

June 2021



# EAA CHAPTER 145

SINCE 1962



**Chapter Meeting: Saturday, June 12, 2020 – 10:00am**  
**Riverview Airport (08C)–in the Main Hangar** (see map on last page)

## CHAPTER PROGRAM

'Last Plane out of Cambodia' - Neil Hansen will be sharing his adventures flying C-123 Packet in and around Vietnam.

The doors open for "Hangar Flying" around 9:30am, then we'll start the meeting at 10am with a brief review of chapter activities, and then enjoy listening to Neil's presentation. After the program, about 11:30, we'll gather for a "Pizza & Beer" lunch.



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## PRESIDENT'S CORNER

The West Michigan Chapters are getting back to flying Young Eagles! I feel this program is essential to help maintain sport aviation that we all enjoy. Read and think about these words from the past coordinator of the EAA Young Eagles Program, Michelle Kunes:

***"Recently I received a message from a volunteer sharing a thank-you note from a young man he had flown as a Young Eagle. The young man was thanking him for all the time and money spent on taking him flying and now he has his dream job of becoming a captain on an airline. He said he learned from the pilot that the best things in life are freely given to those who can never give it back. This taught him to push himself to excellence, not only to become a pilot but also a better person.***

***What a heartfelt amazing tribute to what I think each and every one of you does every time you engage in the Young Eagles program. The simplicity of the program remains the same - a pilot taking a young person for a flight. It's the results that really carry the impact! We owe you all a debt of gratitude we can never repay."***

Let's help introduce some young people to aviation this summer.  
Cheers, Dick

## NEW CLUB MEMBERS

Please join us in welcoming new members Pat Morell, Doran Jaffas, and Christian Bell.

## EAA #145 HANGAR

Currently there is a C172 in the EAA hangar. There's space for smaller projects that could help keep the hangar active. Contact Dick Foster for details.

## YOUNG EAGLES

- Young Eagle flights are back! Plans are underway for the following Young Eagle events:



June 5, EAA704, Sparta, (84D)  
June 21-25, EAA221, Ludington, (LDM)  
July 12-16, EAA221, Plainwell (61D)  
August 21, EAA211 Grand Haven (3GM)  
August (?), EAA145, Greenville (6D6)  
August 13, EAA221, Plainwell (61D)  
September 11, EAA145, Wings of Mercy (BIV)



## New Wing Design Exponentially Increases Total Aircraft Efficiency

NASA's Armstrong Flight Research Center is experimenting with a new wing design that removes adverse yaw and dramatically increases aircraft efficiency by reducing drag. Known as the **PRANDTL-D** wing, this design achieves a 12 percent drag reduction. Handling adverse yaw is inherent in the wing's design, rather than an aircraft's vertical tail. The technology can increase total aircraft efficiency by optimizing overall aircraft configuration through the reduction in size or removal of the vertical tail as well as the reduction of structural weight. Similar improvements have been applied to propellers.



### Benefits:

**Highly efficient:** Reduces drag while optimizing performance

**Economical:** Reduces power consumption and, therefore, fuel costs

**Safer:** For wing-based aircraft, defeats adverse yaw when rolling, achieving stability and control

**Simpler:** Requires no vertical stabilizers for wings, easing aircraft production

**Quieter:** For propellers and rotating machinery, produces dramatically less noise than conventional blade designs while increasing efficiency

**How It Works:** The wing design reduces adverse yaw - the yaw opposes the direction of a turn. As an aircraft turns, differential drag of the left and right wings while banking contributes to adverse yaw. "Proverse" yaw—yawing in the same direction as a turn—would optimize aircraft performance. Initial results from flight experiments at Armstrong demonstrated that this wing design displayed proverse yaw. This wing design further reduces drag due to lift at the same time.

The key to the innovation is reducing the drag of the wing through use of an alternative bell-shaped spanload, as opposed to the conventional elliptical spanload. To achieve the bell spanload, designers used a sharply tapered wing, with 12 percent less wing area than the comparable elliptical spanload wing. The new wing has 22 percent more span and 11 percent less area, resulting in an immediate 12 percent drag reduction.

Furthermore, using twist to achieve the bell spanload on an aircraft wing produces induced thrust at the wing tips. This forward thrust increases when lift is increased at the wingtips for roll control. The result is that the aircraft rolls and yaws in the same direction as a turn, eliminating the need for a vertical tail. When combined with a blended-wing body, this approach maximizes aerodynamic performance, minimizes weight, and optimizes flight control.

For propellers, a similar approach modified the spanload using a non-linear twist. This twist dissipates the tip torque, reducing power required while maintaining thrust. Quieter performance results from reduced load and torque at the tip.

## e-VTOL AIR TAXI HYPE

(from New Atlas) Hundreds of eVTOL companies are jostling for position as next-gen flying taxis approach their prime-time debut – but which of these futuristic aircraft will really take off? Sergio Cecutta talks us through his "Advanced Air Mobility Reality Index."

We've decided to look at five different dimensions. Number one is funding. Do they have enough to complete specific milestones in their development? Do they have enough to build a prototype? Do they have enough to certify? Do they have enough to enter service?

The second piece is their team. Not just the CEO, but is the leadership team an aerospace leadership team? Are they familiar with the industry? Do they know what it means to certify an aircraft? Have they already run programs of this size, this complexity?

The third piece is technology readiness. So we use what NASA uses – that is the technology readiness level (TRL) scale, it's basically a scale from one to nine that looks at the maturity of the technology. Anything less than six is not ready for prime time. TRL 6 is the first time that a prototype has been flown in the relevant environment – a full-size aircraft that has covered the entire flight envelope. So, it has taken off vertically, it has transitioned, it has flown and it has landed. TRL 9 would be the final product.



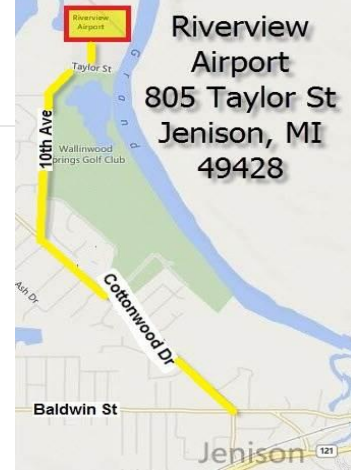
The next piece that comes along is certification. Do they understand the certification requirements? How far along are they? Certification is very important, for the simple reason that the rules for certifying these vehicles are brand new, and no one has done it before.

Last but not least, we look at production, and the reason we look at production is because the manufacturers of these vehicles are talking about thousands of vehicles. In aerospace, we don't make anything in the thousands. Take Airbus, they're starting to think at a rate of about 60 A320-family aircraft a month. That's what, about 700 aircraft a year, and that is a lot. But in the eVTOL market, people are talking about producing 900, 1,000, 1,500 a year. We've never heard of those kind of numbers. So, we wanted to see what's their capability? Can they make one? Can they make ten? Can they make a hundred? Can they make thousands?

The index does not try to say who's going to be the winner. It's a snapshot of how the different companies rank with respect to each other. At this time, Joby Aviation shows the most promise. And who knows, we may see some of these at OSHKOSH this year.

OEM	ARI	Use Case	Vehicle Type	Propulsion	Operation	Vehicle	First Flight	EIS	Country	
Joby Aviation	↔	7.9	Air Taxi	Vectored Thrust	Electric	Piloted	S4	2019	2024	USA
Beta Technologies	↔	7.5	Cargo/Air Taxi	Lift + Cruise	Electric	Piloted	Alia S250	2020	2024	USA
Wisk	↑	7.5	Air Taxi	Lift + Cruise	Electric	Autonomous	Cora	2018	-	USA
Ehang	↓	7.4	Air Taxi	Multicopter	Electric	Autonomous	216	2019	2021	China
Archer Aviation	↓	6.9	Air Taxi	Vectored Thrust	Electric	Piloted	Maker	2021	2024	USA
Hyundai	↔	6.7	Air Taxi	Vectored Thrust	Electric	Piloted	S-A1	2025	2028	South Korea
Volocopter	↔	6.2	Air Taxi	Multicopter	Electric	Piloted	VoloCity	2020	2022	Germany
Lilium	↑	6.2	Regional/Cargo	Vectored Thrust	Electric	Piloted	Jet	-	2024	Germany
Eve Air Mobility	↔	6.0	Air Taxi	Lift + Cruise	Electric	Piloted	Eve	-	-	Brazil
Sabrewing	↔	5.9	Cargo	Vectored Thrust	Hybrid	Autonomous	Rhaegal RG-1	2021	2022	USA
Vertical Aerospace	↔	5.9	Air Taxi	Vectored Thrust	Electric	Piloted	VA-X4	2021	2024	UK

EAA Chapter 145 website: [www.145.eaachapter.org](http://www.145.eaachapter.org) EAA National website: [www.eaa.org](http://www.eaa.org)  
 Riverview Facebook: <https://www.facebook.com/EAA145/>



**UPCOMING EVENTS**

- |                |                                |  |
|----------------|--------------------------------|--|
| June 6         | Houghton Lake (HTL)            | Fly-In & Pancake Breakfast                           |
| <b>June 12</b> | <b>Riverview Airport (08C)</b> | <b>Meeting–Neil Hansen ‘Last Plane out Cambodia’</b> |
| June 13        | Dalton Flushing (3DA)          | Dawn Patrol / Breakfast                              |
| June 19        | Ionia Airport (Y70)            | S.M.A.T. Open House                                  |
| June 19        | Galloway Landings (MI93)       | Burger Fry @ new Galloway Landings                   |
| July 1-5       | Battle Creek Airport (BTL)     | Battle Creek Airshow & Balloon Festival              |
| July 4-5       | Traverse City (TVC)            | National Cherry Festival Air Show                    |
| <b>July 10</b> | <b>Riverview Airport (08C)</b> | <b>Meeting–Randy Houtman – Prandtl-D Wing</b>        |
| July 11        | Iosco / Tawas (6D9)            | Fly-In & Pancake Breakfast                           |
| July13-July17  | Mentone, IN (C92)              | P.R.A. Convention - Autogyros                        |
| July 26-Aug1   | Wittman Field (OSH)            | <b>OSHKOSH 2021</b>                                  |
| Aug 21/22      | Wurtsmith (OSC)                | Oscoda Fly-In & Pancake Breakfast                    |
| Aug 29-30      | Willow Run Airport (YIP)       | Thunder Over Michigan Airshow – Ypsilanti MI         |
| Sept 11        | Holland Airport (BIV)          | Wings of Mercy Open House & Y.E Event                |

**If you know of events that should be on the event calendar, please e-mail them to me**  
 If you would like to be on the e-mail list for meeting and event reminders, or if you would like to receive the newsletter electronically, which is full color and delivered days before the print version... please send your e-mail address to:  
[randall.houtman@dematic.com](mailto:randall.houtman@dematic.com)

**The 2021 Officers for EAA145:**

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**Treasurer’s Report:** (as of June 2th)

Liabilities: \$4055.00  
 Cash: \$145.85    Checking: \$7.58  
 Savings: \$7099.91    Total: \$7282.34

Website Editor, Bill Willyard  
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<b>EAA CHAPTER 145 MEMBERSHIP APPLICATION / RENEWAL FORM</b> DUES ARE \$25.00 PER YEAR – JANUARY 1st to DECEMBER 31st	
Name _____ Co-Pilot / Spouse _____ Address _____ City _____ State / Zip _____ e-mail address _____ Home Phone _____ Work Phone _____ National Membership # _____	Aircraft Owned _____ _____ Projects / % Complete _____ _____ Bring this form to the next meeting or mail to: EAA Chapter 145 Treasurer 6962 Bridgewater Dr. SE Grand Rapids, MI, 49546