New Technologies

CIACA 2024

- History review
- Commercial projects
- Record racer
- New propulsion

General comments

- In the 1970‘is , we talked about new aircraft technologies, when powered planes were built in composite , the classic engines were still usual in this era
- Some developements of modern engines were started, but not all for use in serial production
- Even we had the worldwide first flight with an electric plane 1973 in Wels/Austria flown by Heino Brditschka for 9 minutes, this concept sleeped for years until new batterytechnology allowed practical use.
- Now electric planes are part of the game, as well as Hybrid or Hydrogenpowered planes with fuelcells
- There are a more than 300 startup companies worldwide developing innovations for flying in the future

Commercial Samples

- We talked about most known developed Projects in the last years, from companies like:
  - Pipistrel
  - Volocopter (VTOL)
  - Lilienjet (VTOL)

There are some mentioning companies worldwide

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- **Ehang (China) has already cerified VTOL taxis in testperiode**
- **Väslyflyg (Sweden) uses 40% of Biofuel in their aircraft**
- **In Finnland, there are projects to use fat waste to produce biofuel**
- **H2Fly uses liquid hydrogen (-253°), developed in Stuttgart(Ge), Testflight is Slovenia, uses parts from Pipistrel ->**

H2Fly

https://youtu.be/-qnLkFaX8uo

H2FLY

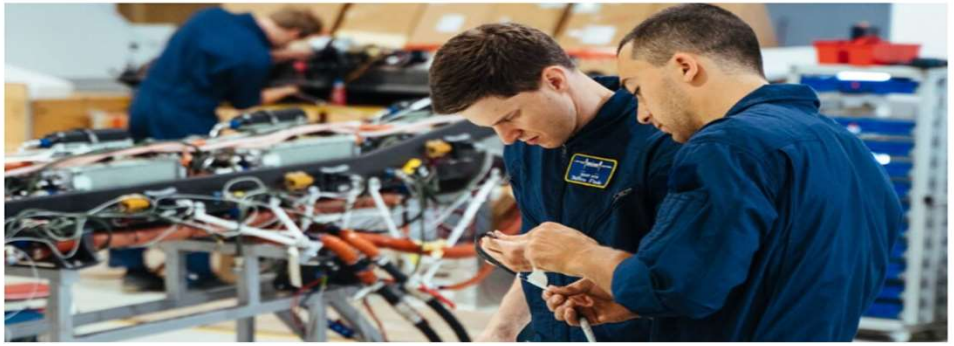
Vision Company Careers Newsroom

A bright future for air travel.

With H2FLY and our aircraft HY4 we have proven that we can make hydrogen fly. And hydrogen's potential for the future of aviation is enormous. By the end of this decade, our first commercial fuel cell system will be certified and operational in aircraft applications across the globe. By the early 2030s, our scaled-up system will be certified, operational, and allow to truly decarbonize at least half of the global air traffic.

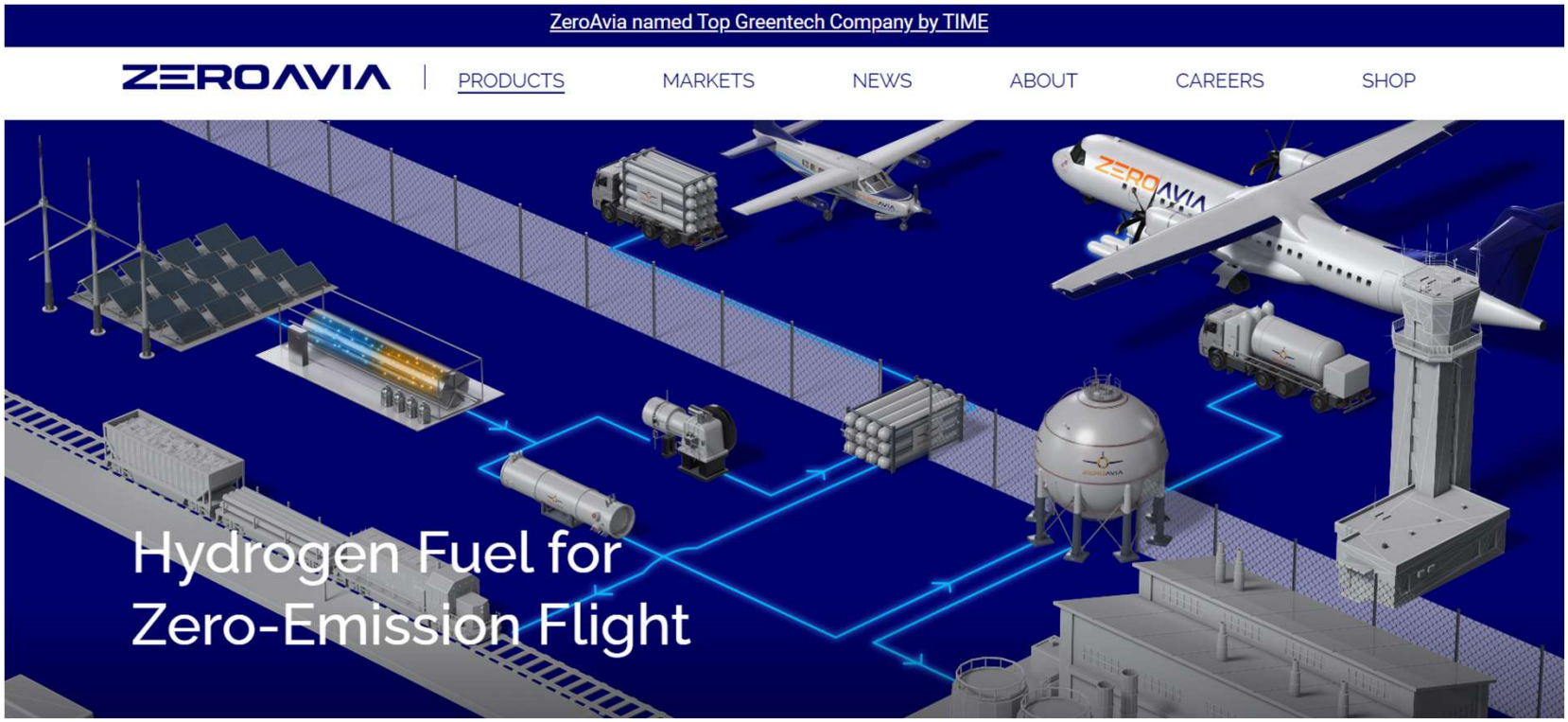
Over a decade of experience.

We've been designing, building, and testing hydrogen-electric aircraft powertrains for more than ten years. From the onset of hydrogen-electric aviation as part of the Antares program of the German Aerospace Center (DLR), to the founding of H2FLY and the development of our own hydrogen-electric demonstrator aircraft HY4, we've built the most comprehensive understanding of the potential of hydrogen-electric powertrains in aviation. To realize the dream of truly sustainable air travel for all of us, we've built a strong team, ready to fly.




EXPERIMENTAL

Zero Avia (WA)


ZeroAvia named Top Greentech Company by TIME
ZEROAVIA
PRODUCTS
MARKETS
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ABOUT
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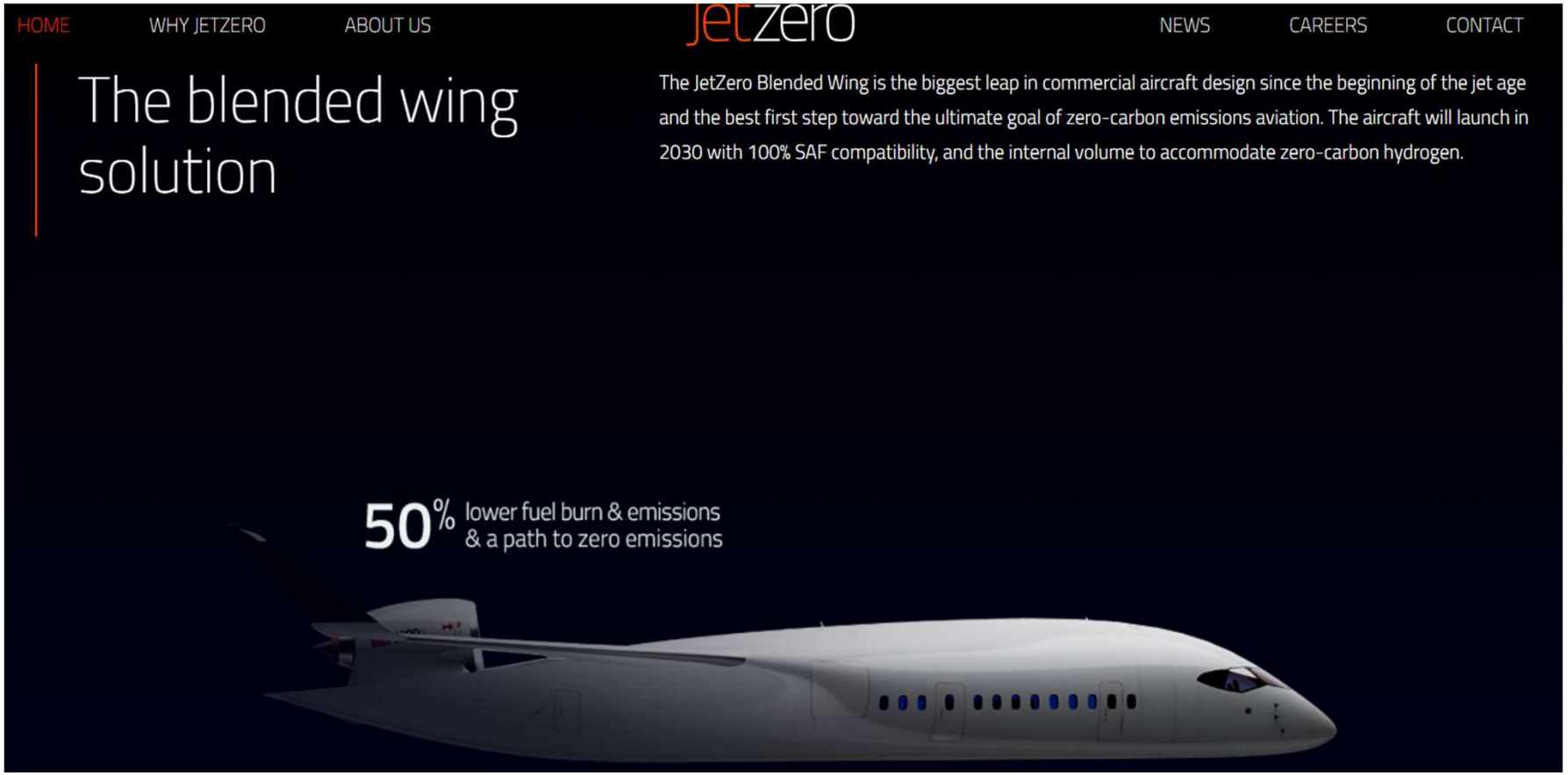
SHOP
Hydrogen Fuel for
Zero-Emission Flight

[Everett, WA: April 24, 2024] — ZeroAvia today announced that it will be offering some of its key components designed for its hydrogen-electric engines to other clean aviation innovators. The move allows ZeroAvia to build upon the multi-billion dollar per annum market for its hydrogen-electric powertrain family, maximizing the company's investment in R&D and its strategy of vertical integration, as well as furthering the company's impact on reducing environmental harm from aviation.

With the certification work for the ZA600 engine for up to 20 seat aircraft underway, and the underpinning technology for the ZA2000 engine for up to 90 seat aircraft in advanced development, ZeroAvia has conducted component market research and sees significant opportunity in the following areas:

- **Advanced electric motors** for aviation, including a 660 kW max-power direct-drive motor capable of speeds up to 2,200 rpm, and the HyperCore 900kW modular motor capable of speeds up to 20,000 rpm.
- **Silicon carbide inverters** – The 200kW continuous power bidirectional inverter design offers a power density above 20 kW/kg and is available in single (225kW peak / 200kW continuous) and dual (450kW peak / 400kW continuous) configurations. The inverters are designed and produced following aerospace standards, allowing a high-power density and reduced weight with advanced thermal management technologies and integration to enable reliable high performance for high altitude and engine compartment location.
- **Low temperature Proton Exchange Membrane (LT-PEM)** fuel cell configurations (in partnership with PowerCell) – ZeroAvia's SuperStack Flex architecture is a customizable 100-400kW fuel cell power generation platform designed to meet a range of different aerospace power, performance, and packaging requirements, while maintaining exceptional pressure, mass flow rate, humidity, and temperature control.
- **High temperature PEM (HT-PEM)** fuel cell stacks and full power generation systems – ZeroAvia's High-Temperature Proton Exchange Membrane (HTPEM) fuel cell stack is a turbo-air cooled modular system which offers up to 3.5 kW/kg specific power, supporting a variety of traditional aviation and VTOL applications.
- **Aviation fuel cell compressor** is a leading-edge compressor capable of supporting up to 900kW fuel cell applications up to 15,000 feet. The compressor is designed specifically for fuel cell applications and designed for aerospace standards from the start.

Jet 0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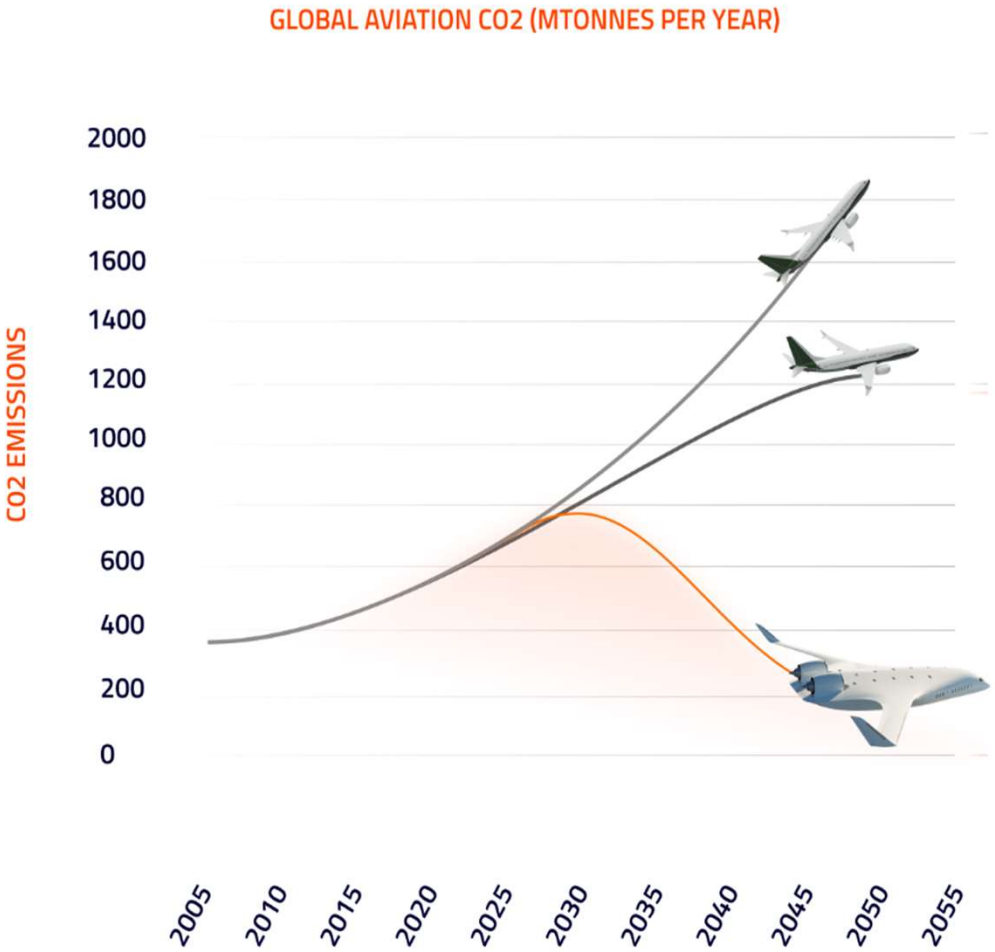
The blended wing solution
The JetZero Blended Wing is the biggest leap in commercial aircraft design since the beginning of the jet age and the best first step toward the ultimate goal of zero-carbon emissions aviation. The aircraft will launch in 2030 with 100% SAF compatibility, and the internal volume to accommodate zero-carbon hydrogen.
50% lower fuel burn & emissions
& a path to zero emissions



The path to zero

An ultra-efficient Blended Wing airframe is agnostic to future propulsion solutions and would lower cost of ownership. This reduces the cost barrier to entry for new propulsion technology, accelerating adoption and clears the path to zero emissions.

Electric racer (Rolls Royce)

Electric record flight 2021

- Average over 3km 555,9 km/h, Topspeed 623km/h,
- Climbing 202 sec to 3000m
- 400KW Rolls Royce propulsion system. Based on Siemens (overtaken by RR)

Bing-Video Rolls Royce

ACCEL: Accelerating the Electrification of Flight | Rolls-Royce

New propulsion system
(developed in Linz/ AUSTRIA)

World's First Flying Car with CycloRotors - CycloTech CruiseUp (youtube.com)

CycloTech Home - CycloTech Revolution of motion

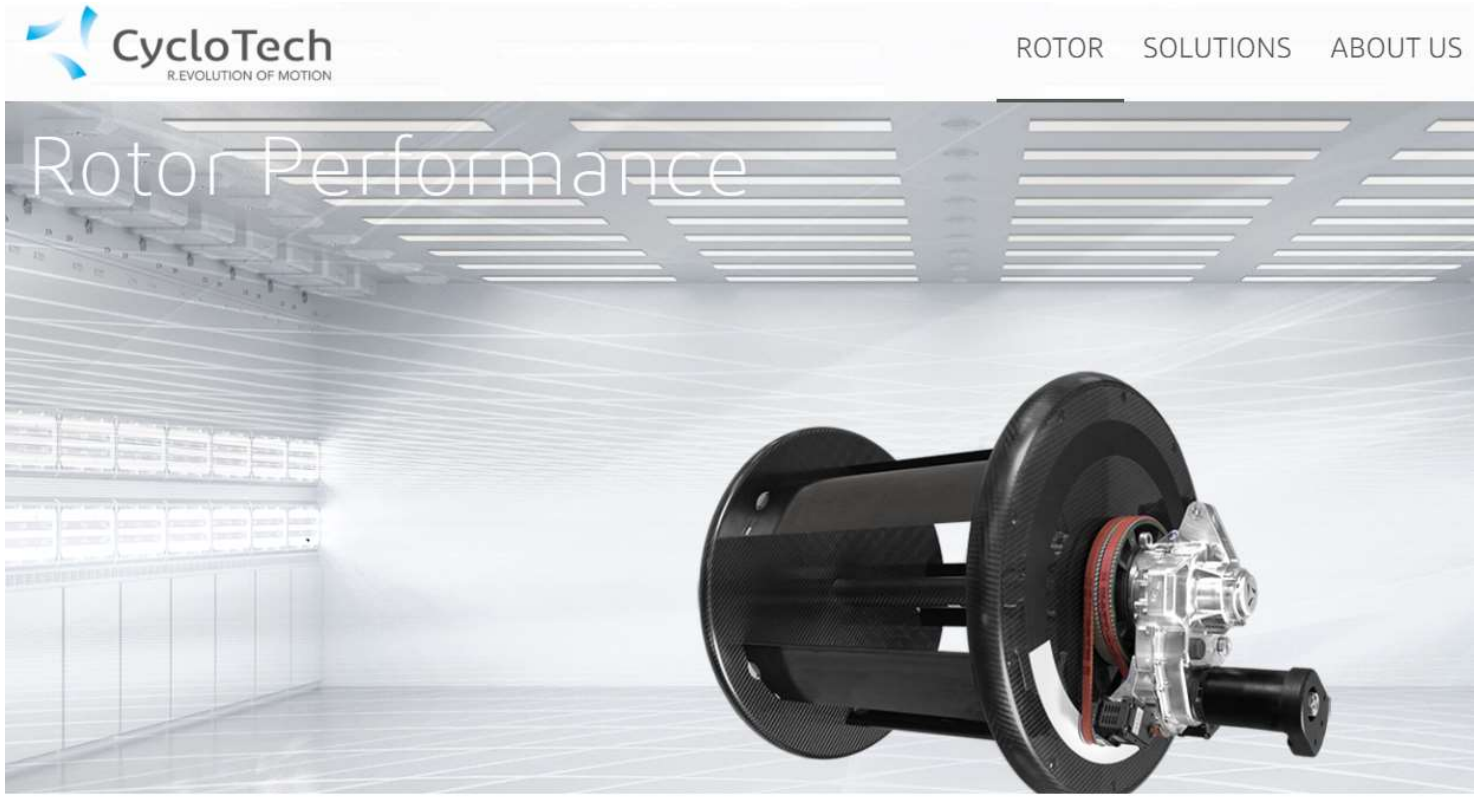
For these NEW challenges it needs NEW answers and technologies to provide sustainable, compact and highly reliable solutions. This is where CycloTech joins the trend. We're inventing flying for the individual mobility demand of the 21st century.

Based on the same principle as the Voith-Schneider-Propeller, CycloTech offers a solution with direct and instant control of magnitude and direction of thrust in a full circle of 360° – up, down forward, backwards – whereas all other propulsion systems basically only push or pull into one single direction.

R.evolution of motion

More than 100 flights with our 4-rotor flight prototype are demonstrating the CycloRotor technology.

Click here for our first free flight video.



ROTOR DEVELOPMENT

The major challenge of using the Cyclogyro rotor technology is its radical new approach as an aircraft propulsion unit. This requires an extreme lightweight construction in combination with smart design which demands new concepts, advanced composite material and innovative manufacturing methods. The key is to understand, describe and control the underlying physics and its effects of a CycloRotor.

Was New Technology more than 40 Years ago…

The End