EAA Chapter 478
COCKPIT CHATTER
Lexington Park, MD February 2022
A Bronze EAA Chapter

EAA Chapter 478 Monthly Gathering
February 15, 2022
Panel Planner Software Demo
Pax Aero Solutions @ 2W6
44183 Airport Rd, California, MD 20619
Social 6:00-6:30 – Gathering at 6:30 PM

One Mile Up

Panel Planner Software
Presented by One Mile Up Inc
Gene Velazquez

Panel Planner is your best solution for designing and fabricating whole instrument panels for large twin to experimental aircraft. It is made for the aircraft owner, homebuilder, repair/refit station, flight department, designer, or manufacturer. While Panel Planner is a stand-alone program for designing the instrument panel, a knowledge of CAD is required to fabricate the panel itself"

In this edition of Cockpit Chatter

Airport Construction Update

Submitted by Allison Swint

A stop work order has been issued for Phase II of the runway extension due to weather. Expect work to ramp back up in April. Phase III is also to start in April, runway extension should be completed by December 2022. Terminal renovation expected completion is the end of March.

Please note the request below to fill out a Survey, due before 17 Feb

St. Mary's County is preparing a Request for Proposal (RFP) to solicit interest in managing food service at the St. Mary's County Regional Airport. Please assist us in gauging the demand for food options among AeroPark tenants and visitors by completing the quick survey at the following link: https://www.surveymonkey.com/r/2W6FOOD The survey will be open through close of business Thursday, February 17th.

We encourage you to share the survey link with others in and around the airport. The results will be used to determine the demand for food service and the days of the week, and meals most preferred.

The terminal renovations are nearly done, now we need to get an interested vendor in place to run the operation. The survey will provide the data needed to show a business case. An airport restaurant would help attract pilots in on the weekend and make the terminal a busy "hub" for the airport community.

Apologies if you've gotten this more than once.

FROM THE TOP

Tom Weiss, President EAA Chapter 478

As the days are getting longer, I look forward to holding Chapter activities at the Airport and getting the chance to catch up with each of you. The social aspects of Chapter life are important but are also difficult through Zoom, but we have turned the COVID corner and will resume our in person events starting with the Gathering this Tuesday.

Gene Velazquez from One Mile Up Inc will present their Panel Planner software. One Mile Up is a local company (Northern VA) and already has a relationship with Pax Aero Solutiions who will be hosting us this month. Thanks to Chris Woodburn for being willing to host us on Tuesday. Make sure you check out some of the amazing work the Pax Aero Team does when you are in the shop on Tuesday.

Make sure you note the section below in green font pertaining to EAA Membership Dues. You can renew at anytime to take advantage of the specials EAA is running, the renewal will be added on to your account starting with your current expiration date. You need to renew before 1 May to take advantage of these specials.

Our big focus in 2022 will be to get back on track with flying Young Eagles, we have not flown the number of kids the last 2 years that we have prior to the pandemic (see the latest statistics in the YE section of this Newsletter). I expect there is pent up demand out there. We will start planning to fly Young Eagles after each VMC meeting starting in March, of course each of these events are weather dependent. We will also hold the large events in June and October.

Take advantage of the EAA Virtual Ultralight Days Webinars on 22-24 Feb. If you have any interest or curiousity about Ultralight and LSA aircraft, building and maintenance techniques or the rules surrounds this class of aircraft, this would be a great opportunity to learn more. You can register by going to EAA.ORG.

I am always looking for ideas on what activities we can hold for both our membership and to support the aviation community in Southern Maryland. Please provide me your ideas on events or activities we could hold that would either be fun for us or will foster aviation and aviation saftety in our area.

Tom Weiss
President EAA Chapter 478

Renew Now to Lock in Your Savings! Effective May 1, 2022, EAA's dues will increase for the first time in 24 years, with individual memberships going from $40 to $48. However, EAA is offering members the opportunity to renew at the current rates and lock in savings for the future. If you renew your membership before May 1, 2022, you can save:

- $8 on an individual, one-year membership (total cost of $40);
- $45 on an individual, three-year membership (total cost of $99); or
- $81 on an individual, five-year membership (total cost of $159).

Members that renew before May 1, 2022, will have their membership extended by the length of the term selected, regardless of their expiration date. Please see the recent column by our CEO, Jack Pelton, for additional information

UPCOMING EVENTS

Feb Gathering 15 Feb
Febrary VMC 19 Feb
EAA Virtual Ultralight Days 22-24 Feb

EAA CHAPTER 478 MEETING MINUTES

EAA Chapter 478 Meeting Minutes
EAA Chapter 478 Board Meeting Minutes
February 1, 2022 - Zoom
1950 – The first prototype of the MiG-17 makes its maiden flight.

Attendees: John Attebury, Don Byrne, Bill Englehart, Paul Gambacorta, Jacqueline Link, Brian Link, Gabriel Murray, Tom Weiss, Sid Wood, and Bernie Wunder

Discussion:

1. February Gathering, Panel Planning software demo @ Pax Aero Solutions
    a. Meeting at Pax Aero Solutions, right next to the UMD UAV hanger.
    b. Panel Planner by One Mile Up
    c. 2,000 aircraft panel templates in the program
    d. Pax Aero Solutions has a copy of the software
    e. Will bring tables and chairs via the trailer
2. VMC February 19th
    a. No plan to fly Young Eagles after this meeting
3. Young Eagles Software demo at the March 15 Gathering, multiple people role playing

    a. Will need 4 volunteers to do this
    b. How to split 4 screens?
4. Young Eagles after the March 19th VMC
    a. Tentative plan
5. What do we need to buy with Young Eagle Credits??
    a. Printer? iPad?
6. Kick Off the New Flying Season Social??
    a. April?
    b. Coordinate with Piedmont and host a social?
        i. Goal is to get more airport pilot turnout.
    c. Do something when the terminal is done, ribbon cuttin?
        i. Coordinate with the Airport Manager.
        ii. Foster pilot community
    d. Bernie was going to talk with the airport manager
7. April 19th, gathering at MD50, Rich Miller Hangar
    a. Make more of social event and cooking on the grill before going over the hanger.
8. Young Eagles Rally June 11
    a. Mark your calendars
9. Federal Tax Return, due in May

TREASURE'S REPORT

Submitted by Don Byrne

EAA Chapter 478 Financial Report
Through 31 Jan 2021

Fund	Amount
Petty Cash	$87.29
Savings	$439.00
Checking	$20,998.30
Total	$21,524.59

SOCIAL COMMITTE CORNER

No report this month

YOUNG EAGLES CORNER

Young Eagle Coordinator – Darryl Crawford

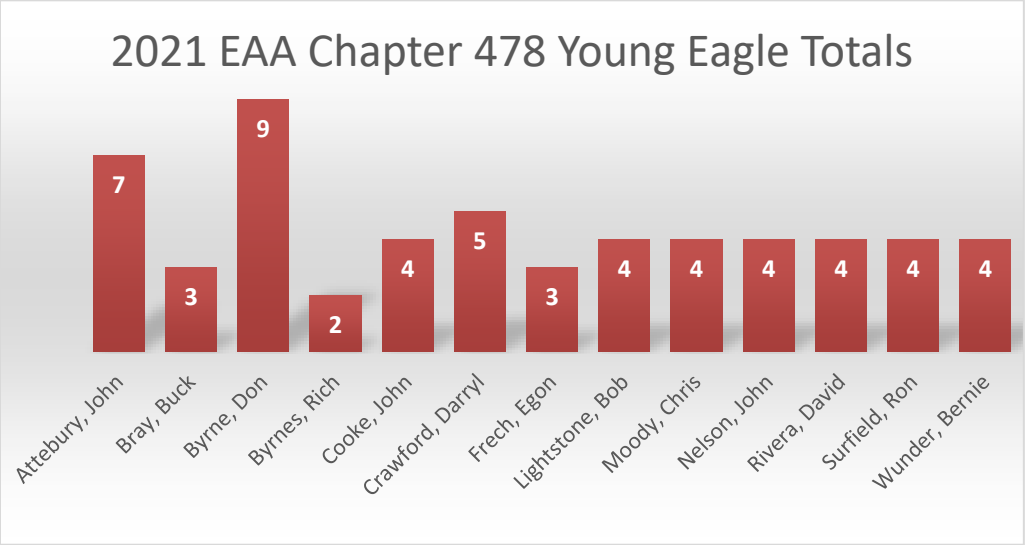
Young Eagles Status and Future Plans

We will continue to exploit the capabilities of the Young Eagles Website in 2022. The YE website has recently been upgraded to allow parents and pilots to sign documents electronically using an IPad. The Chapter is discussing several purchase in 2022 using the EAA Young Eagle Credits we have from EAA HQ. These purchases could be a printer for printing certificates and an IPad. These purchases would allow us to print certificates after the flight and have parents sign permission slips in an electronic format prior to the flight. This would streamline the process for both parents and us for getting all of the "paper work" corrected before and after a YE flight.

We are planning on kicking off the Young Eagles season in March after the VMC meeting.

Year	Flights	Year	Flights
1992	6	2008	51
1993	54	2009	113
1994	44	2010	156
1995	79	2011	187
1996	89	2012	242
1997	90	2013	79
1998	47	2014	127
1999	23	2015	248
2000	113	2016	206
2001	94	2017	205
2002	90	2018	209
2003	101	2019	112
2004	66	2020	2
2005	138	2021	57
2006	97		
2007	122		
TOTAL	1253	TOTAL	1994
GRAND TOTAL		3247	

Pilot	**Total**
Attebury, John	7
Bray, Buck	3
Byrne, Don	9
Byrnes, Rich	2
Cooke, John	4
Crawford, Darryl	5
Frech, Edgon	3
Lightstone, Bob	4
Moody, Chris	4
Nelson, John	4
Rivera, David	4
Surfield, Ron	4
Wunder, Bernie	4
	57



THE HOMEBUILDER'S CORNER

"Shrike" Project Update!!

Submitted by Brian Link

Growing Pains…

Ask most engineers what the most complex part of designing an aircraft is, and most will tell you "all of it". A massive exercise in planning, designing, building, testing & ultimately fielding, most aircraft design projects involve a massive group of teams, each dedicated to their own area of expertise. Even for a small E-AB aircraft like a Vans RV or a Sonex, there is a group of dedicated engineers behind their development. If there is any one thing that my distant relatives Reimar & Walter Horten or even my longtime mentor Burt Rutan and I have in common, it is the fact that due to the highly unique nature of our designs, that we are designing an entire aircraft purely on our own.

In a presentation I gave to the Chapter some months ago, I made mention that during detailed stability & control analyses back in 2017, I discovered a serious issue, as every time I attempted to perform a simulation of a high alpha, aft CG mode with a yaw input (the regime most likely to induce a departure from controlled flight), the program, a MATLAB-based application, kept crashing. While further analysis of the design by industry contacts hinted at an aerodynamically-sound design, I elected to take the at-the-time design of the aircraft and 'morph' it into a dynamically-scaled proof-of-concept demonstrator, an intensive engineering exercise in and of itself. The intent was to postulate an answer to the most basic question- "**Will it Fly?"**

From mid-2018 to early-2020, the moldless fiber composite model took shape, learning several important lessons along the way. However, when the wings took to life, I had realized after construction that the trailing edges took a curved shape, much in the same manner of a hang glider. Honestly, I thought it looked just fine and thought nothing more of it...until it was time to cut out and hinge the elevons. This curvature led to the elevon hinge line to not be straight, and it required a rather extreme re-profiling of the elevon leading edges. This drastic change in geometry led to a crippling aerodynamic compromise that effectively reduced the number of data points I planned to capture from 75 to just 8- the absolute bare minimum I needed to make a go/no-go decision on the full-scale design & build. To add further insult to injury, a recent series of analyses of the model revealed that while it can (and does) fly, it can only do so with the center of gravity drastically forward of design CG, and will exhibit some adverse behaviors expected of those aircraft that are neutrally stable along the directional axis. As such, any data gathered from this model would require even more careful analysis, gathered only by ultra-precisely flown test maneuvers lest it be rendered questionable or unreliable, if not outright invalid.

The well-intentioned, well-built, but unknowingly flawed proof-of-concept test model.
(Note the skeleton of the crow I had to eat behind it!)

Given that the airfoil design, dihedral & wing twist angles et al were all correct, where did I go wrong? Were the construction jigs incorrect? Did I design it incorrectly? Don't get me wrong- I'd rather screw up a model if I had the choice, but I needed answers…and needed them now if I expected to continue this project.

I pored over all my notes and texts. I pored over the internet. Nothing was left untouched, and everything was on the table. Then came a very small paragraph in a book called "Fluid Dynamic Lift" (Hoerner & Borst, 1985), another text by Jim Marske and a white paper from Al Bowers at NASA that discussed the appropriate location of the twist axis for those wings that required twisting along the span, such as my unique flying wing design, in comparison to the lifting line. I had baselined the locations of all my airfoils off the leading edge, which I had discovered is not necessarily the best place to do so. Sometimes the axis needs to be elsewhere along the chord line to accommodate purely aerodynamic and or structural considerations. Long story short, I did some (well, a lot) more calculations and relocated the twist axis of the 24 individual airfoils that make up the half-span of my wing. I came to a solution that allowed for a completely straight elevon hinge line, and a relocation of the lifting line to where it should have been in the first place. Next came the inevitable- Test & Evaluation.

I spent a considerable amount of time remodeling the aircraft in MATLAB. It probably would have been easier and less time consuming to start from scratch, including the "modified" airfoils from the root to BLL/BLR 26.0 that incorporated the compound geometry of the canopy & engine cowling (which I still retained from testing in 2017, fortunately), but at the end of the day, it all got done. I set the parameters to reflect differing regimes across the design flight envelope (to include the high alpha, aft CG with a yaw input), and selected "Run Analysis" (*Note: each regime requires its own individual simulation, and typically takes around 10-20 minutes for the computer application to run the computations*). The results confirmed an aircraft with Level 1 flying qualities across the operating envelope, including a relatively care-free spin recovery within five rotations without control input (three with aileron input into the spin). In 25 simulations performed with this new aerodynamic configuration, never once did the application (which has not been modified since its last use in 2017) crash. This further validated my grave concern back in 2017 that the reason why the software had been crashing during attempted simulations was because the design at the time was in fact aerodynamically unstable in a very critical flight regime.

Considering that the model would have likely produced bad data, had I went on to build and fly the aircraft in this [now known to be bad] configuration, I could have either found myself in a life-threatening situation during flight test, or would have had to incorporate expensive modifications that would have also seriously limited the aircraft's performance envelope.

These remarkable findings are currently under review by selected third parties. Once the data review is complete, we will be discussing if it would be feasible to modify the existing scale model to "simulate" the new configuration in an attempt to validate the design in a dynamically scaled in-flight environment. If it's not, and we all concur with the simulation findings with extreme confidence, we may elect to move forward with finalizing the full-scale design & drawing package and proceed to construction…as soon as I can get a space to build! While the updated configuration will require a complete structural redesign, with consideration to the scope of the required internal changes, the new parametric modeling & structural analysis software I have recently begun using (an open source engineering application called FreeCAD) will ensure a geometrically, aerodynamically and structurally accurate design.

This has been quite the adventure so far. Despite that it consumed years, I am glad to have made the decision to design, construct and test this proof-of-concept model. Some enabling project

objectives, such as delivering a full-spectrum flying qualities data package were not met, which is okay, considering that other objectives, such as the validation of crucial design & fabrication processes, as well as developing an assembly sequence for a full-scale aircraft were satisfactorily met with numerous lessons learned. However, the terminal objective of the entire proof-of-concept model project- risk reduction by way of the identification of necessary aerodynamic & structural changes to drive the final design of the full-scale prototype- has been met with astounding success.

Details matter, no matter how little. All of them. The findings of the last few weeks, which, as of this writing, have seemed to solve a previously unknown but potentially lethal design flaw have opened the door to fabricating with confidence, and when the time comes, performing developmental flight testing on the machine with total & absolute confidence in knowing that I did my homework…and did it correctly.

THE FLYING/MAINTENANCE CORNER

1977 Cardinal Paint Reveal

Submitted by Jacque LaValle

Cardinal II+, N20217 returned from Boss Refinishers in Salisbury, NC in December. I highly recommend this paint shop for their customer support, workmanship and ample updates as the project evolved. The original 1977 paint and scheme was completely removed, hand sanded, etched, primed and final coats. The scheme selected was a mix of my creation and some of other Cardinals, all provided by Scheme Designers in NJ. The Cardinal red on the leading edges was added to provide better ice detection inflight which is hard to see on white. The project did come in 4 weeks late due to COVID impacts and completing the annual before delivery.

The next short term project will be installing the Bendix King AeroCruz100 autopilot, once we are able to find servos. Beyond that, the interior is planned for a total overhaul in 2022.

FOR SALE

I have a tug for sale, I used it to move the Cessna 172 I was flying.
If someone needs one please make an offer.
Charles Fox cef34@icloud.com

I received the below email and flyer from EAA Chapter 64 - TAW

AeroCareers Raffle

Please share the attached Ercoupe Raffle flyer and link with your EAA Chapter Members and other aviation friends, and post it on your airport bulletin boards.

AeroCareers is a 501c3 charitable and educational organization that operates closely with EAA Chapter 64 to provide mentoring, scholarships, and low-cost flight training. Three teens have earned their private pilot certificate in our vintage Cessna 172 this past year and are learning hands-on skills helping rebuild a hurricane-damaged 1957 Cessna 172. We are currently raffling a 1946 Ercoupe to help fund our educational activities. Your assistance in publicizing our raffle is much appreciated.

The raffle flyer is attached and the link to enter is https://rafflecreator.com/pages/52380/aerocareers-aircraft-raffle.

If you'd like to learn more about AeroCareers, visit http://aerocareers.org/.

Thanks for your help!

Bob McDaniel

EAA64 Young Eagle Coordinator & AeroCareers President

AEROCAREERS AIRCRAFT RAFFLE

GRAND PRIZE: 1946 ERCOUPE 415-C AIRCRAFT or $20,000 CASH

SECOND PRIZE:
LEVIL AVIATION
BROADCASTING OUTER MODULE (BOM)

THIRD PRIZE:
LIGHTSPEED ZULU 3 ANR HEADSET

$50 per Ticket or 3 for $125

Scan the QR Code at right or go to

rafflecreator.com/pages/52380/aerocareers-aircraft-raffle

to purchase tickets and see all the details.

Winners will be drawn June 1, 2022

AeroCareers is a 501(c)(3) not-for-profit, tax-exempt charitable and educational corporation. Our mission is air and space career education, networking, and mentoring. One-hundred percent of our funds are used to support our educational and charitable missions. To learn more about our organization, visit http://aerocareers.org/.

CHAPTER 478 CALENDAR OF EVENTS

We need to start populating this calendar, please send my events you find advertised for inclusion here.

Date	Event	Location
JANUARY		
FEBRUARY		
MARCH		
APRIL		
May		
June		
July		
AUGUST		
SEPTEMBER		
OCTOBER		
NOVEMBER		
DECEMBER		

In the Chocks

Thanks for all of the inputs this month, looking forward to seeing all of you at a Chapter event soon.
Build, Repair and Fly Safe.
Tom Weiss – Editor/President

Cockpit Chatter is published monthly by the Experimental Aircraft Association (EAA) Chapter 478 solely for the dissemination of information and ideas to the membership. Gatherings are held on the Third Tuesday of the month at ^:30 PM in the Patuxent River Test and Evaluation Museum. Membership is $20.00 per year and requires an active membership in EAA. Any opinions expressed herein are strictly those of the author and do not necessarily reflect the opinions of the chapter or the Experimental Aircraft Association.