



POSITIVE PROBLEM SOLVING **+** **=**

## WITH CHANGE ON THE HORIZON, ZEROAVIA REQUIRED A HIGHLY STABLE DC POWER SYSTEM TO ENSURE THEIR TEST SCHEDULE STAYS ON COURSE.

Aviation currently accounts for 2-3% of total global emissions. Some estimates project this figure to soar to 50% as other industries decarbonise. In response, the UK government aims to halve in-sector emissions by 2050.

To meet this target, significant change is needed across the industry. This includes the adoption of sustainable alternatives to fossil fuels. Emerging technologies will play a critical role, but must demonstrate their safety and reliability. Achieving certification is a lengthy process within a highly regulated sector, so development work must start now.

ZeroAvia is rising to the challenge. Their ZA600 zero-emission hydrogen electric powertrain can be retrofitted into commercial aircraft with up to 20 seats. The platform provides up to 600kW of power, with a flight range of 300 nautical miles.

Gaseous hydrogen is stored in tanks on the aircraft using an advanced management system. Lightweight fuel cells are used to convert the hydrogen into DC electricity. Finally, this is inverted into AC to power electric motors which turn the propellers.

As with all aerospace components, the motors must be tested under stringent conditions. ZeroAvia required a DC power system which was equally as high quality. ETPS provided the team with a LAB-SCUBI bidirectional DC source/sink.

Patrick Burns, Senior Test Engineer, stated "The LAB-SCUBI maintains exceptional voltage and current stability during the start-up of high power components. The fast response times allow it to react to any sudden motor step changes during testing."

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# CASE STUDY

## ZEROAVIA

### NAVIGATING TO A SUSTAINABLE FUTURE

ZeroAvia's motors are tested by pairing them back-to-back in a closed circuit with a secondary motor operating as a generator. The LAB-SCUBI feeds DC energy into the circuit to compensate for any losses.

The power system can be controlled remotely using a variety of high speed interfaces. This allows motor performance to be monitored from the safety of the control room.

Patrick Burns commented "Safety features were imperative to us when selecting a system. The external emergency stop circuit is rated to performance level d. This enables us to enter the test rig knowing the high voltage hazard has been eliminated."

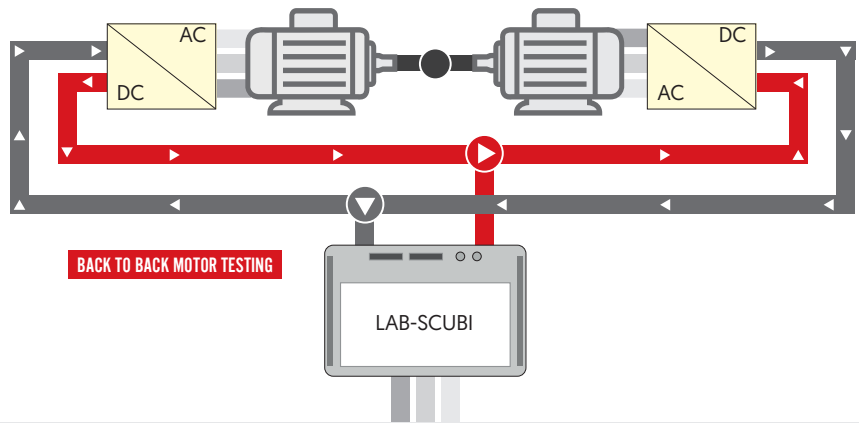
Pablo De Felipe, Systems Test Engineer, added "We can easily implement power and voltage limits via the intuitive touchscreen. The same interface allows us to enable varying levels of permissions for users of different seniority. This ensures any major configuration changes are only made by suitably qualified personnel."

When asked about working with ETPS, Pablo remarked "It's been an incredibly positive experience. The technical team at ETPS are very knowledgeable and answered all of our queries swiftly to aid installation. Their product documentation is also excellent."

Founded in 2018, ZeroAvia has expanded to a team of over 300 employees across sites in the UK and USA. Besides powertrain development, they are working with airports to deliver hydrogen production, storage and distribution.

Flight testing has been taking place from their base at Cotswold Airport using a modified Dornier 228 aircraft. It has completed numerous successful flights over increasing distances and altitudes.

Work has also begun on a 2-5MW engine for an aircraft with 40 to 80 seats. Known as ZA2000, this powertrain uses a liquid hydrogen storage system and has a range of over 700 nautical miles.



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### ABOUT THE LAB-SCUBI

The LAB-SCUBI is a highly dynamic bidirectional DC sink/source. When sinking energy from the unit under test it automatically inverts the DC to AC and synchronises this output to the grid.

Systems are up to 95% efficient. An extended feature set includes voltage and current ripple below 0.1% and the ability to sink full current down to 5Vdc before derating. It also includes very wide DC ranges, for example 1000Vdc and  $\pm 1000A$  is possible with a 100kW model - an autoranging factor of 10.

Each LAB-SCUBI is built for longevity. The lowest life components being the fans rated at 60,000h/7 years and electrolytic capacitors rated at 130,000h/15 years.

Models start at 100kW at lower voltages and currents, with nominals up to 1500V/ $\pm 1200A$ /650kW possible. A master/slave interface can be built into your chosen model, for current balancing of multiple LAB-SCUBIs. It's possible to connect systems in parallel up to 2.6MW.

Additional safety features can include isolation monitoring, discharge resistors, and potential free contacts for signalling and monitoring. Cabinets rated up to IP54 are possible. This offers protection against water splashes in test environments with fire suppression equipment installed. Units are air cooled as standard, with liquid cooled variants available.

To discuss how the LAB-SCUBI can launch your aerospace test program, contact us today.

