Volume 38 Issue 5 May, 2021

Winds Aloft

EAA Chapter 790 Lake in the Hills, IL 790.eaachapter.org

The **April meeting** was hosted by Colonel and VP, Dave Stokes. Steve McGreevy from Poplar Grove was the docent with a wonderful presentation of the Jenny, JN-4 build.

In this Issue

Photos provided by Andy May

No "I" in Team

The squall line extended from Indianapolis to St louis, it was late July. I was on the late shift and the only one in the operating quarters at the Champaign radar room. Planemaster departed Danville heading to Nashville to deliver their nightly load of cancelled checks. The pilot called and immediately asked for vectors through the weather. I radar ID'ed the aircraft and turned them to a 15 mile gap in the weather. As the Cessna 208 neared the gap it had shrunk to 5 miles and I could start to see faint returns inside the gap, precipitation returns. I relayed the information to the pilot and they decided to continue. Entering the disappearing gap I asked her how the ride was. She responded, "Bum…py!" I could tell by her voice that she had entered a lot of turbulence and she wasn't even in the middle of the gap yet. When the C208 reached the midpoint the gap filled in with the rest of the squall line and the Cessna was losing altitude rapidly. I lost communications and the radar return on the Mode C readout went to XXX twice (Each aircraft has a range for aircraft performance programmed into the system, when the rate of descent or climb is out of the programed range the Mode C reads XXX). The C208 exited the line of weather 8000 feet lower than they went in and requested an immediate landing at Mattoon to check out the aircraft, the pilot was shaken, so was I.

Analyzing this scenario years later, I made a lot of mistakes that night. To some extend the information we give as controllers and how we present it can affect the decision of the pilot. Clearly, the pilot departing DNV knew of the line of weather. When they called asking for a hole in the weather I responded, "Yes, I see one 20 miles ahead, 15 miles in diameter." How I say it can also impact the decision, confidence or wariness. The pilot wanted to hear that there was a gap because that's what they needed to hear. The decision to takeoff and find a gap was made prior to calling approach, once they called me and I confirmed a gap I was only solidifying it, whether right or wrong. I was reinforcing a bad plan thereby taking part in it.

Some pilots would argue that the pilot has the final say and it's their decision, thereby their consequences. That sentiment I'll leave for the armchair quarterbacks and back seat drivers. I do know over the years I've offered advice on weather that have helped pilots make their decisions. Some of the advice was taken and some was not, which is totally fine.

I still think of that night every time we roll into thunderstorm season. I think about how I say things and how ATC is part of the decision process on whether a pilot will continue or turn around. In the end I approach my job with a team mentality. I'll give all the relevant information, sometimes advice, and the pilot can formulate their best plan.

Andy May

Work Shop Visit Saturday May 8th

Randy Sweet is building an RV12is. Randy has 80 hours of build time and has gotten quite a bit accomplished

Randy's address is:

2511 S. Riverview Dr., Holiday Hills, IL 60051 Open house begins at 10:00 AM

Youth and Chapter News Announcements

- The Monthly chapter BBQ's will begin in May and will be hosted by Dave Stokes with assistance from Tom Solar and volunteers. Ted Lipinski has graciously allowed us to use his hanger for Summer and Early Fall Meetings beginning in May. Hanger number P60 last row on the West Side. Contact a chapter member for gate access code.
- May 1st Young Eagles was cancelled due to forecasted high winds. The next Young Eagles Event will be on June 5th.
- Megan Pranczke is continuing her ground school studies
- Mark Luchsinger is resuming his flight instructions
- James Tann will be hosting a Youth in Aviation Zoom Meeting this summer

- Thanks to all who submitted responses to the Chapter Survey

Further updates will be posted on the Chapters Web site.

SUN AND FUN PHOTOS

Submitted by Joe Sener

(That's Joe in the Pictures, eh!)

H3X Electric Motor Designed for Aircraft

H3X, a motor company started by three University of Madison, Wisconsin graduates, promotes its integrated motor/inverter power plant as "the next step in the evolution of electric propulsion technology." With Their HPDM-250's **13-kilowatt-per-kilogram** continuous power ability, it meets ARPA-E's (Advanced Research Projects Agency–Energy's) criteria for powering large, 737-type aircraft.

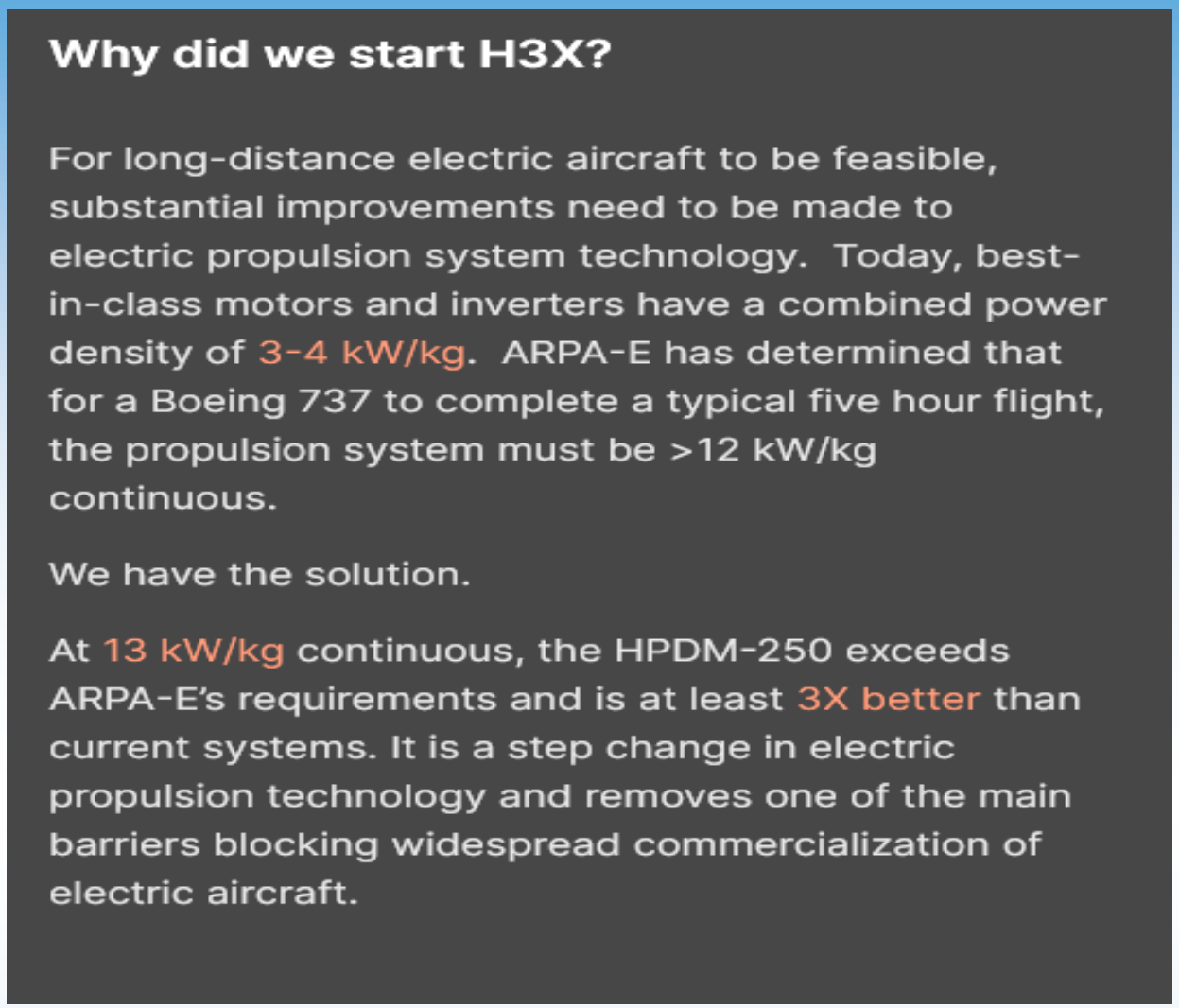
H3X describes its motor drive, a combined motor/controller unit: "The HPDM-250 is an ultra-high power density integrated motor drive for electric aircraft. It combines the electric motor and inverter (+ optional gearbox) into one powerful unit.

More detailed specifications show a 250kW (335 hp) peak output for 30 seconds, and 200 kW **(268 hp**) continuous. The little motor generates 95 Newton-meters (70 foot-pounds) of continuous torque. It can manage up to 800 Volt DC with 96.7-percent peak motor efficiency, 99-percent peak inverter efficiency, and a combined peak efficiency of 95.7 percent. Its 15-kilogram (**33-pound**) mass fits within a 6.75 liter volume – about three-and-a-half large soda bottles.

The motor's efficient speed of 20,000 RPM means it needs a propeller speed reduction unit (PSRU). H3X's is a 4:1 unit, meaning the prop would still spin at 5,000 RPM at top speed, something that might cause blade tips to approach or exceed supersonic speeds and generate a terrible racket. The reduction unit adds only three kilograms (6.6 pound), quite good for a reduction system that can absorb all that power.

At 2700 rpm Jason stated it will produce 45-50 HP. (*Continued on next page)*

H3X (*Continued)*



Keeping it cool helps improve performance and lower weight. Sylvestre explains, "… We use a single, synergistic cooling jacket to simultaneously cool both the power electronics and motor. This integration reduces system mass and volume. Additive manufactured copper stator coils are used to increase copper fill factor and improve continuous current density capability. This is a new technology that has the potential to revolutionize the motor manufacturing industry as it offers faster development, better performance, and greater design flexibility."

Primary near-term applications for this motor, said the company, are urban air mobility, EVTOLs, UAVs, "military jets and select regional aircraft markets. Primary long-term applications: large commercial electrified aircraft, such as the Boeing 737." Projected 2030.

The firm intends to start testing by mid-2021

Interesting Idioms and where did they come from.

"The Whole Nine Yards" - WWII machine gun belts were nine yards long. If the gunner used all of his ammunition he went "The whole 9 yards"

"bought the farm" predated WWII when a large number of training accidents in rural areas would result in property damage to a farmers property. The US government would compensate the owner with checks and in some cases had to buy the farm.

"Crash Diet" Pilot John Puns who became something of a celebrity flying the British de Havilland Comet racer was often invited to elaborate dinner parties of the rich and famous. All that good food and wine made it difficult tor John eventually to wiggle into the narrow confines of the Comet cockpit. Before going on a diet John decided to fly the de Havilland Hummingbird., In an attempt take off he was knocked unconscious by the crash and remained so for almost a month. After which he had lost so much weight, the incident became known as Johns crash diet.

Courtesy of publication "Talewinds" newsletter of the Watertown, Madison and Doge County FBO's

THIS YEARS FLYOUT SCHEDULE

Provided by Josh Cannata and Taylor Thompson

May 15-Sat	Sheboygan, Wi.	KSBM	Fuel Café
June 19-Sat	Quincy, IL.	KUIN	Bluehaven Café
July 17-Sat	Portage, Wi	KFZS	Hitching Post
August 21-Sat	Shawano, Wi.	KEZS	Launching Pad
August 29-Sun	Merkle Field, IL	3IS4	Turf-Orchard Landing Farm
Sept 18-Sat	East Troy, Wi.	57C	LD's BBQ-I mile walk bring bike?
Sept 24-Fri	Battle Creek, Mi	KBTL	Waco Kitchen
Oct 10-Sun	Hanover, IL	3IS4	Turf-Orchard Landing Farm
Oct 16-Sat	Mt. Vernon, IL	KMVN	LSA fly in-Bonnie Café
Nov 20-Sat	Plainwell, Wi.	61D	Fly Inn Restaurant
Dec 18-Sat	Madison, Wi.	KMSN	Jet Room

Batteries for potential Aircraft Consideration *(Batteries 4us)*

Current product Energy density:

Gasoline

1 Kg of Gasoline provides 48Mj (mega Jules) of energy

Lithium

1 Kg of Lithium provides .03MJ of energy

Cobalt is found in abundance in the Congo and helps fund violence there. It is used as an electrode in most current modern lithium batteries.

Tesla Battery Update:

Tesla New 4680 Battery has:

5 X more energy storage

16% greater range

6X more power

Elon Musk has stated 12Kw/kg battery would be required for aviation

New Battery Research Initiatives:

Thus, there are Five popular types of New Battery Technology Currently under Development

1) **Lithium Air (Li-O2)**
   Theoretically Provides up to 10 X more Wh/kg than Lithium Ion
   (Currently 3-5 times more)
   NASA aircraft testing shown to be 800-900 Wh/kg
2) **Nano Technology-Graphene** *(maybe the longer term future)*
   Stronger by weight
   Companies researching are:
   Grabat
   Samsung
   Nano Graf
   Amprius (next door neighbor to Tesla in Ca.)
3) **Lithium Sulphur** *(some car manufacturers will be using a derivative)*
   Theoretically 2,567 Wh/Kg verse 350 Wh/Kg for Lithium Ion
   7.5 times lighter
   Shortcomings:
   Shuttling-energy storage degrades when not in use
   Swelling- Electrolyte (Sulphur) expands

(Continued on next page)

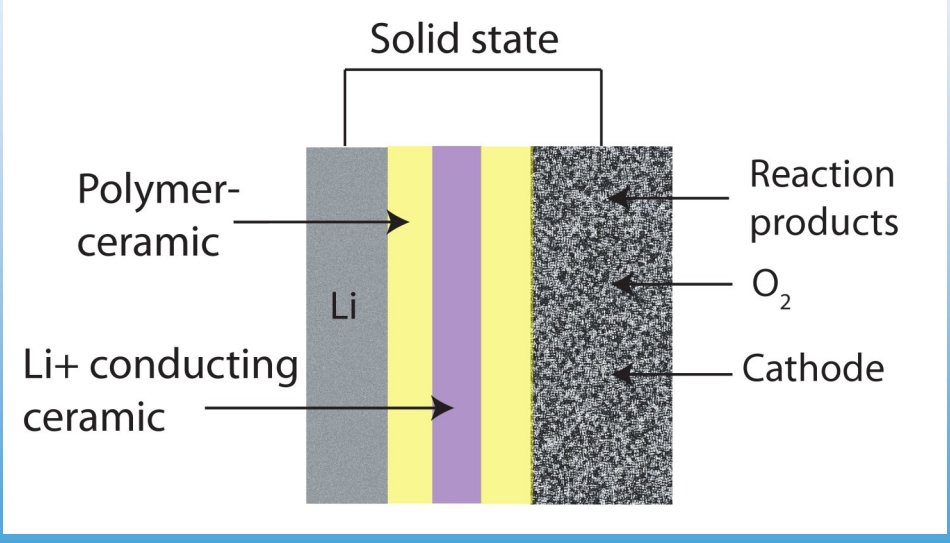
Batteries 4us (continued)

4) **Solid State Electrolytes** (*This is the most enticing technology)*
- Cold climate sensitive, disadvantage
- A Separator blocks dendrite growth-Key for longevity
- Faster Charging
- Companies Developing
  - VW-Quantum Scape
  - Toyota-Panasonic
  - Hyundai
  - BMX
  - Samsung

5) **Dual Carbon**
- Environmentally friendly, carbon extracted from cotton fibers and by-product of oil production
- 40% increased range
- Can be discharged fully
- Runs Cool
- 20 times faster charging
  - Disadvantages
    - Heavier
    - Lower Energy Density
  - Company researching
    - Cambriana Battery

Further Explanation of Electricity and Magnetism or Website of Electricity and Magnetism for Dummies

"Brilliant.org/electric future"



A note from Riley Conroy, one of our Chapters' Scholarship Recipients

Hey Tom

Still am in the world of aviation, yes. Right now I'm still instructing here at SIU part time and am a full time student. Kind of funny looking back at my take on flight instructing two years ago in the email. Definitely still the most challenging part of college, but I've also moved on to teaching 4 students now instead of just teaching one. I am hoping to graduate by next Fall if everything goes as planned and will be here over the Summer to do so. I would like to get my CFII this summer because the school pays for it here and I am considering getting my multi if I can save up the money sometime soon. I really appreciate the scholarship and has definitely helped out financially. Has the scholarship still been going even with everything happening with COVID?

Thanks Riley

Army Air Corps WW II

Nearly 15,000 pilot trainees died, more in the B24 than any other aircraft

52,073 combat crew deaths

22, 844 accidents

65,164 aircraft lost

22,948 aircraft lost in combat

150,000 American Service Men Deaths by accident

Source: Army air Forces Statistical Digest of WWII

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