonfly Work Sessions** every Wednesday and Saturday @ 2:00pm @ KLAM. Contact Will Fox for more information

Letter from the assistant editor

by Will Fox

I'm standing in for April as editor this month because she's a Mom, and Super Heroes can only do so much. I could list all the things that Moms do, but we all know what they are. It really comes down to this: without Moms our world would come crashing down around us. They are the glue that holds things together and the grease that makes things turn. Wait a minute, that sound like a mechanic talking. How about this: "Life doesn't come with a manual, it comes with a mother". Nope, that's not quite it either. Rudyard Kipling said it the best I think, and please allow me to paraphrase it a bit –"God couldn't be everywhere and therefore she made mothers".

President's Report

by Will Fox

Young Eagles Soar

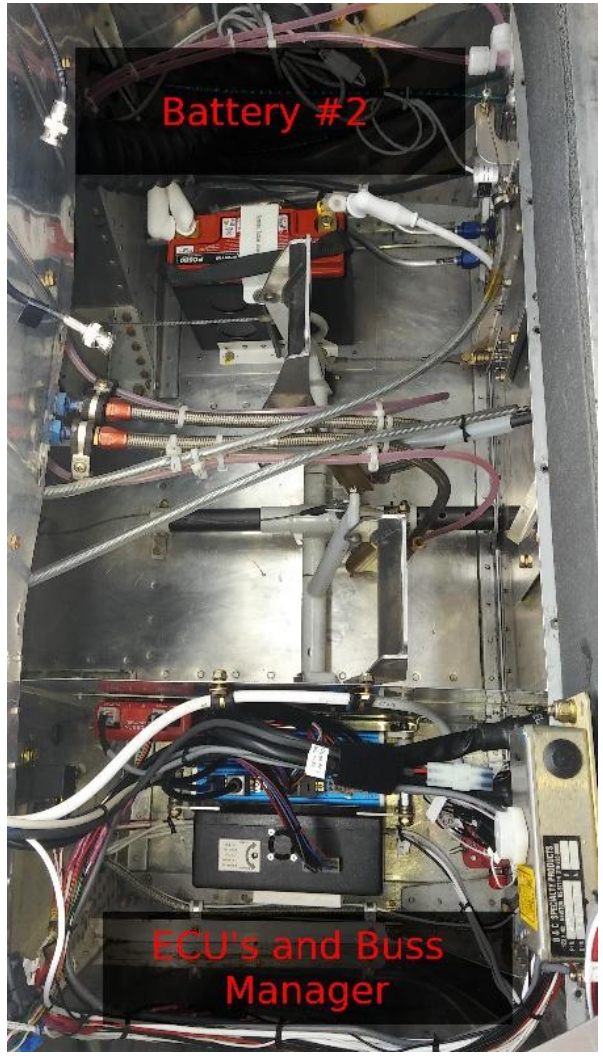
"Once you have tasted flight, you will forever walk the earth with your eyed turned skyward, for there you have been, and there you will always long to return" – Leonardo Da Vinci

We had a great turnout for our Young Eagles rally in Espanola last month. Over twenty kids got rides in seven different airplanes and the weather was absolutely beautiful. The kids had a great time and the parents were extremely appreciative of the opportunity to expose their kids to aviation. A big thanks to April and Sonya Maria for organizing this event and to the pilots and ground crew who made it all happen. Some of the parents and kids were so enthusiastic that they asked if we could do it again in a week or so ☺. We couldn't quite manage to do it again that fast but we did invite them to come to the next Young Eagles rally that we will be hosting at the Los Alamos Airport on October 15th. We hope to have the Los Alamos Civil Air Patrol aircraft on display at that one. We are planning to have a cookout afterwards for the pilots, ground crews, and members to thank them for all the hard work and effort that they put into making our Young Eagles rallies a success.

Young Eagles is all about free airplane rides for kids.

Renovation and electrification of the Dragonfly that Chris Trapp donated to the chapter continues with the modification of a canopy from another Dragonfly to fit it. We are also going thru the control system and rebuilding some of the components to make them more robust and to allow for full travel of the control surfaces. Chris continues to be a major contributor to the Dragonfly project by donating an Ercoupe airframe and a Volksplane project that he had in storage to the Chapter to help us raise money for the electric propulsion system we are going to need before long. More on that topic in a future report, but in the near term we need to put together a crew to move the aircraft parts up to Los Alamos where we can clean them up before we part them out and sell them.

November's Chapter meeting should be real interesting because Steve Hill will be our guest speaker and will give a talk on composites among other things. Steve is a renowned composites expert and propeller builder. His props have been on every Reno National Gold Championship plane from 1991 to 2017. Steve's presentation and our next meeting will be at the Los Alamos Airport on Saturday November 19th.



Member Happenings

David Roe has installed an EFII electronic ignition and fuel injection system on his airplane for more power and efficiency.

Young Eagles Rally

Setember 24th Young Eagles Rally in Espanola

Young Eagles Rally

Setember 24th Young Eagles Rally
in Espanola

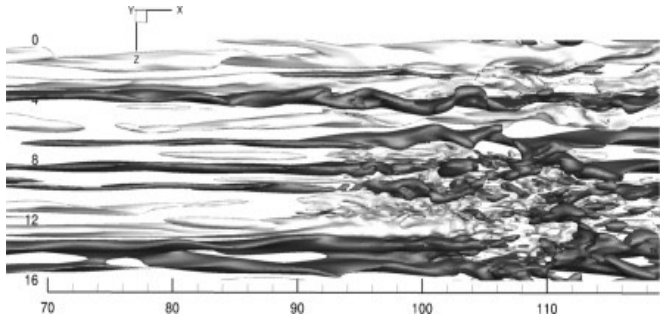
Tech Corner

by Will Fox

Boundary Layers

" The action is always at the interface of things. The Boundary Layer is where the most interesting things happen."

The pilot was taking off on a freshly mowed, dew, covered strip. Everything was fine until the pilot tried to rotate for takeoff and nothing happened. The nose of the aircraft would not come up and no amount of pulling back on the stick seemed to help. The pilot continued down the strip assuming that more airspeed would help but the plane would still not take flight and he was running out of runway. It was too late to abort, so he continued the takeoff pulling harder on the stick hoping the plane would lift off. Finally, just before the end of the strip it did, but would not climb out of ground effect. The pilot then noticed that the leading edge of the canard was covered with pieces of wet grass clinging to it. As the plane continued to accelerate and the grass dried, and began to blow off, the aircraft began to accelerate and climb. As more and more grass came off, the performance of the aircraft continued to improve until all the grass clippings were gone and the plane flew normally.



A numerical simulation of the transition from laminar to turbulent flow in a fluid.

The pilot was enjoying a pleasant cross country flight when the plane entered a light rain shower and began to pitch down. The pilot pulled back on the stick and arrested the descent but didn't have enough trim authority to completely eliminate the pressure. As the rain increased, it required more back pressure on the stick to maintain altitude. The pilot was trying to understand what was happening because even, with considerable back pressure on the stick, the aircraft would not hold altitude. The pilot became concerned that he might not be able to arrest the descent even with the stick pulled all the way aft. Just about then, the plane flew out of the rain and shortly thereafter the pilot regained full pitch authority and the plane accelerated and began a climb back up to altitude.

The pilot taxied out for takeoff on a cold, but beautiful morning in the winter with just a bit of frost on the wings. It wasn't much at all, didn't even cover the whole wing, and was about the size of grains of sand. On takeoff, the aircraft would not lift off even though the aircraft was traveling much faster than its normal lift off speed. The pilot aborted the takeoff but it was too late and the aircraft ran off the end of the runway and ended up, upside down, in a plowed field. Fortunately, the pilot only had minor injuries.

Why did these airplanes not want to fly? The reason is wing contamination. The effects of a contaminated wing can be so pronounced and the performance so degraded, that it can prevent an aircraft from taking off, climbing out of

ground effect, or even maintaining altitude at full power. We have all heard stories about severe icing conditions causing this, but how can things so benign as grass clipping, rain drops, or a light frost do this? The answer is in something call the boundary layer.

To understand this, we need to know a little about the amazing way that a fluid (in this case air) moves around an object (a wing) in motion. First, air like most fluids, is sticky so it wants to stick to itself and to the wing. We call this stickiness, viscosity. Most of us don't think of air as a sticky fluid, but it is and to better understand its behavior lets take a look at another fluid like honey, whose sticky behavior is much more obvious. If you dip your finger into a jar of honey, the honey will stick to your finger as well as itself. When you pull your finger out of the honey and it slowly flows back into the jar, it forms a moving film of honey around your finger called a boundary layer. If you warm the honey up so that its viscosity goes down it becomes easier to pull your finger out of it and the layer of honey on your finger will be much thinner. In the case of air, because its viscosity is 100,000 times less than that of honey it doesn't feel sticky to us nor can we see the tiny boundary layer that forms as we move thru it. But its stickiness becomes more and more apparent the faster and faster you move thru it. If you stick your hand out the window of a moving car you can feel the stickiness of the air as it tries to drag your hand along with it. The drag you feel is due to the viscosity of the air. So is the lift you feel when you angle your hand into the airstream like a wing. The thin layer of air surrounding your hand, is a boundary layer. And in the boundary layer the air molecules that are sticking to your hand are not moving, but just a few thousandths of an inch away, the air is moving by your hand at the same speed as the car. Without viscosity we would have no boundary layer and without a boundary layer we would have no lift or drag.

We can now see that the boundary layer that is created as a wing travels through the air is of some importance when it comes to the lift and drag on the aircraft. On light aircraft the boundary layer over a wing is quite thin and varies in thickness from microscopic at the front of the wing to a few ten thousandths of an inch at the trailing edge. Being so thin, particularly at the front of the wing, it now becomes apparent how it might be affected by things like blades of grass, rain drops, and grain-sized frost. These small objects look like boulders to the thin boundary layer on the front of the wing. Under certain conditions, they can completely disrupt the boundary layer and this in turn can drastically affect the amount of lift a wing can produce and the amount of drag it generates in the process. Different airfoil shapes can be affected more than others when the boundary layer is disrupted and thus it is important for an aircraft designer to select an airfoil that is less sensitive to this behavior. However, certain types of airfoils create boundary layers, that while sensitive to contamination, produce much less drag than others making for a faster and more efficient aircraft. As in all aircraft design there are compromises to be made.

NM PA
New Mexico Pilots Association

Honey is a sticky fluid and has a high viscosity. Because of this when you dip your finger into a jar of it, it sticks to your finger and to itself. When you pull your finger out it will form a boundary layer on your finger as it flows back into the jar.

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.

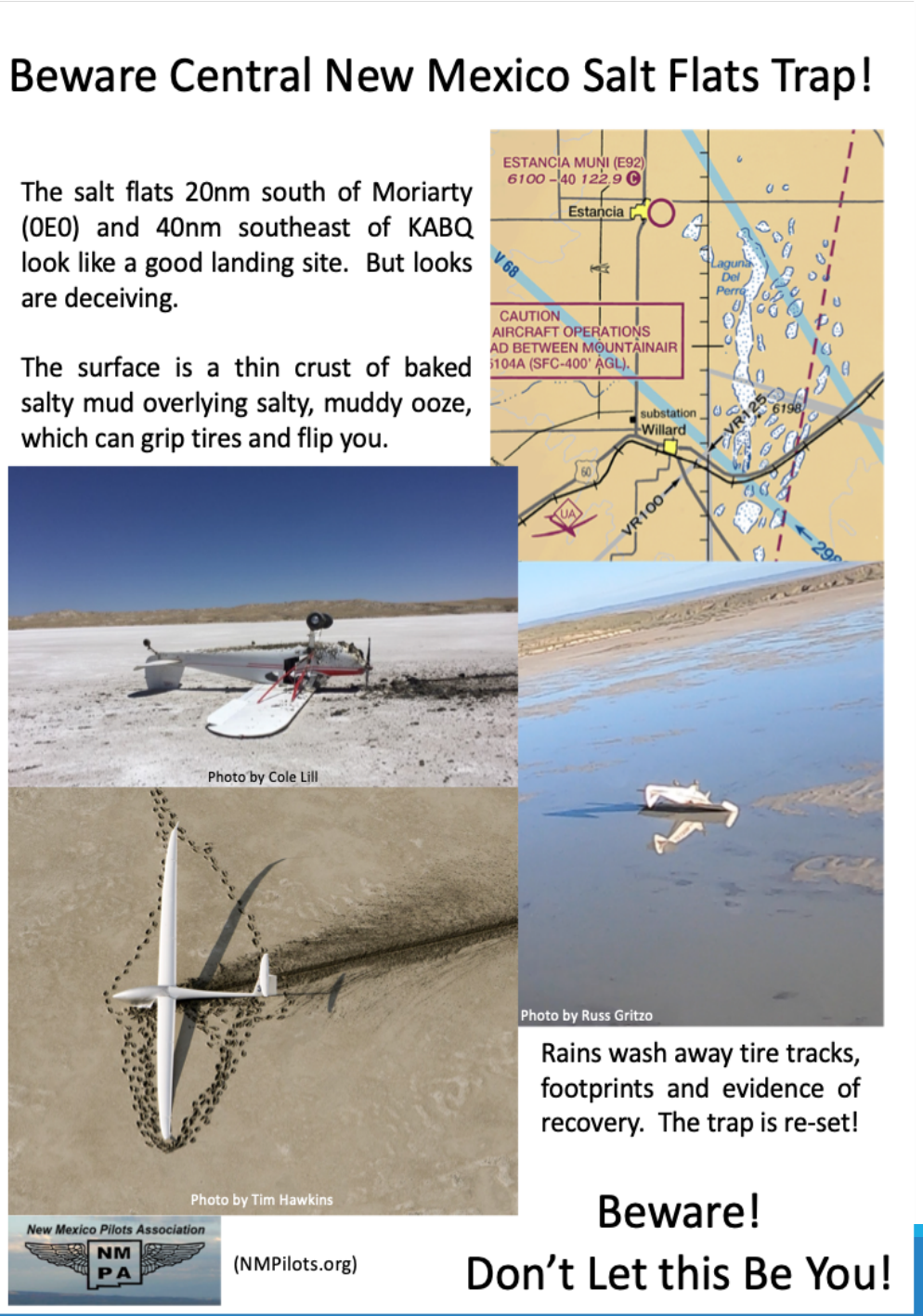
From John Lorenz:

There have been at least two attempted landings on the alluring but deceptive salt flats about 20nm south of Moriarty, NM this summer, resulting in planes that were flipped onto their backs. These are just the latest in a string of disastrous landings going back for years on the flats.

Several things conspire to reset this trap, including

* Embarrassed pilots who generally don't like to talk about their experiences, so other pilots don't learn from them, and
* Oozing mud and subsequent rains that quickly erase all traces of the accidents and the messy wreckage recovery.

Since back-country flying is becoming more popular, NMPA is spreading the word about this hazard. You might want to raise this topic with your membership, pilots and student pilots. We have attached a one-page handbill describing the hazard, which could be placed in your newsletter, posted on a bulletin board, or just handed to pilots.



NMPA is also working to have the salt flats labeled as dangerous on the NM aviation chart, and maybe even on the FAA sectional chart

Yes, successful landings have been made on these flats, but the surface conditions change with the season as well as with the location on the flats, and the success rate is dismal.

Some NM aviation organizations are already aware of and are communicating this hazard, and we thank you. Only by awareness and education can we overcome the trap associated with these salt flats.

Thank you for your support of New Mexico aviation.

Sincerely,

John Lorenz, President
Bob Waters, Safety and Education Chair
New Mexico Pilots Association
www.NMPilots.o

EAA Chapter 691 Membership Application/Renewal Form

Please mail this form along with $25 to our Chapter Treasurer, Checks can be made out to EAA Chapter 691:

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: