



"To promote, encourage, and facilitate in a harmonious and inclusive manner all recreational aviation activities with an emphasis on education, safety and fellowship".

Upcoming Programs and Events

Gary Arms, Program Chairman

November 3, 2015: Ed Wischmeyer will present slides of the 2015 Homebuilt Award Winners from Oshkosh, along with general interest slides. He is also doing a study of RV accidents and incidents, based on NTSB reports, and may have preliminary results to share with the chapter.

December 1, 2015: Christmas Party at Carey Hilliard's on Hwy 21 in Garden City, 6 p.m. Spouses and guests are invited. Order from the menu.

Design Group Minutes

By Will White

October 13, 2015

In Attendance:

Joe Buttner
Doug McKissack
Arman Motamedi
Esteban Villa
Patrick Lloyd
Willard White
Taher Surti

We're delighted to have Taher Surti join us. Taher works for Gulfstream.

Patrick demonstrated a working prototype of our entry in the EAA Loss of Control (LOC) contest. He calibrated the device

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EAA Chapter 1514 General Meeting Minutes October 6, 2015, 6:00 PM at Lovezzola's Pizza, Pooler, GA

The October 2015 meeting was held at Lovezzola's Pizza in Pooler. There were 16 members and 5 guests in attendance. The speaker was Jeff Guy, who gave a presentation on paragliding, including bringing in his equipment, which he characterized as the world's smallest manned flying machine.

The presentation covered how Jeff got into paragliding (he was a skydiver first, powered flight came later) a discussion of his sponsor (the Never Quit Foundation: neverquitnever.com), and the equipment and training required for paragliding. A paraglider is classified as an ultralight, so doesn't require a pilot's license or a medical, but proper training is highly recommended. The equipment consists of an engine and propeller worn on the back, and a canopy. The presentation was followed with some in-flight videos and a question-and-answer period.

A short business meeting was held after the presentation.

President: No report

Vice President: No report

Treasurer: The treasury stands at \$2088.48

Secretary: No report

Design Group: The group still meets approximately every other Tuesday at Sheltair. We are currently working on some ideas for an entry to the EAA's Founder's innovation prize loss of control competition. The VW-powered 2-place homebuilt is also still in work, with the next step being a re-evaluation of the wing airfoil for better cruise performance.

Programs:

Upcoming meetings are:

General Meeting Minutes continued on [page 4](#)

2015 Officers:

President:

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Secretary:

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Jack Scott 912-441-6577 jscott@echosierra.net

Chairmen of Standing Committees:

Design Team Chairman:

Willard White 912-925-2478 whiteat50@comcast.net

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Advisors:

Flight Advisor:

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EAA Chapter 1514 meets the first Tuesday of every month at 6:30 PM at Lovezzola's Pizza, (328 US Highway 80, Pooler. 912-748-6414) or at an offsite location as dictated by that month's program. The November meeting will take place at Lovezzola's.

The November speaker will be: Ed Wischmeyer
See [Upcoming Programs](#) for details.

The deadline for the December 1, 2015 newsletter is: Close of Business, November 20, 2015.

in twenty seconds or so and it worked exactly as we expected in a perfect situation. We had quite a lively discussion about how it would work in the cockpit of various airplanes. Possibly we'll have to develop it in several configurations to fit various cockpit situations – hopefully not. We do intend to beg for access to several of our friend's airplanes for testing. LOC entry forms were distributed – I'll take them up in two weeks when we meet again. Although our prototype uses a micro-controller which measures .7" x 1.4", there is some doubt that we can fit all the components into a 1" x 1" x 2" enclosure. Our plan is to gather the components together and then use a 3D printer to fabricate a tight container. Remarkably the code for this project is only about 50 lines. It will get more complicated but that is surprising. One modification of the program is for the extents to be stored in nonvolatile memory so it won't have to be calibrated on each start-up. Another possibility occurred to us – programming a micro-controller to listen for the stall warning horn and then activate. I was thinking of another little black box, but this could be added to our present device if we wish. We'll talk about it some more. We confidently agreed to keep any winnings in the group and not distribute them, if we're fortunate enough to win anything we'll use it to fund our projects.

We spent the rest of the evening defining our airfoil. We finally agreed on a stall speed of about 53K or so. Our 66 square foot wing with 42% span (plain) flaps extended 30 degrees would have to produce a Clmax of about 1.58. After 20 or so iterations with JavaFoil, we agreed on an airfoil with the following characteristics: Thickness: 15% at .35c. Camber 2.2% at .35c, and a leading edge radius of 2.7." This airfoil has very nice stall behavior and the 3D Clmax is 1.36 at 16-degree angle of attack. With the .25c flap extended 30 degrees the Clmax was 2.17.

The Clmax for the entire wing works out to be 1.7 and the stall speed should be 51K. More laminar flow would have been nice but we were constrained by our spar construction methods – that is using extruded aluminum angles for spar caps. This pretty much necessitates locating the spar at the wing's thickest and most cambered point where the top and bottom skins are most nearly parallel. Thanks to all for a job well done. This was a major milestone for us. This will be a very nice wing for takeoff and climb, and the tradeoff in cruise speed appears to be only about two or three percent.

Our third objective was to begin a review of our airplane specifications. We didn't have time left for that but we have some information about 4" wheels and brakes to consider. We have the current specs to review and discuss when we meet again.

Bob MacDonald noticed that we were wishing for a draftsman with CAD skills, so he offered to send us a complete drafting kit with paper, pencils, T-square, 30 – 60 and 45 degree triangles, and yes, an eraser. Your point is well taken, Bob, we could well spend a great deal of time and money learning to use a powerful CAD/CAM system when simple still works pretty darn good. We're going to muddle through and quit complaining.

Our next meeting will be at the Guild, at 518 Martin Luther King, so we can see the CNC router and 3D printer. We'll continue to advance the LOC project and will proceed with a review of our Design

October 27, 2015

In Attendance:

Doug Mckissack
Joe Buttner
Arman Motamedi
Taher Surti
Willard White

We discussed adding a "tone decoder" to our LOC prevention device. This function could be programmed by putting the device in the programming mode and then activating the stall warning so the "Silver Chain" could store the frequency of the stall warning horn. Thereafter our device would listen for the stall warning horn and activate the stick shaker when the stall warning sounds. Response was tepid, so I'll do some research and bring it up one more time.

Joe suggested that we add a "Calibration LED" to the device. The Light Emitting Diode would have two functions: 1. Tells the operator that the device is in the programming mode. 2. Illuminates the area that the ultrasonics are looking at which will make the installation more reliable. This is a good idea and is easy to implement. Somebody will soon be missing the reflector on their flashlight.

The first change to the specifications was to the fuel capacity. With the smaller engine, 16 gallons of fuel seemed about right for a beginning. We settled on 17 gallons on board; enough for 3.5 hours of cruise with a 30-minute reserve.

We had quite a discussion about how the horizontal and vertical tails are attached to the tail boom. The first option presented was to integrate the H tail with the tail boom. Assembly is complex and we would certainly be hoping the H tail never had to be removed or replaced. Doug suggested we locate the H tail in a notch on top of the tail boom which should make construction

and repairs easier. Another idea was a cruciform tail; the Taper Ratio is quite low on the Vertical tail, which causes the V tail to be nearly four inches thick where it joins the tail boom. Why not attach the H tail to the V tail at its base? I'll make some illustrations of the three H tail locations and how the structure might look and we'll take this up next time we meet. Spin recovery is also a consideration; The H tail should not be in a location so that it will blank the V tail in a deep stall. I'll bring some excellent illustrations from Rymer's book. We'll locate the H tail as far aft as feasible. JavaFoil can illustrate the downwash behind the wing at various angles of attack – I'll try to post some pictures.

H tail location debate spilled into tail boom structure and we basically came down to two options for the tail boom: 1. An oval tail boom with four longerons. 2. A tail boom which is oval on the top and flat on the bottom. Such a tail boom might be easier to construct because it is predicated on two extruded aluminum angles on the bottom corners. This design would still have two longerons at about 10 and 2 o'clock on the structure and one longeron at 6 o'clock to minimize oil-canning on the flat bottom surface in flight. I'll make some illustrations for this continuing discussion.

The horizontal tail has to overcome three forces on the airplane:

1. The thrust line is approximately six inches above the drag line. At cruise, the thrust and drag are approximately 97 lbs., so the thrust line moment is about 49 ft. lbs. nose down.
2. The center of gravity is typically about four inches ahead of the center of lift. At 850 lbs. typical cruise weight, the result is a nose down moment of about 280 ft. lbs.
3. The moment coefficient of the airfoil itself is about -.061. This is fairly typical. The correct formula (we think) is: $Q \cdot C_m \cdot c \cdot S$. Cruise Q is about 48.4 psf, c is 3 feet, and S is 66 sq. ft. so the moment from the airfoil is 585 ft. lbs. nose down.

As it is currently located, the H tail has an arm of 8.0 feet, so the tail needs to make a downforce of 114 pounds at typical cruise for the elevator to be in trail. I presented a tail airfoil with an under-camber which would operate at a zero angle of attack – to minimize drag. The consensus was that we should use a symmetric airfoil and index it at a negative angle of attack to get the necessary (down) lift. I'll do some research and come back with a symmetric airfoil which is 10% thick at .30 c. We anticipate it will have to be indexed at about a minus 1.2-degree angle of attack.

We intend to make the tail surfaces of .020 ribs and .016 skins. 3/32 rivets are appropriate but difficult to find. I'll bring in some examples next time we meet.

Taher said he might be able to model the airplane for FEA which would be an interesting and very educational (for some of us) exercise.

The main landing gear location is under review. We did the research a couple of years ago and located the MLG appropriately, since then there have been some changes so we'll check it. Also tricycle landing gear came up. We need to be thinking about the uses for such an airplane. It can't be used for training, but will certainly be flown by low-time pilots and perhaps by old pilots

who can't remember much. We'll have this discussion too at our next meeting.

Next meeting will be in two weeks; that will be 10 November. We'll meet at Sheltair.

-November 3: 6:00 Lovezzola's pizza – Ed Wischmeyer - slides of AirVenture 2015 and a presentation of Ed's research into accidents in the NTSB database involving RV airplanes.

New Business:

Time for elections is coming up. A nominations committee will be forming to select candidates for 2016 chapter officers. If you have an interest in serving as a chapter officer or committee chair, please contact one of the current officers.

Also, Gary arms volunteered to start looking into a venue for the Christmas party in December (right now it is looking like we would go back to Carey Hilliards in Garden City.)

Guests in Attendance:

Jeff Guy (speaker)
Steve Isabelle
Taher Surti
Thomas Keith
Rich Gurley

Members in attendance:

Will White
Gerry Zimmerman
Joe Buttner
Gary Arms

Steve Bischof
Ed Wischmeyer
Pete Semetis
Mark Wishart
Dennis Varga
Kathy Roberts
Rick Gaffney
Tom Huff
Michael Moore

Officers in attendance:

Mike Wordell
Jack Scott
Doug McKissack