



Pilatus's Pro-gress

Swiss airframer debuts most 'pilot-friendly' version of popular PC-12 turboprop yet

Kate Sarsfield

Pilatus is giving a debut at Aero to its PC-12 Pro, the latest iteration of its iconic single-engined turboprop.

This version is the first PC-12 to feature a Garmin flightdeck, autothrottle and its Autoland automatic landing system. All PC-12s introduced since 2008 have been equipped with Honeywell Primus Apex avionics.

"We listened very closely to our customers, and many were looking for a new, fresh flightdeck and an automatic landing capability to give that added layer of safety," says Andre Zimmermann, vice-president

for business aviation (pictured).

The Garmin G3000 Prime avionics suite was an "obvious choice", he adds, as "so many of our customers are stepping up to a PC-12 from Garmin-equipped aircraft such as the Piper M600 and M350".

The bespoke flightdeck, which Pilatus dubs the "advanced cockpit environment", is "tailored to our pilots' needs", Zimmermann says. It features three 14in main touchscreen displays with "hand stabilisation technology", 7in secondary screens mounted on the centre pedestal and a mouse-type cursor control device that lets pilots work the avionics without touching the screens. "It is an incredibly user-friendly flightdeck and a giant

leap in terms of technology," says Zimmermann.

The \$6.8 million Pratt & Whitney Canada PT6E-67XP-powered aircraft also features a revamped interior, including refreshed seating, improved storage capacity and cabinet designs.

The aircraft has already secured US and European certification and first delivery, of serial number 3003, is scheduled for the middle of the year to an unnamed customer. "It will be a seamless crossover from the current NGX variant," says Zimmermann.

MSN3001 - the first Pro example and the company demonstrator - is on display at the Aero static, while 3002 is destined for Australia's

Royal Flying Doctor Service. The aircraft is now being outfitted with a dedicated air ambulance interior and will be delivered to the service - the largest PC-12 medevac operator in the world - at the end of the year.

The PC-12 was introduced in 1994 and to date over 2,200 examples have been delivered across three generations of models. This includes 788 legacy types, 941 examples of the NG variant (introduced in 2008,) and 476 of the NGX, which entered service in 2019.

The Stans, Switzerland-based airframer has an orderbook of around 200 PC-12 NGX/Pros - equivalent to a two-year backlog, says Zimmermann.

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Aero flying debut for Chinese electric aircraft

Charlotte Bailey

The first certificated four-seat electric aircraft, the RX4E from China's Ruixiang General Aircraft Company (RGAC), is to make its inaugural public flying display this week at Friedrichshafen. The fourth and largest member of a fixed-wing fully electric family, the RX4E received Civil Aviation Administration of China certification in December 2024 and the company is targeting further regulatory approvals across southeast Asia and Africa and potentially in the United Arab Emirates.

However, RGAC's commercial partner, Hong Kong-based Volar Air Mobility, says European certification may be further off. Commercialisation of the aircraft in China is expected later this year, with the initial focus on building hours prior to the type's ultimate deployment as a regional air taxi. To date, the demonstrator



The RX4E is due to fly this weekend

has flown some 11,200h. Indonesia is set to be the RX4E's first foreign market, with Volar's strategy to pursue initial governmental use cases, such as provision of essential services. The early adoption by pilot

schools will also help build the type's hours, aiding future certification campaigns, says the company. Featuring Garmin G500 avionics, a US propeller, Slovenian electric motor and

a Chinese-manufactured composite body and battery pack, production is targeted at 30 units within the first year, rising to between 500-1,000 in five years. A battery-swapping system promises a 3min turnaround.

While the RX4E's impressive short take-off and landing performance will also prove key for remote and regional operations, a prototype four-seat fully-electric seaplane is also under development.



Discover Xplorer

Italian airframer Blackshape is unveiling the latest addition to its lineup at Aero: the Prime Xplorer (pictured), a modified variant of its existing Prime platform developed following extensive feedback from the US market. The taildragger Xplorer features a number of airframe modifications as well as an Italian-made engine. These include wings with more surface area for better short take-off performance, improved wingtips enhancing lateral and directional stability, and a modified empennage improve spin recovery. The powerplant is a 180hp (135kW) unit made by CMD, chosen in part, explains general manager Giuseppe Verde, as part of a "homegrown" strategy in the face of geopolitical uncertainty. The prototype shown here will commence flight testing in a few months to validate its modifications and performance, after which the aircraft will be certificated under either European Union Aviation Safety Agency CS-23 or CS-VLA (very light aircraft) standards, including for aerobatics. It will also fall under the US Federal Aviation Administration's experimental category, the market for which the aircraft was primarily developed; Blackshape has three US dealers and is looking at setting up a US assembly line, potentially at Miami Opa-Locka airport.



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H2Fly's high hopes for hydrogen

As the company behind the H2F-175 hydrogen fuel cell system that powered a one-off prototype of parent company Joby's electric vertical take-off and landing aircraft – something it developed and flew in just 13 months – H2Fly is confident about the commercial potential of its technology. Within the next two years, H2Fly intends to move towards design and development of its first serial product, with co-founder and chief technology officer Josef Kallo expecting to “push forward massively”. Crucially, H2Fly's lighter Gen4 system would allow Joby to keep its five-passenger target if the manufacturer chooses that route, he says. Kallo says H2Fly is also challenging the concept of separate OEMs and powerplant producers, with the Stuttgart-based company and Joby able to propose a potentially vertically integrated offer.



A new spin on training

Technically a training tool for the German Bundeswehr, this gyroscope, in hall A6, is used to help prepare for g-force and spatial disorientation from the safety of the ground. The sensation is a lot like aerobatic tumbling manoeuvres, initiated backwards, and rather enjoyable as long as you hold on tight while inverted. Pictured is the Bundeswehr's Elena Moosmann.

Aero-Dienst's Aero debut



Kate Sarsfield

Germany's Aero-Dienst is making its Aero debut where it hopes to drum up interest in its maintenance, repair and overhaul (MRO), air ambulance and charter businesses. “This is a fresh opportunity for us to tout our offering to the industry – with all the main companies attending Aero this year – and to the show's many aircraft owners, operators and buyers,” says chief executive Dr Oliver Kosing (pictured). Adding to its manufacturer service centre approvals is a key aim. Aero-Dienst is an authorised MRO provider for the Dassault Falcon business jet family and an approved Bombardier service centre. “We are hoping to add another OEM to the list soon but there are many more companies we would like to join forces with. Aero is a great opportunity to open

those channels,” he says. The medevac and charter markets are also thriving, “but there is still room to grow,” says Kosing. Two Dornier 328s and a pair of Bombardier Learjet 60XR make up the AD-AC-branded air ambulance fleet, and a large-cabin Challenger 650 will be added to the line-up early next year. “We are now converting the aircraft's interior from VIP to medevac,” says Kosing. “Once operational, the Challenger will allow us to fly much longer distances non-stop,” he adds. Other long-range types could be added at a future date. Similarly, Aero-Dienst is seeking to expand its managed charter fleet. The three-strong line-up consists of a super-midsize Challenger 300 and Challenger 3500 and long-range Global 5500. “It is a large, competitive marketplace and we are not looking at aircraft below the super-midsize range, but there are still plenty of opportunities,” says Kosing.



FAI seeks buyer for Challenger 604

German business aviation services provider and Aero debutant FAI is displaying a refurbished Bombardier Challenger 604 business jet on the static, which it hopes to sell, but, if not, will retain in its charter fleet. The 2000-build twin jet (D-AFAC) will head to Norwich in the UK following the show for exterior painting at Satys, formerly Air Livery. “We are open to selling the aircraft if and when the right buyer comes along. In the meantime, we will add it to our charter fleet. Delivery from Satys is expected in early May,” says FAI chairman Siegfried Axtmann (pictured in the Challenger 604). FAI already operates a Challenger 604 – an 18-seater typically used for large group transportation. The Nurem-

berg-based company's owned charter fleet also includes a midsize Bombardier Learjet 60XR and five long-range Global Express jets. “We are looking to get as much utilisation from our aircraft as possible,” Axtmann says. The Globals each log around 1,000h per year, “but they could easily fly another 300h. We hope to get more than 600h per year out of the Challengers,” he adds. Axtmann describes the charter market as “pretty robust” particularly for transatlantic flights. “For the first time in the company's history we expect the revenue for air charter to match that of our thriving air ambulance business,” he says. FAI operates a fleet of nine medevac aircraft: four Challenger 604s and five Learjet 60-series jets.

Appy days at Cirrus

Kate Sarsfield

Cirrus unveiled at the show yesterday its new IQ Pro digital aircraft management app and updated its standard IQ offering for owners and operators of its Vision Jet and Cirrus SR series of piston aircraft. “The mobile app as been redesigned from the ground up with a new user interface that is cleaner, sleeker, easier to read and navigate,” says Seneca Giese, director of Cirrus IQ products and services (pictured). With the Cirrus IQ app

owners can check their aircraft's status including fuel and fluid levels, oil temperature, battery health, flight hours and other flight information by pairing their connected aircraft to a dedicated app on their phone or through the My Hangar online portal. The information is collected by a module installed in the tail of the aircraft and connected to a cellular service, Giese says. “It records the data during the flight which is then transferred to Cirrus. We process that data and display it in the app after the flight,” he adds. The IQ Pro offers a num-

ber of additional features and allows users to sync their aircraft remotely to provide real-time status updates. “IQ Pro vertically integrates independent systems for maintenance and flight logs into one simple go-to solution,” says Giese. IQ Pro will be complimentary until January 2026 when the service will be accessible via a paid subscription. Cirrus IQ is offered to owners of SR-family aircraft from 2020 onwards and Vision Jet owners from serial number 463, which represents almost 3,000 and 200 aircraft, respectively, says Giese.



Red the news?

Meet the team responsible for getting *Flight Daily News* into your hands during Aero. Our red flight suit-clad distributors are a familiar sight at air shows and conventions around the world, including Paris, Farnborough, Singapore, Dubai, Avalon, Bahrain, EBACE and NBAA BACE, but this is the first time *Flight Daily News* has published in Friedrichshafen. We hope to be back in 2026.

Historic Huey

Built under licence by Dornier between 1967 and 1981, the Bell UH-1D Huey – on display in Aero's Helicopter Hangar – saw service with the German army and air force as a utility helicopter. This example was used for search and rescue missions until 1994, when it transferred to an air transport role. With the Huey replaced in service by twin-engined Airbus Helicopters H145s, this airframe made its final flight in 2006 and now resides in Friedrichshafen's Dornier museum.



Daher's current plans

French manufacturer eyes 'more electric' architecture on next aircraft for 2027 launch

Dominic Perry

Daher continues to evaluate the future potential for hybrid-electric propulsion, although the French airframer admits its next aircraft will be "more electric" rather than featuring a highly advanced powertrain.

Speaking at an Aero press conference yesterday, chief executive Nicholas Chabbert (pictured) said the company "is committed to have a product to announce in 2027" that will be "as electric as possible". But he says Daher is "not so sure" about electric propulsion based on its findings from the EcoPulse hybrid-electric technology demonstrator project alongside Airbus and Safran.

The around 50 test flights performed with the modified TBM 900-series led Daher to the conclusion that certain technologies, notably batteries, "are not at the level they need to be", says Christophe Robin, vice-president of engineering and head of design.

"If we use a lot of electric power we will have a weight penalty which will kill the equation... you will lose more efficiency from the weight than you gain from the electric system."

Those limitations rule out the use of a hybrid-electric powertrain on its next-generation aircraft, he says. Trying to develop an aircraft that matches the performance of current-generation TBM or Kodiak models means "at the end of the day you are

making a flying battery".

Instead, Daher's future product roadmap foresees an aircraft incorporating a combination of aerodynamic improvements, new lightweight materials and a more-electric architecture.

But Robin says that hybrid-electric power remains in the airframer's plans as a possible "second step".

He points to the evolution of the TBM 900 series in the decade since its launch in 2014. "We have made new models every year. For the next generation of aircraft it has to be the same thing.

"You need to have a first step and then improve this. The architecture at the beginning should be capable of that evolution."

Chabbert says the next aircraft must deliver an overall "positive" outcome: "A negative impact on the environment is absolutely useless," he says.

And any product that it brings to market will have to be commercially viable, he says: "We have to have a product that is going to be bought by customers."

Initial operator feedback is that unless an aircraft can achieve a range of around 700nm (1,300km) "there is no use for it".

But if switching to an alternative propulsion system limits range to 50-100nm "I don't know what market you can address with that", says Chabbert. While operators will also tolerate slightly higher costs, he says, "they are telling us if [costs] double we will be out".



Hartzell highlights material benefits



Hartzell Propeller is at Aero to showcase its latest composite innovations which deliver a performance boost across a range of general aviation applications.

"Most of our new product development is centred on carbonfibre technology," says JJ Frigge (pictured), president of the Piqua, Ohio company.

Due to the properties of the material, Hartzell can cut the weight of the propellers while retaining the same strength as the metallic equivalent.

For a turboprop application, that allows the addition of an extra blade without increasing the overall mass, says Frigge.

"It's been a great investment for us - when I started 13 years ago, we had two composite designs and now we have well over 25 to 30.

"That's where most of our growth has been - we have gone from six employees in the composite shop to 70-plus running around the clock."

A recent example of Hartzell's composite expertise is the Yukon propeller for the Cessna Caravan. Developed in collaboration with float manufacturer Wipaire, which holds the supplemental type certificate for the installation, the four-blade composite design shaves 9kg (20lb) over the metallic component it replaces and boosts take-off performance by 25%.

While Hartzell remains focussed on its core general aviation market, Frigge sees the potential for "explosive growth" coming from the advanced air mobility (AAM) segment.

It is already working with

US firm Beta Technologies as the propeller supplier for the conventional take-off and landing Alia CX300.

The three-blade fixed-pitch composite design is in the "late stages" of certification, a milestone that should be achieved by around June, he says.

However, Hartzell is also working to translate its know-how to meet the requirements for vertical take-off and landing aircraft - a use that combines the need for the same component to supply both lift and thrust.

Additionally the firm is collaborating with electric motor suppliers such as Magnix and Dovetail Electric Aviation to optimise its propellers for new-generation powertrains.

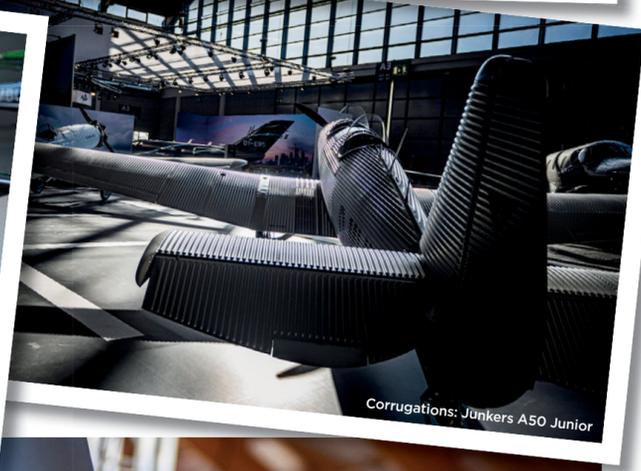
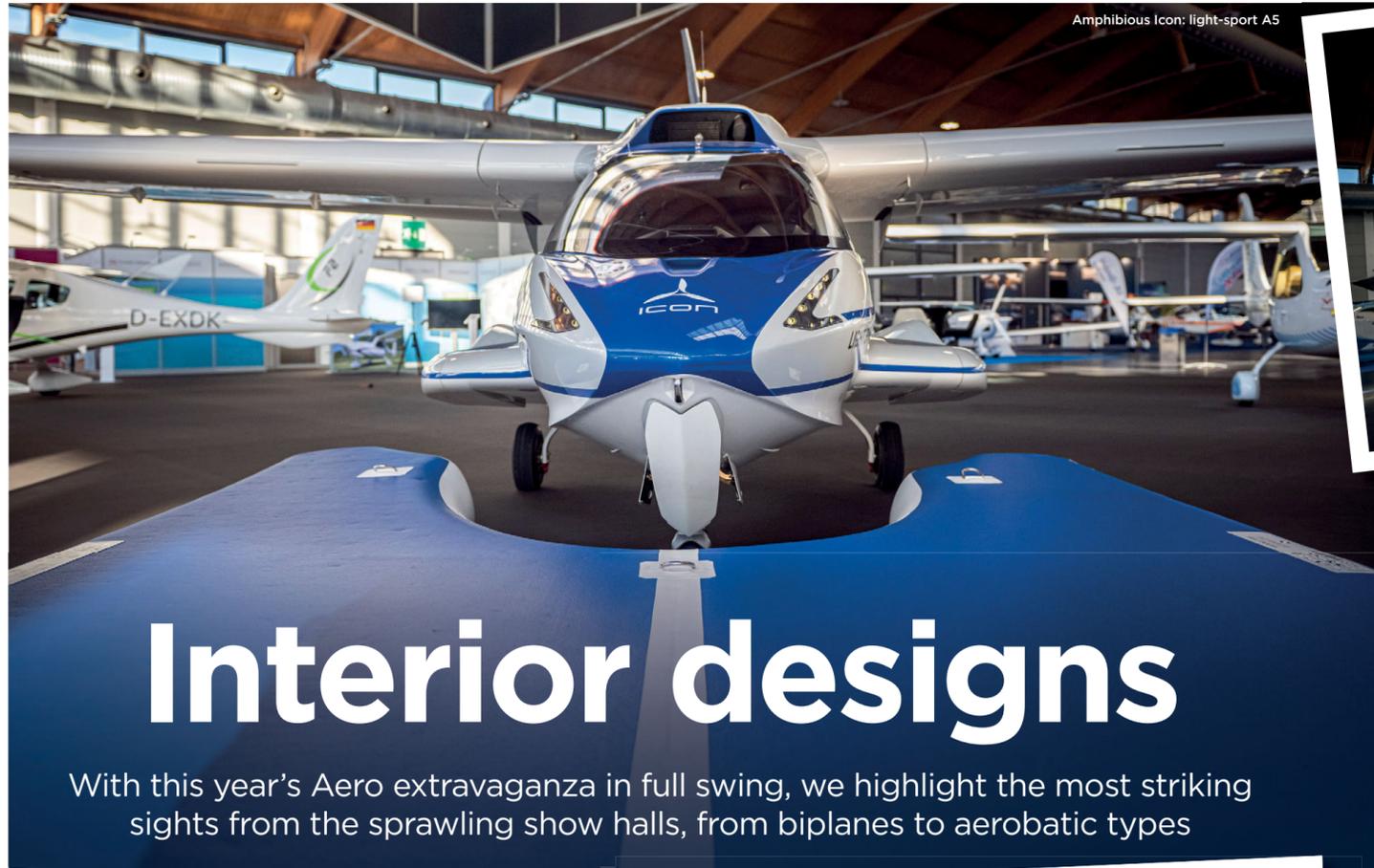


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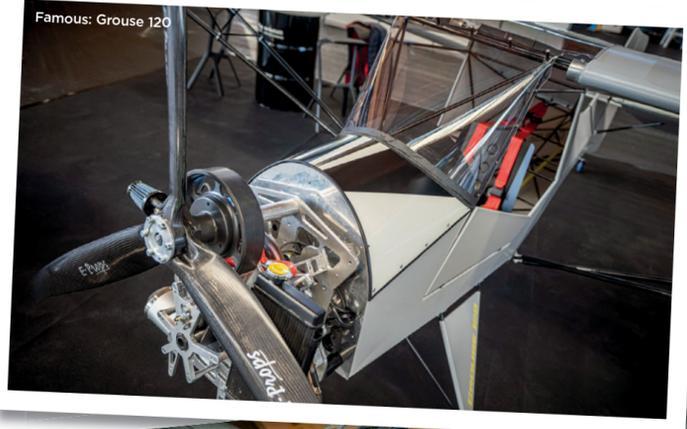
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Interior designs

With this year's Aero extravaganza in full swing, we highlight the most striking sights from the sprawling show halls, from biplanes to aerobatic types



Fury flying high in Europe

Kate Sarsfield

Piper Aircraft's flagship M700 Fury has returned to Aero, this time with European and UK certification under wraps. The Aero regular is hoping to drum up sales of the single-engined turboprop from the region's corporate and owner-operators for which it says the six-seat type is "ideally suited".

Alba Walcott, Piper's senior manager for marketing and communications, says a handful of models have been handed over to European customers since the aircraft received European Union Aviation Safety Agency and UK Civil Aviation Authority approval in the third and fourth quarter of 2024 respectively. This includes the Fury on display which belongs to a UK owner.

Unveiled in February 2024, the \$4.3 million Fury is the latest model in Piper's PA46 line of M-class aircraft - which also features the M500 single-engined turboprop and the M350 piston-twin.

The M700 is a successor to the M600 SLS. While it shares many features with its predecessor including the Garmin G3000 flight-



Walcott with the Fury: M700 outperforms SLS in several flight phases

deck with autothrottle and Autoland capability, notable enhancements include a revamped interior, a five-rather than four-blade Hartzell propeller, and a 700hp (522kW) Pratt & Whitney

Canada PT6A-52 engine which delivers greater operating and runway performance than the 600hp -42A variant on the SLS, according to Piper. "The M700 outperforms the SLS in several

key flight phases and opens up a lot more airports and territories," says Walcott. Improvements include a 35kt (65km/h) increase in cruise speed to 300kt, take-off distance of 608m

(1,994ft) - a 24% boost - initial climb rate of 2,048ft/min, which is 32% better; climb to 25,000ft in just under 14min (34% better); and a landing distance of 595m (26% better).



Honda promotes Autoland for Elite II

Show regular Honda Aircraft is promoting on its stand the new Garmin autothrottle and emergency automatic landing, or Autoland, systems for potential European owners of its HondaJet Elite II business jet. Both autonomous safety systems are scheduled for European Union Aviation Safety Agency certification on the light twin next year, and Timothy Peters, Honda's manager global events and merchandise (pictured), is confident they will be well received by customers, "particularly owner-flyers".

The autothrottle is offered as a standard feature on the Garmin G3000-equipped Elite IIs. It secured US approval on the aircraft earlier this year. Peters describes it as an "incredibly efficient" system for pilots. "It reduces cockpit workload by automatically managing engine power from take-off to landing," he says.

Garmin's Autoland feature - which is undergoing flight testing on the Elite II in the USA - is designed for emergency situations when the pilot is incapacitated. With the push of a button the Autoland can automatically control and the aircraft without human intervention. When activated, Autoland calculates an optimal flight path, initiates the approach and communicates with air traffic control throughout the process.

Autoland is available as a \$100,000 option on the Elite II and is earmarked for US and European approval in the fourth quarter of 2025 and early 2026 respectively. Launched in 2023, the \$8 million Elite II is the third iteration of the HF-120-powered HondaJet with around 40 of the type in service. To date, the Greensboro, North Carolina-based airframer has delivered nearly 260 HondaJets of which around 65% are US-based.

Al Bateen beckons for Bombardier

Bombardier is to move its Abu Dhabi service centre to Al Bateen Executive airport from its previously planned location at the emirate's main international hub.

Construction of the new facility is expected to start in the first half of 2025, ahead of its opening in the second half of 2026.

Bombardier, which has a prime position in the show's business aviation hub, had in 2022 announced that it had broken ground on a site at Abu Dhabi International airport, which was expected to open in 2025.

But Paul Sislian, Bombardier executive vice-president of aftermarket services and strategy says he is "delighted" by the shift.

"This location is strategically aligned with all our aftermarket priorities and perfectly matches the needs of our discerning customer base.

"Our customers are accustomed to receiving an exceptional service experience wherever they are in the world, and this new facility in this dynamic financial hub will ensure they continue to receive the best service experience possible."

Elena Sorlini, managing director and chief executive of Abu Dhabi Airports, says the move "represents a strategic alignment" given Al Bateen's "focus on business aviation".

The new facility will cover an area of around 120,000sq ft - larger than the 100,000sq ft of the previous site - including a 55,000sq ft hangar.



Going the Extra mile

Charlotte Bailey

Six months after introducing the latest model to its high-performance aerobatic stable, Extra Aircraft is celebrating double-digit sales of its new Extra 300SX.

Building on the success of its nine-time world-championship-winning 300SC, the

company is confident the improved variant will prove a podium-topper at its inaugural major competition in a few months.

"We will always see if we can make anything better, greater and faster," says Christian Hochheim, executive manager of customer service and sales (pictured). The elimination of a central fuel tank, shorter fuselage

length and subsequent centre of gravity alteration gives the SX the edge over its predecessor, along with certain additional aerodynamic changes including aileron amendments, he says.

Although the SX is expected to slowly take market share from its predecessor, Extra will continue to offer the SC "because for some people, it is more important

to have a little more fuel on board," says Hochheim.

However, he cites a current "window of opportunity" for the French team, which trains extensively on the SC, and has expressed interest in upgrading. The SX is also due to participate in its first championship this June, at Extra's home airfield of Dinslaken, before taking the challenge to the World

Championship in the USA next year.

Extra currently offers a lead time of a little less than 12 months, a timeline that has stayed relatively stable over recent years with slots now being taken for deliveries from February 2026. Since its inception in 1980, Extra has constructed close to 900 aircraft, making it one of the most successful post-war German airframers, building two units a month across its five-product range. And in terms of what comes next: "We never stop thinking," says Hocheim.

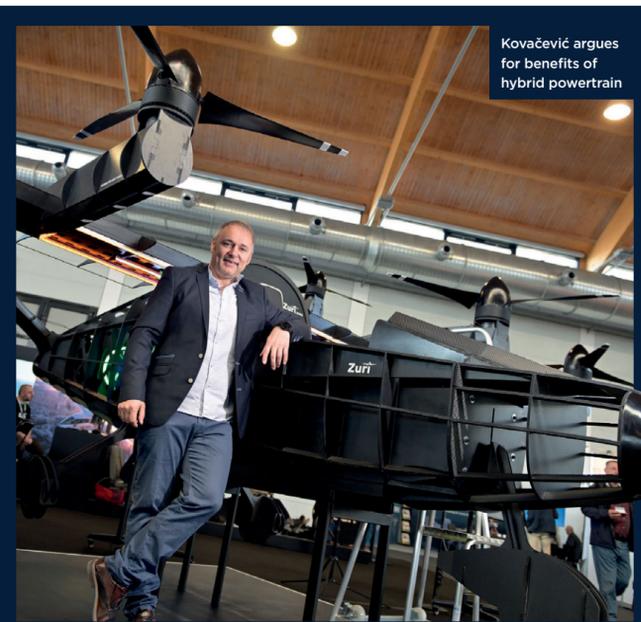
Czech this out

Although broadly similar in style to other fully electric vertical take-off and landing (eVTOL) offerings under development, Czech developer Zuri insists its hybrid-electric concept is the way forward - or rather, up. As a sector, "we haven't learned the lesson from the automotive industry," says chief technology officer Predrag Kovačević, highlighting the decades of work required to achieve reasonable range from a fully electric car. "At this point, it's far better to optimise a hybrid aircraft configuration."

Founded in 2017, Zuri is developing a regional air mobility aircraft, eschewing urban air mobility for a projected 378nm (700km) range aided by eight tilting rotors, four attached to each of the high fixed wings and V-tail. The fuselage - featuring space for four passengers and one pilot - will be made from weight-saving composite material.

Although the model on display at Aero is not necessarily indicative of a final design, Zuri is focusing on testing its systems and proof of concept. Augmenting ground-based systems testing is its "demonstrator 1.0" drone, which has carried out vertical flight elements. A remotely piloted 2.0 model, featuring two seats and an enclosed canopy, is scheduled to make its maiden flight in late 2026 or early 2027, with the onboard space potentially suitable for a subsequent autonomous cargo variant.

While Zuri is collaborating with several global suppliers for this mock-up, the hybrid-electric powertrain provider is still unknown, with Kovačević noting: "No one has previous experience with this build of configuration and aircraft." In-house development is also a possibility, although expectations are that the market will be "much richer in a few years".



Kovačević argues for benefits of hybrid powertrain

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French light aircraft developer Aura has taken a staged approach to bringing its electric aircraft to market

Towards a new ERA

Murdo Morrison

French advanced air mobility (AAM) start-up Aura, which is exhibiting at the show this week, has taken a rather different route to market to many of its competitors. The Toulouse-based company's flagship in-gestation product is the 19-seat hybrid Electric Regional Aircraft, or ERA, which it hopes to fly by early 2027. In the meantime, it has been developing rather more conventional aircraft. Just before the end of 2024, the Integral R, the first variant of its two-seat trainer/aerobatic aircraft family, achieved certification. Two other versions, the sporting S and the electric-powered E, are awaiting approval from the regulator - the E made its first flight also in

December, while the S will return to flight testing in April ahead of a targeted certification later this year.

Aura is now moving ahead with volume assembly of the Integral R, which has been in build since 2019, at its Franczal airport site, as the first aircraft reach customers. It means that the company will gain invaluable production experience, while revenue from sales generates cash and helps fund Aura's more ambitious hybrid-electric project.

Chief executive Jeremy Caussade says the strategy - decided when he founded the company with two colleagues in 2018 - has proved a sound one as other AAM pioneers have begun to run short of cash and some - including electric vertical take-off and landing developer Lilium - appear to have reached the end of the road.

Aura hopes to fly the ERA by early 2027

"Time to market is very long when you are designing a whole new mode of air transport, and this has been behind the problems we have seen in the eVTOL sector," says the former Airbus executive. "Our approach from the beginning was always to be in the final stages of developing the ERA as a certified production company. We are preparing ourselves to be as efficient as possible before we start ERA production."

Aura expects to deliver between 12 and 15 Integral Rs in 2025, with production of the wood-carbon aerobatic-capable type ramping up to around two per month next year and three to four per month by the end of the decade as S and E variants are added to the mix.

The company is sticking to its target of late 2026 to have the

Integral E, which is powered by a Safran ENGINeUS electric motor and lithium-ion batteries, ready for delivery. That would likely make it the second electric aircraft in Europe to be certificated after the Pipistrel Velis Electro.

However, as a European Union Aviation Safety Agency CS-23 category aircraft, the Integral E - which will have a battery life of almost 1h and will be rechargeable in 30min - is a much more complex design than the Slovenian-built light sport, Caussade says, noting that in flight testing it has been behaving very similarly to the other Integral variants.

Next on the line - if everything goes to plan - will be the ERA, one of a number of sustainably powered contenders intended to revitalise a commuter market once dominated

"Time to market is very long when you are designing a whole new mode of air transport, and this has been behind the problems we have seen in the eVTOL sector"

Jeremy Caussade Chief executive



"Our approach from the beginning was always to be in the final stages of developing the ERA as a certified production company"

Jeremy Caussade Chief executive

by the likes of the Beechcraft 1900, De Havilland Canada Twin Otter, Dornier 228 and Fairchild Metroliner but that has seen very little new aircraft production for decades.

Since the programme's launch in 2021, the ERA has secured high-profile customers. They include Maltese private aviation operator Elit'Avia, which has committed to 28 aircraft, regional cargo airline Alpine Air Express, which last year signed a letter of intent (LOI) to purchase up to 75, and US charter outfit JetSuiteX, which agreed an LOI for 50 examples. US commuter carrier Republic Airways is a "strategic advisor" to the programme, although it has not formally committed to aircraft.

Aura has recently pushed back its targeted entry into service for the ERA, which will be a hybrid able to fly on kerosene rather than a fully electric aircraft, to "before 2030". Production of the first parts for the aircraft, which will be certificated in the EASA CS-23 category, will begin this year.

Caussade says the company will announce at the Paris air show in June the closing of a funding round that he says should provide it with enough funding to bring all the Integral models to full production, bring on stream new factories at Franczal and in Florida, and build

a flying prototype of the ERA. Once that is achieved, "we will be in good shape for an IPO [initial public offering] or at least be on a very secured path to raise more", he says.

Investors in the company have included French electricity giant EDF, while Aura has raised around €134 million (\$139 million) in non-equity finance. Caussade notes that Aura is the first aerospace company to be awarded money from a French innovation fund aimed at promoting sustainable technologies. The company also last year launched its first Europe-wide crowdfunding campaign.

To preserve cash, Aura will partner with property companies to erect and rent its new-build factories. Last year the Toulouse city council gave the go-ahead for the construction of a 20,000sq m (215,000sq ft) complex, capable of producing 150 aircraft a year, to replace its existing hangar at Franczal in the next two years. Meanwhile, Aura will open a factory twice that size at Daytona Beach airport in Florida, where it will assemble aircraft for the North American market.

Caussade expects Integral customers to be drawn from both the owner pilot and flying club community as well as from professional training schools. With the electric version of the aircraft, he expects many early customers to be from the military market as that sector strives to make its operations more sustainable, and update fleets that often rely on very old designs.

Although it has not announced a formal order, Airbus Flight Academy Europe, a unit of the airframer that provides basic instruction for pilots destined for the French air force and navy, is collaborating on the development of the Integral E version following the signing of a memorandum of understanding at the 2023 Paris air show.

As for the ERA, Aura and Sweden's Heart Aerospace are the two companies furthest ahead in the race to certify the first clean-sheet electric aircraft with double-digit seats (France's VoltAero and Eviation of the USA are among those developing nine-seat electric designs). With negligible competition from established aerospace players, the door is open for a market entrant to potentially disrupt regional air travel in a major way.

That is providing, of course, they can continue to raise finance, keep the regulator onside during a tricky certification process, and, perhaps most crucially, industrialise production by managing a supply chain and demanding customer delivery deadlines. With its two-step business model of first establishing itself in the light trainer market, Aura believes it will have learned many of those lessons by the time the ERA is ready for market. ▶



The Integra E is scheduled for first delivery next year



The company hopes to deliver between 12 and 15 Integral Rs this year

UK charter operator Saxon Air wants to lead by example when it comes to aviation sustainability and introducing young people to a career in the sector



Two Velis Electros under the charging port at Saxon Air's Norwich base

Electric dreams

Murdo Morrison

In the rare March sunshine at Norwich airport, a Pipistrel Velis Electro sits under a canopy being recharged by a power unit that is itself being replenished by solar energy via panels on the roof. The station is part of what Saxon Air chief executive Alex Durand describes as the company's small but symbolically significant contribution to the industry's decarbonisation efforts.

Saxon Air – a fixed-wing and helicopter management and charter operator that also runs the UK regional airport's sole fixed base operation (FBO) – fitted the charging port in October, shortly after leasing its first Electro to offer "sustainable flight training" as well as "experience flights" to youngsters considering a career in aviation.

The initiative is about more than creating a new revenue stream – in fact, Durand admits the flying school, which currently has 10 students, costs more money to run than it makes. Rather, it is about "showcasing electric aviation to a wider audience", enthusing teenagers about the industry, and setting Saxon Air on the road to net-zero.

That means making its two-hangar facility at the airport self-sufficient in energy by 2030, according to Durand, including by installing solar panels and other environmental measures. Operating its Electros – it has since added a second – will help "us work out what we need as an FBO when it comes to supporting sustainable forms of air transport", he says. "We want to advance the cause of electric aviation."

The charging port, which generates just over 18,000kW of energy a year, is one of two installed in the Norwich area by charging specialist RenEnergy. The other, at Old Buckenham, an airfield 30km away, allows students to fly between the locations and charge the aircraft while they wait – that typically takes an hour. It might not quite be the nationwide network of stations that the UK general aviation sector will need to leap headlong into electric flight, but it is a start.

The two-seat Velis Electro was approved by the European Union Aviation Safety Agency in June 2020 as the world's only certificated electric aircraft, two years before Textron Aviation acquired its Slovenian manufacturer. Intended for short training flights – battery endurance is less than an hour – under visual flight rules conditions, more than 100 are in use with flying

schools and even the US Air Force, which has been evaluating two leased examples.

Saxon Air might not seem an obvious evangelist for electric aviation. Its base at Norwich is a hub for helicopter operators serving the oil platforms of the southern North Sea. Every year, 35,000 workers check in and pass security checks at its terminal. From its VIP lounge next door – and FBOs at other UK airports – business leaders and high-net-worth individuals board rotorcraft and private jets bound for meetings in Zurich, golf courses in Marbella, and second homes in Tuscany.

As one of the UK's prominent aircraft management and charter specialists, Saxon Air – owned by the Klyne family – runs a fleet of 11 Textron Aviation Citations, Bombardier Learjets, and Embraer Phenom 300s, as well as seven Leonardo helicopters under separate air operator certificates. It has the exclusive contract to handle all non-scheduled flights at Norwich. One of its two hangars is leased to an offshore operator for maintenance.

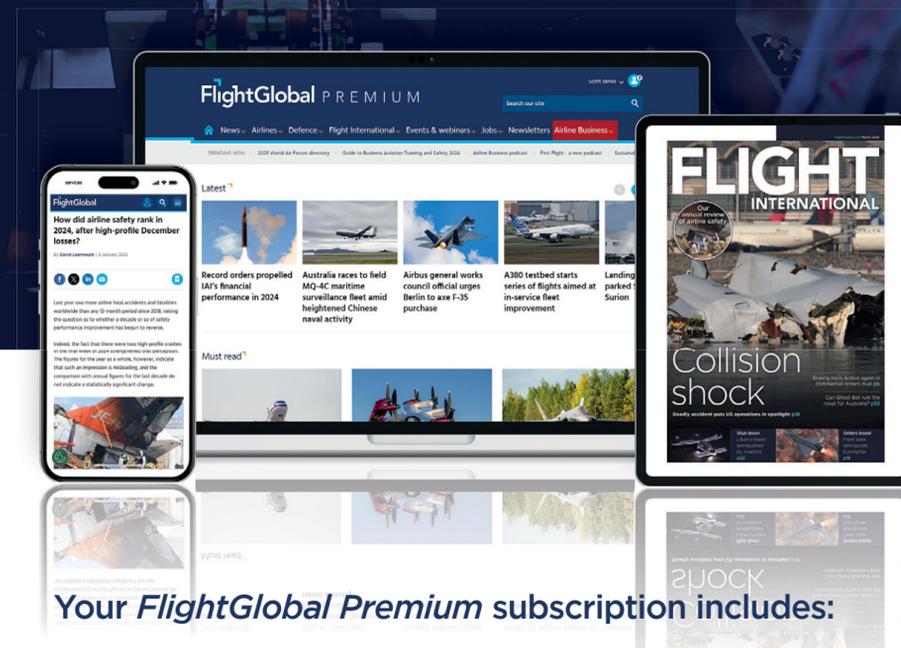
However, Durand insists it is successful aviation companies such as the one he manages that must lead the way when it comes to sustainability. He admits it is not always easy. Aside from the

infrastructure challenges of not having enough charging stations, the UK Civil Aviation Authority, for instance, does not approve ab initio training on an electric aircraft, so Saxon Air's students must complete much of the private pilot licence syllabus on a conventionally powered type.

However, he believes Saxon Air's efforts will help engage environmentally minded and technologically curious youngsters with an industry that "they only hear negative things about on the news". Aside from offering the experience flights, Saxon Air works with other companies in the area to run "Saturday STEM clubs", giving boys and girls, often from socially deprived parts of the city, a chance to take part in activities from flying a drone to marshalling an aircraft.

"We want to make it as relatable as possible to show them and their parents that anyone can work in aviation," says Durand. The largely rural county of Norfolk is home to high-tech employers from Air France Industries KLM Engineering & Maintenance, Lotus Cars, and Mirus Aircraft Seating to dozens of digital start-ups. "There is a huge skills shortage across this region," he says. "Helping youngsters find their right career is an obligation of our social licence in the community." ▶

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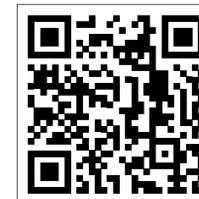


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Cirrus may be one of the industry's most prolific manufacturers, but the US business believes there are market opportunities over the Atlantic

Murdo Morrison

With the region representing only a tenth of Cirrus Aircraft's global sales - including just 40 or so of roughly 600 single-engine Vision Jets operating worldwide - Europe offers plenty of potential for the Minnesota-based manufacturer. The Aero regular is back in Friedrichshafen, displaying its piston-single SR22 as well as the Vision Jet.

Thanks to typically short flying distances and the 1,275nm (2,360km)-range Vision Jet's ability to fly over mountain ranges such as the Alps and Pyrenees at 31,000ft, Cirrus products are perfect for the continent's owner-pilots, asserts chief executive Zean Nielsen.

Cirrus arrives at the show after another impressive 2024, during which it increased shipments year-on-year of all its four lines - the original baseline SR20, two versions of the higher-performance SR22, and the SF50 Vision Jet, which was certificated in Europe in 2017, a year after the USA. In total, Cirrus delivered 731 aircraft, including 101 Vision Jets, breaking the treble figure barrier for that type for the first time, according to General Aviation Manufacturers Association figures.

January last year also saw the launch of the latest version of its SR Series. The Generation 7 comes with Garmin's Perspective Touch+ avionics suite with dual touch controllers, as well as comfort enhancements and improved safety systems "to make single pilot flying even safer", according to Nielsen. Sales of the variant in the first two months after the announcement "shattered all records", he says, although these have since "plateaued down".

The move also brought the flying experience of the SR Series closer than ever to the SF50. "We simplified the cockpit, making the jump into the jet much easier," he says. "There was sometimes a bit of trepidation about moving up to the Vision Jet, but this way



Cirrus says the Vision Jet's ability to comfortably fly over mountain ranges makes it perfect for Europe

Looking to Europe

transitioning to the new type rating becomes much easier."

That came just after an update to the Vision Jet announced at the 2023 AirVenture show in Oshkosh that included an automated weather tracking system as part of the Garmin avionics that Cirrus says provides improved situational awareness during bad weather. Software that collates aircraft data such as fuel levels and flight hours for owners via an app was also part of the package.

However, it is perhaps its safety features that Cirrus is best known for. When it came on the market in 1998, the Continental IO-360 SR20 was the first in general aviation to feature a parachute that could lower the aircraft to the ground after a loss of control or pilot incapacitation incident. The

technology was later included in the IO-550-powered SR22 and the Vision Jet, and Cirrus claims it has helped save over 250 lives.

In 2020, Cirrus followed that with the Garmin-developed Safe Return emergency autoland system on the Williams International FJ33-5A-powered Vision Jet. Activated by a passenger or pilot pressing a button, or automatically if there is a sudden loss of cabin pressure, the software autonomously guides the aircraft to the nearest safe landing area.

Although it has never been deployed in a real-life situation - except by accident when it has been quickly manually deactivated - Safe Return remains a "huge selling feature" for the jet. It is especially popular with many owners' families given that the typical customer does not fly for a living, says Nielsen.

Nielsen maintains that many of Cirrus's recent product improvements originate from an innovation centre established at its Duluth airport campus in 2022. Based in a 17,600sq m (189,000sq ft) former maintenance hangar, the facility houses almost 500 engineers who can work in a close-knit, collaborative environment. The development has substantially reduced innovation cycles, he says.

It has also helped with recruitment, retention, team-working and motivation following the pandemic when many young professionals were falling into the habit of working remotely and losing the ability to interact creatively. "We created a great space for people to come back to after Covid," says

Nielsen, a former Tesla executive who took over the running of the now Chinese-owned firm from co-founder Dale Klapmeier of in 2019.

Perhaps surprisingly, for someone who used to work for the world's best known electric vehicle brand, Nielsen is ambivalent about the prospects for electric-powered aircraft, and, unlike some manufacturers, has avoided any high-profile involvement in alternative propulsion initiatives.

"We have done some studies into different sorts of propulsion system, but two fundamental things come into play: the weight of batteries when what you're trying to do with an aircraft is defy gravity, and the cost of designing a system," he says. Instead, Cirrus has focused on more mundane environmental targets, such as ways to reduce the lead in aviation fuel.

Nielsen insists that, while Cirrus has been affected by industry-wide delays and shortages of parts, "by and large we have navigated things better than most" thanks to a supply chain that is 97% based in the USA - something that may also provide a safeguard should Trump administration import tariffs on many industrial raw materials and other goods take effect.

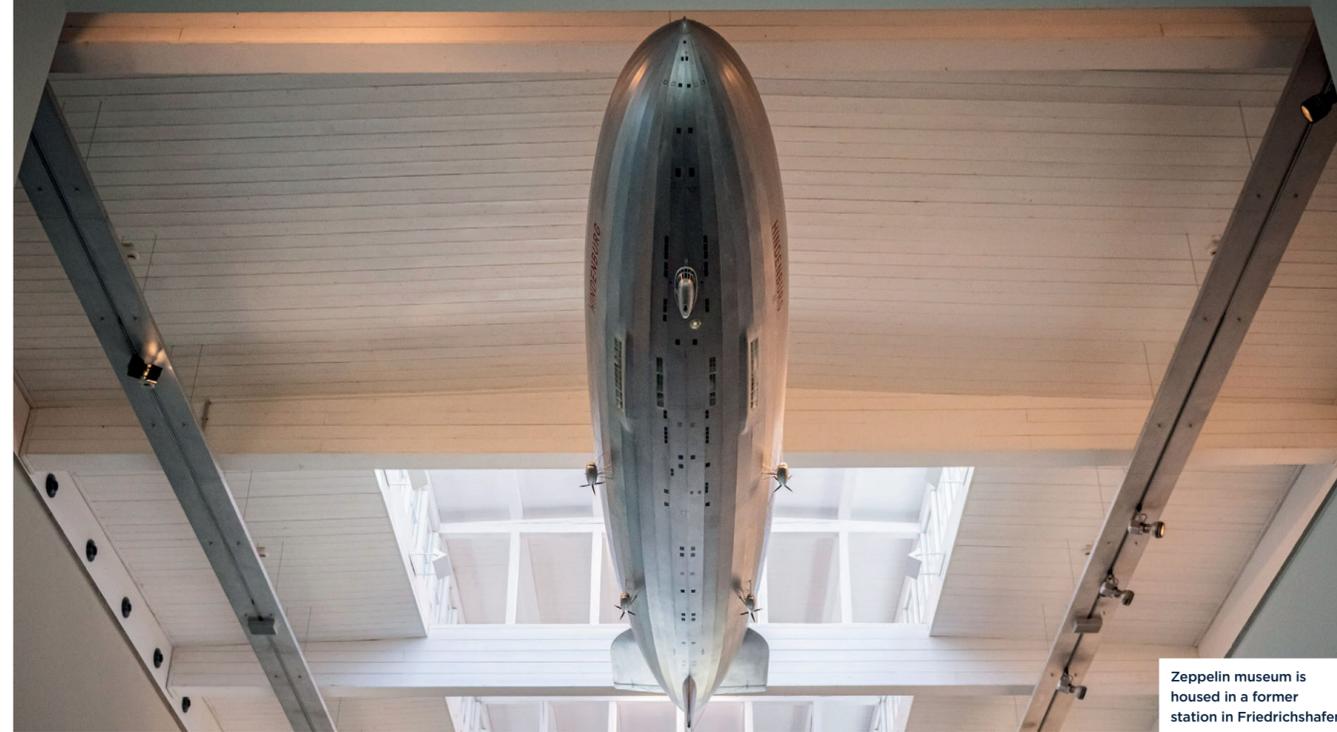
Above all, Cirrus has remained a champion of the consumer, insists Nielsen. "A lot of OEMs have put up their prices a lot in recent years. We've adjusted our pricing but not as aggressively," he says. "We try very hard to be an advocate for the owner. Our mission is to create pilots and to keep down the cost of owning an airplane." ▶



The SR22 has been the company's most successful product

Flight back to Friedrichshafen's pioneering past

Southern German city's aviation heritage stretches back to the dawn of heavier-than-air, powered flight. Aside from being the home of Europe's biggest general aviation event, the town is the birthplace of Dornier and Zeppelin - whose notable aviation advancements include world-leading flying boat and airship expertise, respectively. Two top-class attractions give visitors to the show, and the region, a chance to trace the history of these remarkable companies - still in existence in name at least. We took a pre-Aero tour ▶



Zeppelin museum is housed in a former station in Friedrichshafen



Futuristic Dornier Do 31 project was cancelled in 1970

Dornier's lasting legacy

In 1910, Claude Honoré Desiré Dornier became Zeppelin's scientific designer, tasked with improving the strength of light metals and lending his name to an iconic German brand. Initially famous for its metal flying boats built in Zeppelin's former shed at Manzell, Dornier Flugzeugbau would go on to build record-breaking commercial airliners and light bombers, leaving a lasting legacy.

Certainly, approaching the museum's entrance, there is no ignoring the imposing and unusual Do 31. The only vertical take-off and landing-capable jet transport ever built, the concept was commissioned by the German air force and first flew in 1967, although sadly was never adopted.

It is the same marginally bonkers brilliance that also manifests itself in the Dornier 'Janus' bubble car, featuring back-to-back seating for a family of four. Altogether, the museum hosts 12 original aircraft and two full-scale replicas.

Just as with Zeppelin, Dornier's

undisputable legacy is significant not just in terms of its realised ambition but also the physical size of its endeavours. Revolutionary at the time, Dornier's all-metal interwar aircraft included flying boats and land-based airliners, including the Komet (comet) and its final iteration the Merkur (mercury) used by Lufthansa in the 1920s and 1930s.

The eight- to ten-seat, high-wing Merkur held seven world records, while a seaplane-reconfigured variant became the first to cross Africa, flying from Switzerland to Cape Town in 77 days. Meanwhile, the 1924 Wal (whale) - of which a replica is also on display - reached the most northerly latitude of any aircraft during polar expeditions of 1925.

And from the weird to the wonderful, the innovation does not stop there. Building on Dornier's aptitude for flying boats, the Do-X took the title as the largest, heaviest and most powerful of its kind in the world, constructed in 1929 on the Swiss side of Lake Constance.

The all-Duralumin-hulled craft made its first

test flight from the lake carrying 169 people - also a new world passenger record. Although the original was destroyed in a Berlin air raid of 1943, the museum's tail fragments pay homage to a world-leading leviathan.

Acknowledging the undoubtedly darker side to Dornier's endeavours, military aircraft manufactured include the Do 13 light twin-engined bomber and the Do 335: the fastest piston-engined fighter of World War Two, but one ultimately too late to see service. Building on the success of its commercial and military aircraft post-war, Dornier ultimately joined forces with Dassault-Breguet to build the Alpha Jet in 1974.

After being acquired by the Daimler-Benz group in 1985, Dornier's aircraft division was briefly acquired by Fairchild in 1996 until the resulting Fairchild Dornier declared bankruptcy in 2002. Dornier's aviation subsidiaries taken over by the Airbus group, which still manufactures space components at its Friedrichshafen site.

Charlotte Bailey

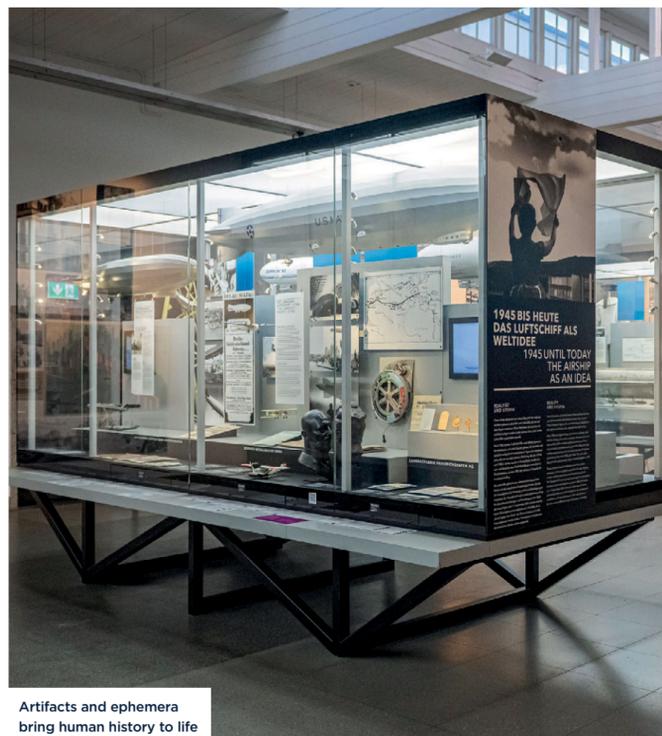
Once the pinnacle of transatlantic transportation, the iconic Zeppelin is synonymous with Friedrichshafen, with a museum opened in 1996 to celebrate the town's heritage now welcoming up to 240,000 visitors each year. Located in a grandiose 1933-built former train station, the collection comprises a comprehensive tribute to the iconic airship. While celebrating its many technological successes, it also thoughtfully acknowledges challenging associations with conflict and its use as a weapon of war.

With the interwar airship representing a bygone era of elegance, a 33m (108ft)-long reconstruction of a portion of the LZ 129 Hindenburg gives a glimpse of the opulence offered on the 245m-long leviathan. Taking up to three days to cross the Atlantic - the only commercial air service available until the 1939 fixed-wing Dixie Clipper - a ticket on this 'flying hotel' cost around 1,200 Reichsmarks - around half the yearly salary of the some 50-plus staff working on board. Just 50 passengers were carried on each flight during the aircraft's first season, although with the weight allocation for each, including luggage and provisions, of around 300kg

(660lb), the lounge's piano was ousted for the following year, helping increase headcount to 72. When not relaxing in a two-passenger cabin, travellers could enjoy a dedicated writing room or even - yes, really - a carefully controlled, pressurised smoking room. (No conclusive proof connects this to the aircraft's fiery demise, however.)

Lake Constance proved an ideal place to test airships allowing them to always take off into the wind, with the successful 24h flight of the experimental LZ4 instrumental in the type's military adoption. A huge industry sprang up from this success - part-funded by national donations - with the Zeppelin

deployed as the first ever strategic aerial bomber. However, technology facilitated by airship construction enabled wider-reaching scientific endeavour, including advancements in light metallic materials and the development of radar disc structures. Transmission components and adjacent aeronautical products are still manufactured in the town today. And just as slow-moving, comparatively quiet Zeppelins once watched out for submarines, contemporary applications include whale watching, bringing the airship into the 21st century. Separate galleries at the museum also curate additional changing exhibitions linked to its collection.



Artifacts and ephemera bring human history to life



A Zeppelin relies on a rigid internal structure for stability



Models next to the remains of a gondola give an impressive sense of scale



A collection of vintage Maybach cars beneath the 33m airship reconstruction panel



Hindenburg's lounge accompanied adjacent writing and smoking rooms

A German company wants to become Europe's first AOC-holding on-demand charter service operating twin pistons. Why does its founder believe he can succeed where others have not?

Murdo Morrison

Peter Knappertsbusch is determined not to repeat mistakes of the past with his planned European venture, Air Taxi Express. A host of other charter start-ups – going back to the very light jet bubble two decades ago – have foundered because they have opted for platforms that are too expensive, he believes.

While there is a market for those who want to travel by jet, Knappertsbusch says the demographic he wants to tap – small business owners, lawyers, and lower-ranked professional tennis players or golfers – simply cannot afford the thousand-dollar-plus flight hour cost of most on-demand charter services.

Instead, Cologne-based Knappertsbusch plans to become Europe's first AOC (air operator certificate) holder flying piston aircraft, in his case the Tecnam P2006T, a four-seat, twin Rotax 912S3-powered design from the Naples-based manufacturer, with a range of 1,100nm (2,040km) and approved to fly instrument flight rules.

The P2006T's hourly rate, he says, will be a fraction of what passengers would shell out for a jet or a turboprop such as the Pilatus PC-12. "You might pay €5,000 (\$5,450) to fly from Germany to Paris in an aircraft like that. The target price we are looking at makes it cheaper per kilometer than a taxi," he says.

He admits a piston aircraft cannot compete with a jet in terms of comfort, speed and range, but for those prepared to put up with a smaller cabin and a few bumps, the value is evident. "If you are [superstar footballer Cristiano] Ronaldo you will choose a jet," says Knappertsbusch. "But there are hundreds of CEOs of small businesses who want to get to their destination and back in a day but cannot or aren't prepared to pay jet prices."



Taxi light

Air Taxi Express plans to be operating five P2006Ts by next year

Knappertsbusch says he came up with the concept because, as a corporate tax adviser, he was travelling a lot within Germany using airlines. However, after the pandemic, carriers including Lufthansa drastically cut domestic services and getting around the country in a timely fashion started to prove difficult.

Despite Germany's impressive autobahn network, it is a large country. The roughly 570km from Cologne in the west to the eastern city of Dresden takes 6h by car, and with no direct service, even longer by train. These are exactly the sort

of routes he believes will be popular among Air Taxi Express customers.

While he is in the final stages of securing his AOC and has the first of what he hopes will be five Tecnam P2006Ts in place ahead of a planned launch this summer, Knappertsbusch says he is already proving the concept works. For more than a year, he has been offering on-demand charter flights in a Tecnam P92, a high-winged microlight.

Although carrying paying passengers in a P92 does not require an AOC, flights must be under visual flight rules in daylight hours, and there are only two seats. However, thanks to aggressive social media marketing on Instagram as well as word of mouth recommendations, the business operated around 300 flights over the past year.

Most have been inside Germany – the P92 has a range of around 432nm which is enough to cover most city pairs – although Air Taxi Express has flown passengers as far as Spain, Italy, and Poland with fuel stops. "The lack of a bathroom rather than range is really the issue," he says.

Air Taxi Express's initial P2006T is a third party-owned, managed aircraft, but Knappertsbusch believes that the AOC will help the business unlock further financing, from financial institutions as well as some 300 small shareholders he says will be willing to inject more capital. He then plans to acquire his

own Tecnam P2006Ts, taking the fleet to five by the end of next year.

By that stage, he says, the company will have the critical mass to offer same-day, on-demand services, not just within Germany but to neighbouring countries. He envisages a "multi-hub" operation with Air Taxi Express's pilots living near their aircraft and able to pick up passengers anywhere in the country within an hour or giving them the option of turning up at the airport at which the aircraft is based.

Customers, says Knappertsbusch, will be able to decide to arrive at local airfields – the company's app allows them to link to the Uber network and book a door-to-door journey – or pay more for a major airport. "We will fly you to [Berlin] Brandenburg where it costs €1,000 to land, or to an airfield a bit further out where the landing fees are €10. The choice is yours," he says.

Knappertsbusch is aware that so-called disruptive start-ups in business aviation do not have a sterling record. But he believes his model makes more sense than those proposing point-to-point services with electric vertical take-off and landing vehicles, none of which have been certificated and cost many times more than the roughly \$700,000 list price of a Tecnam P2006T.

"We have seen that there is a market for this," he says. "We already have more demand than we can cover, and that is before we have our AOC." ▶



The company currently offers charter flights in a two-seat P92



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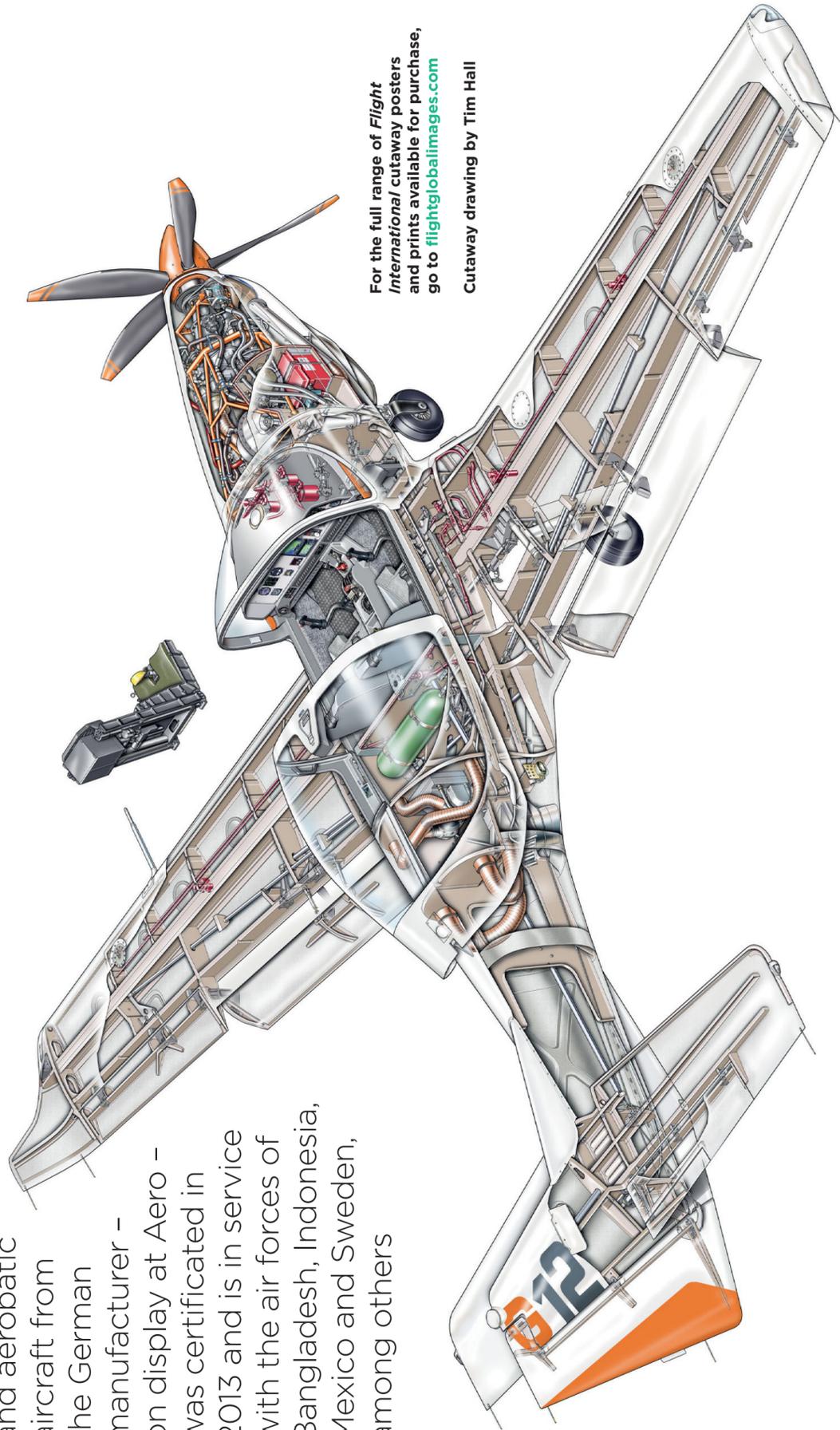
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Grob G120TP

The Rolls-Royce M250-B17F-powered trainer and aerobatic aircraft from the German manufacturer – on display at Aero – was certificated in 2013 and is in service with the air forces of Bangladesh, Indonesia, Mexico and Sweden, among others



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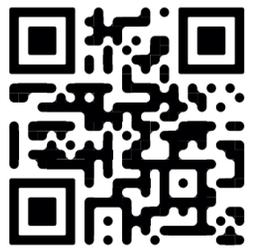
Cutaway drawing by Tim Hall

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