

Issue

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FLIGHT DAILY NEWS

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TRANSCEND THE
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Any way is up

launched as latest member of Excel midsize jet family

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supplier Pratt
disclosed the
new version of
the PW545D
the Ascend.
and is designed
new cockpit,
and a more
midsize

business jet market," the company
says. Textron Aviation has a mock-
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Key enhancements on the Ascend
are Garmin's G5000 avionics suite
- replacing its predecessor's Collins
Aerospace Pro Line 21 cockpit - and

the improved engines, plus a flat-
floor cabin and larger windows.

"We asked customers what they
wanted in the next evolution of this
iconic aircraft, and we believe the
Citation Ascend will deliver," says
Textron Aviation chief executive
Ron Draper.

The Garmin G5000 avionics
include three 14in (35cm) high-

Continued on page 3



Cessna

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Bombardier executives cut the ribbon yesterday on the debut of the company's first Certified Pre-Owned aircraft – a Challenger 605 – at an air show. *Left to right:* Peter Bromby, Francois Ouellette, Paul Sislian and Chris Milligan. **See story on page 3**

The only way is up

Re-engined Citation Ascend revealed as latest member of Excel midsize jet family

Jon Hemmerdinger

Textron Aviation's Cessna Citation Excel will soon have a new family member. The Wichita manufacturer is developing the Citation Ascend, an updated variant of the 12-passenger midsize jet, with a service entry target of 2025,

executives revealed yesterday at the show.

In tandem, engine supplier Pratt & Whitney Canada disclosed the development of a new version of the PW545 turbofan – the PW545D – which will power the Ascend.

"The Citation Ascend is designed to bring an entirely new cockpit, improved performance and a more luxurious cabin to the midsize

business jet market," the company says. Textron Aviation has a mock-up of the Ascend's cabin at EBACE.

The company last updated the Excel in 2021 when it rolled out the XLS Gen2 variant, which included several cabin updates.

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Continued on page 3

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Benson: Dream job

Boeing books first BBJ 777-9

Jon Hemmerdinger

Boeing Business Jets' new president has made an instant impact at EBACE revealing that his team has landed orders and commitments this year to sell four VVIP-configured airliners, including its first BBJ 777-9.

"What I love about our orders is the diversity," said Joe Benson at yesterday's press conference. "We have each part of our family represented in those orders and commitments."

Benson was appointed as BBJ's president on 8 May, stepping into a role held, for slightly less than a year, by Erika Pearson who has switched to a new post in Boeing's commercial unit.

"One of the things I bring to the job is continuity and stability," says Benson, who joined the company in 2010

and was previously BBJ's deputy to the president and business director. "There's been some turnover recently... This is my dream job."

The four commitments taken this year include orders for one BBJ 737 Max 7 and for two BBJ 787s, while another customer took an option to purchase one BBJ 777-9.

Boeing declines to name the customers but Boeing says buyers of large BBJs like 777-9s tend to be governments, which use the aircraft for head of state transport.

Neither the 737 Max 7 nor the 777-9 – the commercial aircraft on which the BBJs are based – has yet been certificated. Boeing expects the Federal Aviation Administration will clear the narrowbody this year and the widebody in 2025.

The BBJ 777-9 will have more than 300sq m (3,229sq ft) of cabin space and be ca-

pable of flying "to anywhere to everywhere in the world", says Boeing marketing director Alexis Fecteau.

He says business jet traffic in Europe this year is down about 8% from 2022 but remains up 6% on 2019 levels.

"It makes us think that the business jet improvement in numbers is going to be persistent," Fecteau says. "Once you go private, it's really hard to go back."

Fecteau says a BBJ 737, despite being significantly larger than a dedicated business jets like a large-cabin Gulfstream, has lower direct operating cost – a function the 737's vast commercial success. "We have massive economies of scale," he says.

As an example, operators might pay about \$12,000 to replace a BBJ 737 Max's windscreens, versus \$61,000 for a windscreen on a dedicated large-cabin business jet.

Old to sold

Bombardier is hailing the success of its Certified Pre-Owned (CPO) programme, which is seeing jets sold through the initiative change hands faster, and for more money, than comparable aircraft.

Launched in mid-2021, the CPO scheme sees Bombardier fully update selected Learjet, Challenger and Global aircraft with new interiors, avionics and connectivity systems, alongside completion of required maintenance.

To highlight the aircraft transformation, Bombardier has brought a refurbished Challenger 605 to EBACE, where it is on the static display.

A 2012-built example, the jet has the "feel of being a brand-new aircraft", says Paul Sislian, executive vice-president Bombardier aftermarket services and strategy. It features a new interior, paint-job and Collins Aerospace Pro Line 21 avionics.

Aircraft sold through the CPO programme sell for around 10% above market value and 40% faster than other aircraft of a similar vintage, he says.

"We are creating a brand-new category of pre-owned aircraft," Sislian adds.

Meanwhile, Bombardier said at the show yesterday that it has begun testing a larger version of its EcoJet technology demonstrator having completed an initial

trial of a sub-scale version of the blended wing-body concept.

Unveiled at EBACE last year, the EcoJet is intended to help develop low-carbon technologies to equip future business jet designs.

Flights of the 7%-scale model have now been "successfully completed", said Stephen McCullough, senior vice-president of engineering and product development, yesterday.

Bombardier is "really happy" with the results generated by that test phase, says McCullough, and has now embarked on trials of a larger demonstrator with a 5.4m (18ft) wingspan.

"We are happy with the first flights of the larger unit," he adds. "It's a technology demonstrator – we are at the stage of the programme where information is good, whatever the information is."

A further scaled model could be considered but it will be informed by the results of the current phase "to see if we need to go any larger", says McCullough. A bigger version would also allow the inclusion of "more representative systems", he notes.

In addition, Bombardier has been "extremely pleased" with the level of engagement shown by the wider industry in the project. "We are keen for collaboration," it says.



The CPO Challenger 605 on the static



Textron Aviation's Christie Tannahill and Ron Draper inside the mock-up

Continued from page 1 resolution displays, weather detection and avoidance technology, dual flight management systems and auto-throttles.

Available power from the PW545Ds increases to 4,213lb (18.7kN)-thrust, up from 4,119lb on the current C-model variant, and the engine also features a FADEC system.

Additionally, the PW545Ds run cooler and burn less fuel in certain conditions, says Textron Aviation senior manager of technical marketing Jimmy Beeson.

"The engines use new materials and technology – including a more-efficient high-pressure compressor, an enhanced single-stage high-pressure turbine module and an upgraded exhaust mixer," Textron Aviation says.

"The engine was designed and enhanced for Textron Aviation to deliver improved specific fuel consumption, thrust and time between overhauls," adds P&WC.

Textron Aviation is now working toward securing an amended type certificate for the Ascend. It has already

started flight-testing some components but has not completed the maiden sortie of a certification-conforming Ascend.

"Preliminary performance targets" for the Ascend include range at high-speed cruise and with four passengers of 1,900nm (3,519km), maximum range of 2,100nm, and maximum cruise speed of 441kt (817km/h) – similar specifications to the XLS Gen2. It will accommodate nine passengers in a standard configuration but be capable of carrying up to 12.



CAE to open in Vienna

CAE plans to base its new Central European pilot training centre in Vienna, with the new site to open in the second half of next year.

In April, the Canadian company had revealed plans to establish a presence on continental Europe but had not disclosed the whereabouts.

However, revealing the location yesterday, CAE said it saw a looming surge in demand for pilot training, particularly for corporate jets.

"Following the pandemic, the recovery in business aviation has been very fast," says CAE vice-president of civil and business aviation training Alexandre Prevost (pictured). "With the pilot attrition and retention struggle, it creates a very big spike in pilot training demand."

The Vienna facility will be CAE's first pilot training site on continental Europe and will complement its UK and Middle East sites, he adds. "We really based our location on where the customer needs us to be."

The site will house six simulators, including those for Bombardier Global 6000 and 7500 jets – the latter CAE's first for that type in Europe.

CAE has recently been on an expansion push, having in April inaugurated its first US West Coast business aviation training site in Las Vegas. It opened a Singapore site in November 2022 and is expanding near Orlando and in Savannah, Georgia.

In brief...

Volt of confidence

Kawasaki Motors has become a "strategic investor" in electric aircraft start-up VoltAero, which is behind the Cassio hybrid-electric aircraft family. Announcing the move at EBACE yesterday, VoltAero founder and chief executive Jean Botti said Kawasaki's investment was "another major vote of confidence" in the programme.

Daher gives TBM 960 EBACE debut

Kate Sarsfield

Daher was in bullish mood yesterday at the show where it detailed developments across its booming product line and championed the EBACE debut of its flagship TBM 960.

Nicolas Chabbert, senior vice-president for the French company's aircraft division, describes the single-engined turboprop as "incredibly popular, quintessential TBM, representing the fifth evolution of our very fast turboprop aircraft family since the introduction of the TBM 900 in 2014".

The six-seat TBM 960 was unveiled in April 2022 replacing the TBM 940 in the Daher line-up. It features a more efficient Pratt & Whitney Canada PT6E-66XT turboprop, a "fully digital e-throttle", digital engine and propeller control system, and a "digitally



Chabbert: Aiming for Eco-Pulse decision by middle of next year



Six-seat TBM 960 was unveiled last year

controlled cabin", together with a five-bladed Hartzell propeller.

The aircraft also features Garmin's G3000 cockpit and its Autoland system – branded Homesafe by Daher. "It's the fastest-selling aircraft in the TBM family with over 100 aircraft on order – exceeding two years of production," Chabbert says.

Similarly, Daher has secured a backlog of over two years of production for the Kodiak 900 since its launch in July 2022.

The 10-seat, PT6A-140A-powered aircraft is "gaining traction" with cargo, corpo-

rate, business, charter and medevac customers across the globe and "is increasingly regarded by some operators" as a potential replacement for the [Beechcraft] King Air C90 and Cessna Caravan, says Chabbert.

Daher is offering the G1000NXi next-generation flightdeck as a retrofit for owners of the first-generation Kodiak 100. The NXi was introduced as standard on the second series of the short take-off and landing aircraft in 2018, says Chabbert but 260 examples do not have the upgraded avionics. "The replacement

market is huge," he adds. Similarly, Daher is offering a five-blade Hartzell propeller as a retrofit for early generation Kodiak 100s. The feature is available as an option on Series III aircraft and will be standard equipment from 2024.

Meanwhile, Chabbert says the EcoPulse hybrid-electric demonstrator – which Daher is developing alongside Airbus and Safran with the support of the French government – will make its debut at the Paris air show next month. It will then return to Daher's base in Tarbes, southwest France, for "several months" of flight testing.

The EcoPulse is a TBM 900-series turboprop with the PT6 engine augmented by six wing-mounted propellers each driven by a Safran-supplied 50kW electric motor. Chabbert describes the project as a "stepping stone to a future sustainable aircraft in the Daher product line".

The airframer will evaluate the market over the next six months to determine the demand for a hybrid-electric "or even fully electric" aircraft and to "assess what form that design will take", Chabbert says.

"Our aim is to make a decision on a design by the middle of next year and bring the aircraft to market by the end of 2027," he adds.



Martel: Existing book and claim system 'limited'

to the economy".

Michael Amalfitano, Embraer Executive Jets chief executive, stressed the importance of technology in helping the industry cut its

carbon footprint.

Joe Benson, the new Boeing Business Jets president maintained that "working closely" with the entire supply chain was essential.

'Under-resourced' FAA stalls G700 progress



G800 is making its first appearance at EBACE

Jon Hemmerdinger

Gulfstream's in-development G800 is making its show debut, alongside five other types from the Savannah-based manufacturer: the G280, G500, G600, G650ER and G700.

However, slow progress by the short-staffed Federal Aviation Administration (FAA) has prompted Gulfstream to push back until autumn its expectation of when the regulator will certify the G700, which the manufacturer is developing alongside its G800 sibling.

Gulfstream president Mark Burns, said at EBACE yesterday that the FAA is "under resourced. They are not fully back in the office. They are working remotely, mostly".

Burns says the G700 has performed well in tests. He has previously noted that the FAA's certification process is taking longer in recent years due to increased scrutiny.

"It is a difficult process... It is taking much longer than I anticipated," he says.

The company previously aimed to have the G700 approved this summer.

"I am hopeful it is in the fall. It's still a bit of a debate," Burns says, adding

that Gulfstream has already finished most G700 certification flight tests. "We are essentially done. This is now up to the judge and the jury... We are a little bit at the mercy of our regulators."

The FAA did not immediately comment, but its leaders have conceded staffing shortages in some departments.

Burns says Gulfstream aims to have the 7,500nm (13,890km)-range G700 concurrently cleared by both the FAA and the European Union Aviation Safety Agency.

The slow progress is also pushing back certification of the 8,000nm-range G800,

which Gulfstream previously anticipated would come six months after the G700 – meaning by end-2023.

Now, Burns says, "I would hope that we can get done [in the] early part of" 2024.

He stresses the G800's approval should be relatively quick and easy because Gulfstream will not need to perform many tests already completed by the G700. The types are sister ships, sharing avionics, Rolls-Royce Pearl 700 turbofans and other components.

"We've done all of the heavy lifting on the G700" using five flight-test aircraft, Burns says. Gulfstream plans

to use just two G800s for that programme's certification.

The company recently completed three days of testing the G700's contaminated-runway performance at NASA's Wallops Flight Facility in Virginia. That effort involved "touchdown and taxi manoeuvres in standing water at take-off and landing speeds ranging from 60 to 120 knots".

Also, "the G700 demonstrated excellent stability and control in take-off, landing and climbing during field performance and flying qualities trials during two months of testing at Cecil Airport in Jacksonville, Florida," it adds.

Certification headaches aside, Gulfstream insists demand for the G700 and G800 remains robust, with delivery slots for the former sold out until late 2026.

"The airplane is better than we advertised," Burns says.

The company intends to kick off G400 certification work as soon as it completes the G800 programme. Burns expects Gulfstream will get its G400 airborne "later this year". It aims to deliver the first example of the 4,200nm-range jet in 2025.



Burns: Certification taking 'longer than I anticipated'

Trappier wary over 10X supply chain snags

Dassault Aviation is keeping a careful eye on the certification timeline for its developmental Falcon 10X amid continued supply chain pressure that could push back the arrival of its new flagship.

Briefing journalists yesterday, Dassault chief executive Eric Trappier said it is "a little bit too early to say" if the Falcon 10X would make its end-2025 target or "would be a little bit later".

However, he notes the challenges in the supply chain which are impacting the construction of the initial prototype.

"Manufacture of the first aircraft takes time because of the delays at suppliers," he says. "We may expect some delay."

Trappier says the supply chain congestion is "worse than last year" and it is unclear whether the issue



Dassault has a 10X cabin mock-up on its stand

is at its nadir "and it is back to normal in the coming months or year".

But Trappier says he prefers to wait until the situation is clearer to provide a more concrete update, rather than announcing repeated six-months delays to the programme.

Meanwhile, discussions continue with the European Union Aviation Safety Agency (EASA) relating to the

introduction of single-pilot operations in the Falcon 10X.

Dassault hopes a relaxation of the rules will be possible to allow one of the two crew to rest in the cockpit during low-intensity flight phases such as cruise.

EASA representatives have been integrated into Dassault's "advance studies" in order to advance the adoption of single-pilot operations.

"We do expect it as soon as possible – it is totally in line with the 10X development," says Trappier. However, he says Dassault will not commit to its availability at service entry if there is a risk of delaying the programme.

Carlos Brana, executive vice-president of civil aircraft, says production of primary parts for the first Falcon 10X prototype is under way, while long lead items such as the landing gear have been manufactured.

Ground tests of the Falcon 10X's composite wing are also ongoing; the demonstrator has accumulated 10,000 cycles to date with a target of 20,000 by the end of the summer.

Engine supplier Rolls-Royce is also gearing up for the first flight later this year of the jet's Pearl 10X powerplant, having racked up more than 1,500h of ground

runs to date using a variety of test assets.

To be performed from its facility in Tucson, Arizona using a company-owned Boeing 747 flight testbed, the maiden sortie will build on the first run of the full powerplant, including its bespoke Spirit AeroSystems nacelle, engine build up and mount system, which took place earlier in 2023.

Additional evaluations to date have included ground runs of other Pearl 10X engines and the Advance2 demonstrator, plus separate trials of the engine's new 3D-printed combustor, and the accessory gearbox.

Rolls-Royce says the Pearl 10X will be the most powerful business jet engine in its portfolio but has yet to specify an exact maximum thrust figure, save to say it will produce more than 18,000lb (80kN) of force.

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Airbus eyes fractional ACJ TwoTwenty order

Kate Sarsfield & Murdo Morrison

Airbus believes it can secure a major fleet order for its ACJ TwoTwenty, which is appearing at an air show for the first time.

Speaking at EBACE yesterday, Chadi Saade, vice-president commercial for Airbus Corporate Jets, described as "an amazing value proposition" the type, which Airbus launched in 2020 shortly after taking ownership of the former Bombardier CSeries programme.

"We're convinced we'll receive a major fleet order from an operator like NetJets or Flexjet at some point," he says.

The example on show is the first ACJTwoTwenty, which Comlux Completions delivered to launch customer, Dubai-based Five Hotels & Resorts, in April. The Swiss company has an agreement with Airbus to install the interiors on the first 15 aircraft.

Saade says that having the aircraft at EBACE is likely to



The ACJ TwoTwenty is making its show debut at EBACE

spark considerable interest. "Customers just want to touch and experience it, which they haven't been able to do up until now," he says.

Comlux will hand over its second outfitted aircraft to an unnamed customer by early 2024, with two more green examples due to arrive at the company's completions unit in Indianapolis late this year and the following spring.

Chief executive Richard Gaona says potential customers from "all over the world" are showing interest in the corporate jet version of the A220-100 airliner. Airbus has an eight-strong backlog for the ACJ TwoTwenty, having delivered the first aircraft. Comlux installed the first VIP interior over 14 months, but Gaona expects subsequent projects to take less time.

"Our goal is to deliver the second aircraft in 12 months and progressively move to eight months," he says.

Gaona also expects Comlux's 12,000sq m (129,000sq ft) maintenance facility at Dubai's Mohammed Bin Rashid Aerospace Hub to be operational by the end of the year.

As well as offering covered parking, line maintenance and AOG (aircraft on

ground) services, the site will include a showroom where Comlux will display cabin concepts and host customers, says Gaona, a former Airbus veteran who has run Comlux since 2007.

While the facility will offer cabin refurbishments, Gaona has no immediate plans to mirror the Indianapolis operation by offering full outfitting. However, he notes: "Diversification has driven my career at Comlux, so why not at some point move up to completions?"

Airbus also announced yesterday its first order for the ACJ330neo, to an unnamed customer. The manufacturer launched the corporate version of the re-engined widebody in 2017. It will deliver the first example to a completion centre in 2025.

It is doubtful if that completion centre will be Comlux, however, Comlux Completion delivered its first VIP widebody cabin completion – an ACJ330 – in 2019. But Gaona thinks it unlikely the company will bid for further projects on aircraft that size.



Honda's Elite II marks its EBACE debut

Honda Aircraft's HondaJet Elite II has touched down at EBACE, marking the update's debut at the European show following its launch last year. The North Carolina-based manufacturer expects to receive certification for the enhancements from the European Union Aviation Safety Agency soon, having

achieved certification from the US Federal Aviation Administration last November.

"The HondaJet Elite II continues our dedication to exceeding the expectations of customers worldwide by setting new standards in performance, efficiency and comfort for the future of very light jets," says Hon-

da Aircraft chief executive Hideto Yamasaki.

"Debating our latest aircraft at EBACE marks an important milestone for everyone at Honda Aircraft," he adds.

HondaJet's update to the light jet gives the type more range and a series of cockpit tweaks, including the addition of auto-throttle and auto-land capabilities.

A bump in fuel capacity brings the Elite II's range to 1,547nm (2,865km) with four people aboard – 110nm more than the previous HondaJet Elite S – while maximum take-off weight jumps to 5,035kg (11,100lb), up from 4,940kg.

"The Elite II bolsters the HondaJet's position as the most fuel-efficient jet, flying farther than any other aircraft in its class and with lower carbon emissions," the company says.

HondaJets can carry up to seven passengers and are powered by twin over-wing GE Honda Aero Engines HF-120s, each delivering about 2,050lb (9.1kN) of thrust. It can cruise at 422kt (782km/h) and reach altitudes of 43,000ft.

PC-12: 2,000 and counting

Pilatus has a PC-12 and a PC-24 on display, less than two weeks after it handed over the 2,000th example of the single-engine turboprop, to US fractional operator PlaneSense.

Delivered at a special ceremony at the Swiss airframer's Stans headquarters on 12 May, the milestone aircraft is the 44th of the type for PlaneSense, which also boasts a fleet of 11 PC-24 light jets.

"We are honoured to receive the 2,000th PC-12. We took delivery of our first PC-12, the 20th built, in 1995," says George Antoniadis, PlaneSense founder and chief executive.

"This aircraft constitutes the backbone of our opera-

tion and has been an important part of the success of the PlaneSense programme."

Currently built to the NGX standard and powered by the latest Pratt & Whitney Canada PT6E-67XP engine, the original PC-12 entered service in 1994.

"Year after year, our PC-12 is, and will remain, the world's best-selling single-engine turboprop aircraft in its class with pressurised cabin," says Markus Bucher, Pilatus chief executive.

Cirium fleets data records 1,889 examples, both civil and military, in service, with a further 31 aircraft in storage. Pilatus holds a backlog for 63 units, the data adds.





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GJC upbeat on industry growth

Finance provider Global Jet Capital has become the latest business aviation company to issue a bullish medium-term outlook for the sector.

Its annual Business Jet Market Forecast, released yesterday, predicts \$195 billion in total transaction values for new and pre-owned aircraft between 2023 and 2027, an annual compound growth rate of 3.1%.

While all size categories will increase, heavy long-range jet demand will rise fastest, suggests the firm.

Andrew Farrant, chief marketing officer, says that, while there has been some "levelling off" from the "unprecedented demand" in the immediate post-pandemic period, "a steady growth pattern" for new and used aircraft will continue.

"Most OEMs have strong backlogs and we should see improvements in supply chain challenges that limited deliveries in 2022 and so far in 2023," he says.



Piaggio still searching for saviour

Dominic Perry

Piaggio is back at EBACE with the 'for sale' sign still hanging over it after the Italian government gave the go ahead for the company's administrators to make a third attempt at finding a new owner for the airframer.

Would-be bidders have been asked to submit development or turnaround plans as part of their initial expressions of interest in the Italian airframer, which is showing the latest Evo version of its

Avanti P180 twin pusher at the show.

Piaggio Aerospace – which comprises two companies, Piaggio Aero Industries and Piaggio Aviation – has been in extraordinary receivership since 2018, when majority shareholder Mubadala pulled out. Two previous attempts were made to sell the business, both ending in failure, leading the Italian trade ministry to trigger a third sale attempt that kicked off on 9 May.

Documents supporting the sale process stipulate expressions of interest must

say which entities or business units the bidders are keen on in, alongside "the recovery/development programmes planned for them".

Additionally, prospective bidders should detail the corporate structure and chain of command of their operations, plus present three years of financial statements.

Interested parties have until the close of business on 12 June to supply the required information. A decision will then be taken as to which can enter the 30-day due diligence process.

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The Praetor 500 on display at EBACE



Embraer thinks big

Amalfitano says manufacturer looking at new offerings in large cabin, as well as light jet market

Jon Hemmerdinger

Embraer sees an opportunity to develop a larger business jet to help it retain customers looking to upgrade from midsize Praetor 500s and 600s.

Embraer Executive Jets chief executive Michael Amalfitano says his team is also eyeing possible new offerings in the light jet segment, where Embraer now competes with the Phenom 100EV and Phenom 300E.

The Phenom 300E, along with the midsize Praetor 500 and super-midsize Praetor 600 are on show at Geneva. The company has made no commitments to launching any new aircraft development, and Amalfitano says his priority is expanding Embraer's aftermarket support network. However, aware of the need to keep customers who are moving up in cabin size and range, Embraer is weighing potential successors to its current four-type business jet line-up.

"Longer term, you are going to see us look upstream at what's next above the Praetor 600," says Amalfitano. "Clearly, that's an opportunity that's intriguing for us to assess and evaluate."

"Now that the fleet is continuing to grow, we need to be mindful that we need to

keep those customers in our product family," he adds.

Amalfitano specifies Embraer will no longer focus on "bizliners" – passenger jets converted to business aircraft – having cut its teeth in the sector with the E190-based Lineage 1000E and the ERJ-145-derived Legacy 600/650. "We're going to stay true to... clean-sheet, purpose-built executive jet aircraft that are designed for the markets in which they serve," he says.

Embraer's two light jets – both of which allow for operation by single pilots – are the 1,180nm (2,180km)-range, seven-passenger Phenom 100EV, and 2,010nm-range, 10-passenger Phenom 300E. Its nine-passenger, 3,340nm-range Praetor 500 and 12-passenger, 4,020nm-range Praetor 600, round out the midsize/super-mid-size offering. The company launched the Praetor programme in 2018 and delivered the first 500 and 600 in 2019. They are derivatives of Embraer's Legacy 450 and 500.

Embraer and competitors took new orders hand over fist during the pandemic, when money was cheap and travel by commercial airline was particularly unappealing. Embraer Executive Jets closed March with a backlog worth \$4.1 billion, up from \$1.4 billion at the end of 2019.

Amalfitano describes Embraer as particularly well positioned to scoop up orders from first-time buyers during the Covid-19 era, thanks to its "entry level" jet – the Phenom 100EV.

"We... had that huge influx of new buyers during the pandemic period, and that has been a very sticky part of the market segment," he says. "It's a step change that happened in the marketplace."

However, demand has since cooled from pandemic highs, a shift Amalfitano attributes to factors including broadly slowing economic growth and "sustainability pressures" – the heat faced by buyers and manufacturers to curb carbon output.

"You are seeing a calming effect," Amalfitano says. "Everyone got used to the double-digit growth that took place over the last three years."

"It'll come back to that high-single-digit growth that it's always enjoyed," he adds.

Amalfitano views Embraer as well-positioned thanks partly to ongoing sales success with US fractional aircraft ownership companies. On 11 May, it disclosed that NetJets agreed to buy up to 250 Praetor 500s in a deal Embraer says is worth up to \$5 billion. NetJets is already a Phenom 300 customer, having ordered the type in 2010 and signed a follow-on

deal in 2021.

Competing fractional player Flexjet was launch customer for the Praetor programme, having signed orders for those types in 2019.

"That was a really big catalyst," Amalfitano says of the Flexjet deal, noting it enabled Embraer to expand its global presence.

Embraer has also secured a strong foothold among corporations that need to fly executives between US cities, Amalfitano adds.

As well as looking at the larger-cabin categories, Amalfitano is also wary of competition in the light-jet segment, where Embraer has long held a commanding presence, with its Phenom 300 series having been the best-selling light jet for 11 years running.

But Amalfitano notes threats posed by "the strength of the turboprop marketplace and the personal jet marketplace".

Indeed, Textron Aviation is developing its single-turboprop, six-passenger Beechcraft Denali, now scheduled for certification in 2025. Also, Honda Aircraft, which helped invent the very-light-jet category with its HA-420 HondaJet, says it is developing a larger successor called the 2600 that will be able to fly across the USA and carry about nine people.

"That opens the door for us to make sure that we're

protecting our downstream strategy as well... Lots ahead for us," Amalfitano says.

Embraer's immediate priority is strengthening its aftermarket network – a strategy pursued in recent years by other business jet manufacturers.

"The first thing you're going to see is investments and announcements associated with our services and support areas," Amalfitano says, specifying that Embraer will seek to grow that work through means including "organic growth", mergers, acquisitions and "strategic partnerships".

Meanwhile, Embraer must also make good on delivery commitments amid an incredibly stretched supply chain and tight labour market. The company aims to deliver 120-130 executive aircraft in 2023, which would be about 20-30% more than the 102 aircraft (including 66 Phenoms and 36 Praetors) it delivered last year.

"The biggest issue is the loss of talented master craftsmen and specialised workforce" – across the aerospace manufacturing industry, Amalfitano says.

"It's going to continue to dampen the timing of when things deliver," he adds. "But we still feel very confident in our relationships with our partners, to be able to deliver our guidance for the year."

New Gogo Galileo service makes significant progress one year after unveiling



Leaping ahead with LEO

Last year at EBACE, Gogo Business Aviation announced it would be building a new low-Earth-orbit (LEO) global broadband service designed specifically for business aviation that would fit virtually any size business aircraft from light jets and large turboprops to the largest ultra-long-range large-cabin aircraft.

According to Gogo, the company has made significant progress in the past 12 months in conjunction with its strategic partners OneWeb and Hughes Network Systems. And the company has named the new service: Gogo Galileo.

OneWeb, Gogo's network provider, conducted the final launch to complete its full LEO constellation with more than 588 satellites at the end of March, and the network is expected to be operational and aero-ready in early 2024. In addition, Gogo and its antenna provider, Hughes, completed preliminary design review of Gogo's exclusive electronically steerable antenna (ESA) assembly earlier this year.

"We are actually ahead of schedule thanks to the work being done by our team in conjunction with the teams from OneWeb and Hughes, and testing with the antenna prototype on the AVANCE platform is underway," says Sergio Aguirre, Gogo's president and chief operating officer. "What we're bringing to the market will deliver best-in-class global performance that is faster, smaller, more affordable, and easier to install than other global satellite solutions."

Customers interested in harnessing the power of Gogo Galileo can pre-provision their aircraft today by installing an AVANCE system, and once the service launches, will only need to add the antenna to the fuselage.

"Gogo has been in business for more than 30 years and business aviation is the only thing we do," Aguirre adds. "We understand the discriminating needs of this industry better than any other inflight connectivity provider, and we have a proven track record of delivering quality products and services."

With Gogo's already extensive portfolio of products and services, unparalleled industry expertise and global customer service, the commercial launch of Gogo Galileo will complete the company's holistic offering with a product to serve every segment of the business aviation market for aircraft operating anywhere in the world.

"Unlike other providers, we're focused on serving all of business aviation with Gogo Galileo, just like



Gogo announces the global broadband service at last year's EBACE. Pictured left to right: Ben Griffin, vice-president OneWeb, Reza Rasoulan, vice-president for Hughes, Shuaib Shahid, head of global sales for Gogo, and Sergio Aguirre, Gogo president and COO

we did with our ATG network in North America several years ago," says Aguirre. "The majority of midsize and smaller aircraft operating outside the U.S. have no viable broadband solution today and Gogo Galileo will give everyone in business aviation the ability to have an exceptional inflight wi-fi experience."

POWERFUL ADDITION

The Gogo AVANCE platform is at the heart of Gogo Galileo. The new service will require just one AVANCE line replaceable unit (LRU) inside the aircraft, which means existing AVANCE customers

will only have to install the ESA antenna, with a single cable in for power, and a single cable out for data.

Today's geosynchronous satellite (GEO) systems are not only more expensive, but are also much larger and require multiple LRUs so they require large airframes to accommodate the size and weight.

"We specifically designed AVANCE so customers could easily and affordably add additional features, functionality, and network capacity to the system," says Aguirre. "We made a strategic decision years ago that would give us the ability to add new networks and for upgrades to be done with minimal cost and less downtime."

Gogo Galileo will deliver performance comparable to terrestrial broadband services, with latency that is significantly less than GEO networks deliver today. The reason is the close proximity of the LEO satellite constellation to Earth. LEO satellites are roughly 1,200 kilometers from the Earth's surface while GEO satellites sit roughly 36,000 kilometers away.

"The experience on our LEO network will be much better than a GEO network can provide and it's not only because LEO will be faster, which it will be, but the latency – or the time it takes for a signal to travel from satellite to ground to aircraft – will be greatly reduced," says Aguirre. "It's basic physics: LEOs are 30 times closer to Earth so the signal gets there much quicker."

The Gogo Galileo system will include one fuselage-mounted unit with an integrated antenna, modem, power supply and RF converter; will only require 28 volts of DC power and much lower wattage; will not rely on aircraft-positioning data; and will include an AVANCE router. ▶



Shuaib Shahid, head of global sales for Gogo, holds a model of the antenna Gogo unveiled at EBACE 2022

Gogo Business Aviation has been in the inflight connectivity game for more than three decades and today is the world's largest provider of broadband services for the business aviation market



From analogue phones to worldwide wi-fi

While many around the world may recognize the Gogo brand, they primarily know the company as an air-to-ground provider in North America. However, Gogo has been serving customers around the globe for more than 20 years.

Today, Gogo offers a customizable suite of smart cabin systems for highly integrated connectivity, inflight entertainment and voice solutions. Its products and services are installed on thousands of business aircraft of all sizes and mission types from turboprops to the largest global jets, and are utilized by the largest fractional ownership operators, charter operators, corporate flight departments and individuals in more than 80 countries.

In other words, Gogo is no stranger to providing international services. Gogo indeed continues to serve North American operators with ATG services and last October it completed construction of the world's first 5G network exclusively built for business aviation.

But Gogo is also focused on global operations and when the company announced that it would be launching a global broadband service last year at EBACE here in Geneva, the industry took notice.

"Gogo created the inflight connectivity revolution in the 1990s and we continue to be the driving force behind breakthroughs that have redefined the inflight experience," says Sergio Aguirre, Gogo's president and chief operating officer. "We've been focused on helping people in the air stay fully connected to their work, life and entertainment on the ground with the latest technology available."

Gogo Business Aviation began as an idea scribbled on the back of a napkin in 1991. At the time, and under the brand Aircell, founder Jimmy Ray had an audacious goal of putting a phone on every aircraft around the world. It was a massive undertaking.

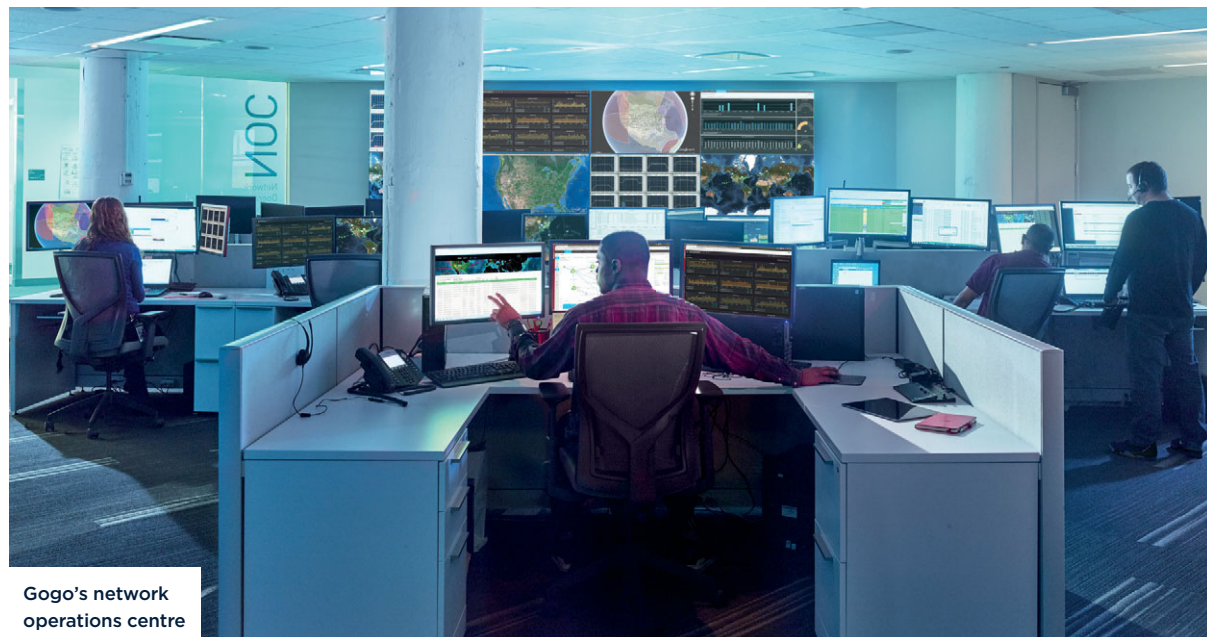
"Our team worked hard from the beginning to bring the best communications solutions to the aviation market," says Aguirre. "Things started small, and at the time, nobody would've imagined where we'd be more than 30 years later. Innovation is in our DNA, and we've never stopped seeking the next great technological breakthrough."

FIRST INFLIGHT CONNECTIVITY SYSTEM

Gogo's first product offered analogue phone service to the business aviation market.

"Very little of what we wanted to accomplish existed when we started, so the technology we were creating was absolutely cutting edge," says Aguirre. "Many of the basic building blocks for getting connectivity to aircraft resulted in Gogo being issued some very important patents."

Thanks to some of the early pioneers at Aircell, Gogo became the proud owners of several core patents for inflight communications. The industry has seen many new technologies since then, with the main goal of trying to keep up with bandwidth demands from passengers traveling around the world. What started as a platform for sending a couple of quick emails, has evolved into networks



Gogo's network operations centre

capable of streaming movies and keeping passengers connected at the same time.

The company operated a domestic analogue phone service for many years before other technologies caught up with it.

In 2002, Gogo began offering Iridium phone service as a new solution for business aviation. The service was able to provide global digital phone service through an extremely lightweight hardware package. Over the years, Gogo has installed Iridium hardware on thousands of aircraft and began offering Inmarsat's SwiftBroadband service as well.

INTERNET TAKES CENTRE STAGE

In the early 2000s it was clear that the internet was becoming an increasingly important part of everyone's lives. At that time, internet access was primarily limited to homes and offices, and while there were plenty of laptop computers (and even

some early tablet PCs), it would be several years until the technology required to take the internet in the air would be developed.

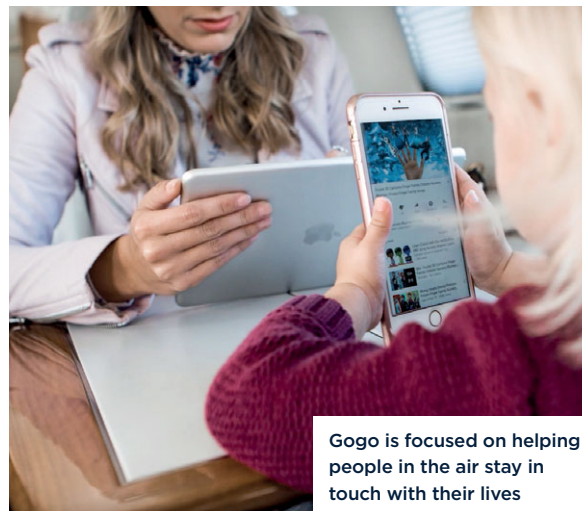
"Gogo realized that things were changing, and we used some of the expertise we gained from developing our first network to create a way to bring internet access to business and commercial aviation," Aguirre says.

"One of the first things you need in order to get data transmitted wirelessly is radio spectrum," he continues. "Thankfully for us, the Federal Communications Commission (FCC) in the USA was about to auction off some new spectrum. This spectrum auction took place over several months in 2006, and on 7 June 7 2006, Aircell was announced as the winner of the largest spectrum block, netting us 3.5MHz. It changed everything."

From that point forward, the company began to build an ATG cellular network from scratch while creating the airborne hardware and building tower sites around the country. All of that work was completed in just two years.

The advantages of Gogo's ATG system were clear: the system was extremely lightweight, it could be installed relatively quickly and offered a path for future upgrades. Gogo began developing other systems that could fit on aircraft of all sizes from small turboprops to the largest private jets. Today, Gogo connectivity products can be found on more than 9,000 aircraft.

"We've never stopped looking for what's next and that's why we're building global broadband system that will use a low Earth orbit (LEO) satellite network," says Aguirre. "We brought broadband connectivity to aircraft of all sizes and mission types in North America and our global broadband service, Gogo Galileo, will do the same on a global scale. We are dedicated to this industry. Business aviation is all we do today, and our customer service is second to none." ■



Gogo is focused on helping people in the air stay in touch with their lives

Gogo AVANCE: business aviation's only true technology platform

In 2017 Gogo introduced the AVANCE connectivity platform and the new technology represented a paradigm shift for inflight connectivity in business aviation. Since that time, AVANCE has been so well received that others in business aviation have caught the 'platform' bug.

You see it in ads, marketing content, and sales pitches. Many technology players in business aviation talk about the "latest and greatest platform" or "our new and improved (insert buzzword) platform".

But what, specifically, is a technology platform? What does it mean and what benefits does it need to provide to warrant that term?

To answer that question, we asked Gogo Business Aviation to see how it defines "platform", and to explain how AVANCE meets the criteria.

"A technology platform is a group of individual components brought together to make a cohesive unit," says Jeremy Tyler, vice president of software applications engineering for Gogo. "You bring in software, hardware and other tools to create a consistent experience for the user. Apple is a great example."

"The Apple iOS operating system is the 'brains' across its hardware, but Apple created an entire digital ecosystem where everything can be integrated, automatically synchronized through the cloud, and even updated between any Apple device," he continues. "The result is a seamless, consistent 'Apple' experience independent of the Apple device you are using. AVANCE is very similar."

According to Gogo, AVANCE software is the "brains" on all of its systems - AVANCE L3, L5 and SCS - and future products as well, such as Gogo's global LEO broadband product Gogo Galileo. Gogo uses one operating system that detects what systems and services it is connected to so every feature Gogo offers is available to every system.



The Gogo AVANCE experience is the same, regardless of aircraft



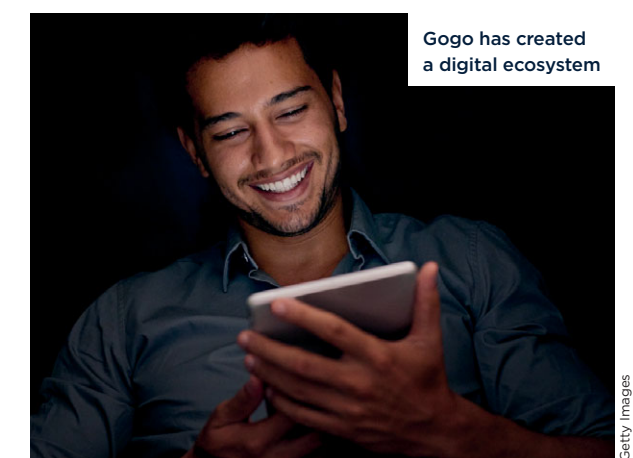
AVANCE offers upgrade paths to global broadband and Gogo 5G

"It doesn't matter if our system is on a Gulfstream heavy-iron aircraft or a turboprop like a Pilatus PC-12, the experience is the same," says Tyler. "And the benefit for aircraft owners, operators and passengers is that Gogo can get innovations and updates into their hands almost instantly: things that other providers have to do with hardware, which requires putting the aircraft down for a period of time for the change which takes time and is expensive, we can do over the air."

In terms of hardware engineering, AVANCE is built modularly, and it's designed to be what the company calls "plug and play" which makes it easy for customers to expand and upgrade their inflight wi-fi experience.

"When we create a new solution, we don't have to start from scratch, we can simply use our base set of features," says Chris Rippe, distinguished member of technical staff product development for Gogo. "When we need to do an upgrade, we can design it once for the whole platform. 5G is a great example of this modular design. When a customer is ready to upgrade, they won't have to remove any hardware to add 5G speed to their AVANCE L5 system - instead, they'll simply plug a small Gogo X3 (5G) LRU into the AVANCE L5, much like how you'd connect a peripheral like a printer to your laptop."

AVANCE also gives operators comprehensive inflight connectivity and entertainment in a single LRU (line replaceable unit) that has been designed to be future-ready right out of the box which allows Gogo to:



Gogo has created a digital ecosystem

- Easily add new networks such as Gogo 5G and the new global LEO broadband system
- Instantly deploy new services over the air
- Remotely deploy support and software updates over the air
- Quickly connect to and enable new third-party applications

"When we lowered our service altitude from 10,000 feet AGL to 3,000 feet, every AVANCE customer received that update over the air," says Rippe. "Our customers never had to touch the aircraft or bring it down for that upgrade to be implemented, and Gogo is the only connectivity provider in business aviation with that capability today." ■



Leading Gogo's expansion

Shuaib Shahid is responsible for Gogo Business Aviation's global sales and channel management activities and is the company's main point of contact for international operations. He will be leading Gogo's sales initiatives for the new global LEO broadband satellite service expected to launch late next year.

Shahid has nearly 20 years of experience in the inflight connectivity market, working in global operations throughout that time. He spent several years with a leading satellite network operator early in his career in business aviation and helped it launch the ubiquitous inflight connectivity service SwiftBroadband. Throughout his tenure, he was responsible for that company's entire business aviation division.

He also set up global operations in Europe and the Middle East with another major business aviation IFC service provider, so he's no stranger to serving global markets.

Shahid joined Gogo 10 years ago and has been exclusively focused on Gogo's services and equipment portfolio outside the United States during that time.

Shahid: No stranger to global markets

Gogo Vision 360 captivates passengers

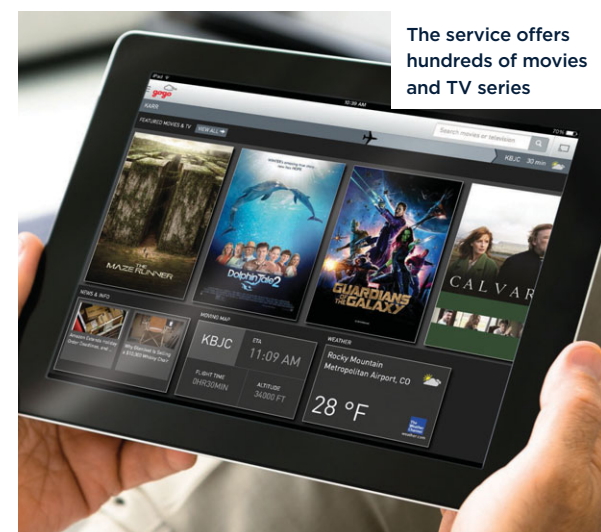
Gogo set a new standard for inflight entertainment (IFE) in business aviation when it unveiled Gogo Vision 360 in 2020 – a premium IFE service that features a compelling and comprehensive suite of services, including a state-of-the-art 3D moving map.

The service offers unlimited streaming of on-demand movies, TV programming and news, along with digital magazines and a stunning 3D premium moving map from FlightPath 3D, all at a fixed monthly price eliminating the unpredictability and often high costs associated with inflight video and audio streaming.

Gogo Vision 360 is integrated into every AVANCE system – L3, L5 or SCS – and is available for activation via a call to Gogo customer care as a new service or as a free upgrade for existing Gogo Vision customers. Activation will occur automatically over the air with no downtime required.

There are 30 leading digital magazine titles available on Gogo Vision 360, and for those interested in global news, a wide array of current news topics from Bloomberg News have been added including global business, investing, technology, automotive, energy and breaking business and finance stories from Asia, Europe, the Middle East, Africa and the U.S.

Gogo Vision 360 is configurable for Arabic, English, French, German, Italian, Russian, and



The service offers hundreds of movies and TV series

Spanish. Audio tracks for movies and TV episodes are offered in English, French, German, Italian, Russian, Spanish, and Swedish.

All Gogo Vision content is updated automatically each month through a seamless delivery via Gogo Cloudport, either in a customer's own hangar or at Gogo Cloud locations in Europe and throughout the U.S. Gogo Vision is the only IFE service that can deliver content updates over the air. ▶

Aero-Dienst maintains its edge after 65 years

Murdo Morrison

Aero-Dienst is marking its sixty-fifth birthday at EBACE, making it one of Europe's oldest business aviation entities. It is not the Nuremberg company's only significant milestone in 2023. German automobile club ADAC acquired Aero-Dienst 25 years ago, as its fixed-wing medevac arm. From its base at Nuremberg airport, the firm provides on-demand airlift services to ADAC members, using a pair of specially configured Fairchild Dornier 328Jets and two Bombardier Learjet 60XRs.

However, Aero-Dienst's capabilities go beyond air ambulances. Its 8,000sq m facility in the Bavarian city contains four maintenance hangars – it has OEM authorised approvals for Dassault Falcons and Bombardier jets. Hawkers and Dorniers are also maintained at Aero-Dienst, and it is a designated engine repair facility for all four major manufacturers of business aircraft engines: GE Aerospace, Honeywell, Pratt & Whitney Canada and Rolls-Royce.

In 2021, it won approval to operate a full-service maintenance hangar at Oberpfaffenhofen near Munich – one of Germany's main aerospace hubs – adding to line stations in Vienna and Klagenfurt in Austria. In addition, it procures, sells and manages aircraft on behalf of clients, with a fleet comprising a Dassault Falcon 7X, a Bombardier Challenger 300, and a Learjet 45XR.

The target is to increase this managed fleet to around 12 aircraft, says new chief executive André Ebach.

According to Ebach, who previously worked for Lufthansa Technik and Swiss group RUAG, Aero-Dienst's one-stop-shop philosophy makes sense as third party owners can have their aircraft completely looked after under one roof. Meanwhile, having its own maintenance set-up means its air ambulance fleet can be on standby 365 days a year and is never at the mercy of another

company's hangar capacity or priorities. A component shop – which opened in 2018 – completes the in-house offering, says Ebach.

"There are many reasons why a broad portfolio is important," maintains Ebach. "All work can be coordinated, which minimises administration for the customer. We can accompany the customer in many situations during a life cycle of an aircraft, starting from acquisition, pre-purchase inspection, management and operation, maintenance and finally aircraft sales. The fact that we do aircraft transactions also gives us all-round visibility of the market."

Aero-Dienst's latest European Aviation Safety

Agency Part 145 venture in Oberpfaffenhofen is part of an aerospace cluster at the airport that includes German aerospace centre DLR, Dornier Seawings Lilium, RUAG and Safran. Both a large talent pool and a significant business aviation community in Germany's third city, Munich, are on the doorstep. "Success stands or falls with the right employees and closeness to our customers and the location combines both," says Ebach.

Given its parentage, flying the sick and injured remains one of Aero-Dienst's major business units beside offering the entire range of general aviation services related to business jets and ambulance aircraft – neighbour

FAI is another medevac operator, making the 24-hour Nuremberg airport Germany's air ambulance hub. Aero-Dienst's two types offer different capabilities. The 1,620nm (3,000km)-range Do 328Jet has room for six stretchers and four seated patients in its 10.3m-long cabin. The Learjet's interior is just over half that length with space for just two stretchers, but is faster and can fly 2,000nm without a stop.

The company employs around 330, with just over half of them maintenance technicians and the remainder pilots, medical, sales, operational and administrative staff. As with most MRO companies in the Covid recovery era, Aero-Dienst has challenges finding skilled staff – "We are hiring," says Ebach – as well as all sorts of replacement parts, including those as seemingly mundane as windshields and tyres.

However, Ebach says the outlook for 2023 and beyond is bright, driven largely by an expanding MRO business. Despite its ownership by Europe's largest automobile rescue association – with its 21 million members and separate fleet of 55 medically equipped helicopters – Ebach insists Aero-Dienst's ability to tailor its services for its private customers is its strength. "We are flexible," he says. "And that is what our customers like."



The company has authorised approvals for Falcon jets among other types

Jet Aviation gives ACJ319 art deco treatment

Jet Aviation has redelivered an ACJ319neo with a new custom interior to an undisclosed customer, the Swiss company said just ahead of the show.

Jet Aviation's in-house design studio and the customer's interior architect Colin Radcliffe cooperated to create the "art deco" interior, which features a monochrome palette in dark woods and tiling, contrasted with beige and gold upholstery and finishes, says Jet Aviation.

Features include a handmade "sunburst" marquetry in the bulkhead, which includes 180 "rays" comprising two light and two dark veneers, separated with 3mm brass inlays.

"Every interior we create is completely bespoke and hand-crafted by our team of some 200 artisans in Basel," says Christoph Fondalinski, vice-president completions at Jet Aviation.

Europeans fly to Flying Colours

Canadian maintenance and completions business and Bombardier specialist Flying Colours says it is attracting increased interest from European aircraft owners because of its ability to carry out a range of work in one location.

It comes as the Peterborough, Ontario-based company prepares to accept a European customer's Challenger 605 for maintenance, an interior upgrade and a landing gear overhaul later this year.

"The fact that we have all the services to complete the work under one roof, technicians with thousands of hours of experience, and a state of the art paint shop is a real draw for European owners," says Eric Gillespie,



The company's maintenance facility in Ontario

executive vice-president. "The strength of the UK and European currencies also makes the trip across the pond financially worth it."

Gillespie adds that the company is in discussion

with three more owners of large-cabin jets about carrying out refurbishment programmes this year. It says its presence at EBACE reflects the importance of the region to its business.



Gogo Galileo

Broadband internet for every business aircraft, of every size, everywhere on Earth.

Built for all of business aviation, by the best in business aviation.



gogoair.com/galileo

Satcom will deliver Dual benefit with Ka-band kit

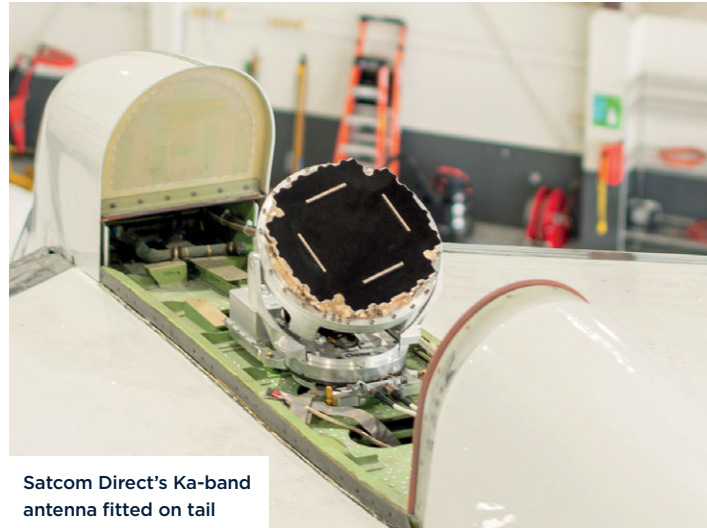
Connectivity specialist to launch latest variant in Plane Simple series this year

Kerry Reals

Satcom Direct is preparing to commercially launch the Ka-band variant of its Plane Simple antenna series, after introducing a Ku-band terminal earlier this year.

When the second antenna hits the market towards the end of 2023, the company will add its Dual Dissimilar technology to the portfolio, enabling business jet operators to access both Intelsat's FlexExec Ku-band and Inmarsat's JetConnex Ka-band networks for in-flight connectivity.

The SD Plane Simple Ku-band tail-mount terminal, developed in partnership with QEST, entered commercial service in February. The antenna consists of two line replaceable units (LRUs) which, together its design to work in unpressurised environments, minimises installation times and frees up cabin space, according to Satcom Direct. It is designed to work with Intelsat's FlexExec broadband satellite in-flight connectivity network for business aviation.



Satcom Direct's Ka-band antenna fitted on tail

More than 30 customers are already using the Ku-band system, says Dave Falberg, vice-president international at Satcom Direct, and there are outstanding orders for 70 more units.

Satcom Direct's Ka-band Plane Simple antenna is "following suit" and is on track for commercial introduction "towards the backend of this year", adds Falberg. It is designed to work with Inmarsat's JetConnex in-flight Wi-Fi solution for business

aviation.

Once the second terminal enters commercial service, Satcom Direct's Dual Dissimilar hardware will become available. This allows aircraft owners and operators to install both the Ku and Ka antennas, which Satcom Direct says will enable them to leverage the best aspects of each satellite network. Dual Dissimilar is aimed at larger business jets and VIP aircraft.

"It is the first network integrated terminal which



Falberg: Ka-band solution on track for end of year

has been designed specifically for the business aviation sector, so it's not a repurpose of any other technology that's been out in the market before," says Falberg. "What Dual Dissimilar brings to the party is that our customers that use it are not going to be limited to a single network on the aircraft. They can run two high-speed data networks at the same time."

One of the benefits of this, he explains, is that more data can be transmitted

to and from the aircraft, increasing the bandwidth and improving the amount of digital communications monitoring that can be carried out.

In addition to this, Satcom Direct is developing a flat panel fuselage-mounted Plane Simple antenna that will work with OneWeb's upcoming low-Earth orbit (LEO) satellite network. The two companies signed a three-way partnership with QEST at last year's EBACE to develop an electronic phased array antenna for smaller aircraft that supports OneWeb's new LEO satellite-based IFC solution, for which Satcom Direct is a distribution partner.

The antenna is expected to be commercially launched in 2024.

"The portfolio that we've put together and the roadmap for our customers is to deliver on all of the new technology that's coming out – LEO being one of those key new technologies in this space," says Falberg. "Being able to offer that as part of this solution will be an important path for us."

Tecnam Travellers Hawaii-bound

Italian aircraft manufacturer Tecnam has secured orders for two of its P2012 Traveller commuter aircraft from Hawaii's Pacific Air Charters.

The Honolulu-based Part 135 carrier also took options to order another 23 of the nine-passenger, twin-piston-engined type, which is among the few new-build commuter aircraft.

Tecnam disclosed the orders on 29 March, saying two aircraft are due for "immediate delivery". Pacific Air's website says it expects to receive the aircraft in "late July".

Its existing fleet includes two aircraft: one Piper PA-31 and one PA-34, according to Cirium fleets data.

"We are excited to bring comfortable, convenient and modern multi-engine travel to the islands of Hawaii and other areas of the Pacific Ocean," Pacific Air says. "The P2012 Traveller is the perfect aircraft for our routes."

Pacific Air says P2012s will provide "very competitive



Pacific Air expects to take delivery of the P2012s in July

operating costs", citing the type's twin 750hp (559kW) Lycoming TEO-540 engines, which are equipped with full-authority digital engine controls (FADEC).

The US Federal Aviation Administration certificated the P2012 in 2019.

The global in-service P2012 fleet includes 47 aircraft, 30 of which are operated by Massachusetts-based regional airline Cape Air, Cirium data shows. Another US carrier, Southern Airways Express, operates three of the type.

Azzera's emission possible

Carbon-offsetting and compliance solutions provider Azzera is planning the next phase of its growth after achieving its initial objectives following the launch of its business at last year's show.

The company returns to EBACE as an exhibitor a year after launching a suite of solutions aimed at helping aircraft owners and operators find a pathway to net-zero carbon emissions. Services include managing compliance with the European Union and UK emissions trading systems (ETS), sustainable aviation fuel (SAF) certificate purchasing and tracing, and triple-verified carbon credits for compensation.

"We are very pleased with the traction that we generated in just six months," says Azzera chief executive and co-founder Puja Mahajan. "We have achieved the objectives outlined in our business plan and have established ourselves as thought leaders on sustainability within the global business aviation community."

Azzera says it is now building the next phase of its evolution: a scalable, cloud-based platform that can be fully integrated with flight operations data and used to calculate and report carbon-dioxide emissions. It teamed up with Montreal-based technology company Innovobot last year to develop the platform. The company will also offer instant access to carbon and SAF markets while using blockchain technology to deliver full transaction and reporting transparency.

"Next year, one of our biggest deliverables will be the launch of our online exchange, providing direct access to carbon and SAF markets," says Mahajan. "We remain well-capitalised, thanks to pre-seed funding, and look forward to discussions with select prospective investors in the coming year."

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Faced with daunting debts, the Canadian airframer sold every part of its portfolio except business jet manufacturing. However, the decision proved the right one as the once troubled firm is thriving, argues Brian Foley

Things are banging on all cylinders for Bombardier lately, which in an effort to survive a previous bad bet on narrowbody commercial jets shed all of its business units except business jet manufacturing. Train manufacturing, aerostructures, its regional jet and turboprop activities were all sold to pay down its liabilities.

Slimming down from a multinational conglomerate to a one-trick pony with a crushing \$9 billion debt load would seem like the beginning of the end. However, during its more than three years as a rationalised company – a period that included the pandemic – its management team has proved otherwise.

The first scare under its new identity came when Covid-19 lockdowns closed the factory, disrupted the supply chain and gave would-be buyers a reason to pause due to economic uncertainty. Shortly, however, the pandemic instead became a boon to the private jet industry as first-time flyers sought ways to circumvent the public airport petri dish and reduced airline schedules.

Bombardier was at the right place at the right time with a family of business jets to meet this sudden market demand for new aircraft, which buyers were forced to turn to after the late model pre-owned supply was completely picked over. This prosperity was shared by all business jet manufacturers as demand outstripped supply granting them negotiating leverage and in turn pricing power.

For whatever reason, supply chain challenges or not wanting to further extend itself, Bombardier produced the same number of planes in 2022 as it did in 2021, undoubtedly missing out on making more deliveries and revenues. Despite this, plane backlogs continued to grow and like a responsible borrower, the company dutifully paid down its debt by almost half, raising its credit ratings.

Citing 2020-2022 revenue growth of 23% and a quadrupling of profitability, combined with diversifying beyond civil business jets with its year-old defence division, the company revised its 2025 financial projections upwards by 20% for revenues and 8% for profits, while anticipating further debt reductions. Having broadened into military will allow it to better weather the ups and downs of



the highly cyclical civil private jet market.

While in a much better place today, there are still potential risks to Bombardier's Cinderella story. Although its top-end Global series of aircraft models are fresh, its smaller Challenger counterparts are in need of expensive, meaningful improvements to remain competitive and to differentiate them from the same models on the less-expensive pre-owned market.

As for the Global jets, the company is in the middle of moving to a new production facility, which could cause disruptions. There is also a bevy of new products on the way from Dassault and Gulfstream that will directly compete.

Further, the pandemic-fuelled rush to private aviation has subsided as

evidenced by lower new aircraft book-to-bill sales activity, reduced charter usage, and a sharp increase in the number of pre-owned jets for sale. Regardless, I forecast that the business aviation industry as a whole will enjoy a permanent 10% addressable market expansion thanks to some of those new flyers sticking with private air travel even after things return to normal.

Due to the sudden popularity and scarcity of new aircraft, manufacturers are now more at risk of having speculators in their order books. With a relatively modest deposit those tactical investors can buy an aircraft delivery position with no intention of ever taking it and instead flip it to an impatient buyer at a premium. Due to their tendency to cancel orders when the market drops, speculators make for a less sticky order book.

Another risk is that one-third of 2022 worldwide business jet deliveries went to large charter and fractional fleet operators. Like the airlines, these types of companies will cancel or defer their orders in a heartbeat should demand ebb.

To this point, branded charter

activity has fallen by 23% year-over-year in the world's busiest market in North America, but still remains 10% over pre-pandemic levels according to WINGX. Bombardier has oversized exposure to one fleet client that were it ever to fall on bad times, could flood the market with over 150 late model Bombardier aircraft that would compete directly with new sales for many years to come.

Lastly, business jet sales do not do well in times of economic downturn or uncertainty. As such, there are hopes within the industry that the next recession will be a soft landing.

Despite all of these what-ifs, for now the all-new Bombardier is proving its ability to endure as a pure-play business jet manufacturer. The company can continue to buttress its financial footing or in the longer-term tie-up with another company. After all the company has been through, it is nice to have choices. ■

Brian Foley Associates (BRiFO) has provided aerospace firms and investors with strategic research and guidance since 2006.

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-Henry Maier, President and CEO, FedEx Ground

From sustainable fuels to solar-powered flight to the stratosphere, and urban air mobility to Formula 1, there is plenty to learn at the EBACE education and keynote sessions taking place this week

A two-day Sustainability Summit and an opening keynote session featuring motor racing power couple Toto and Susie Wolff are among the special features to tempt delegates from the static and the exhibition stands at this year's show.

Formula 1 and business aviation have long had a close relationship, with teams using private jets to travel between races during the season - the sport's generously remunerated top stars also enjoy the privacy and convenience the mode of transport offers and many own or have owned their own aircraft.

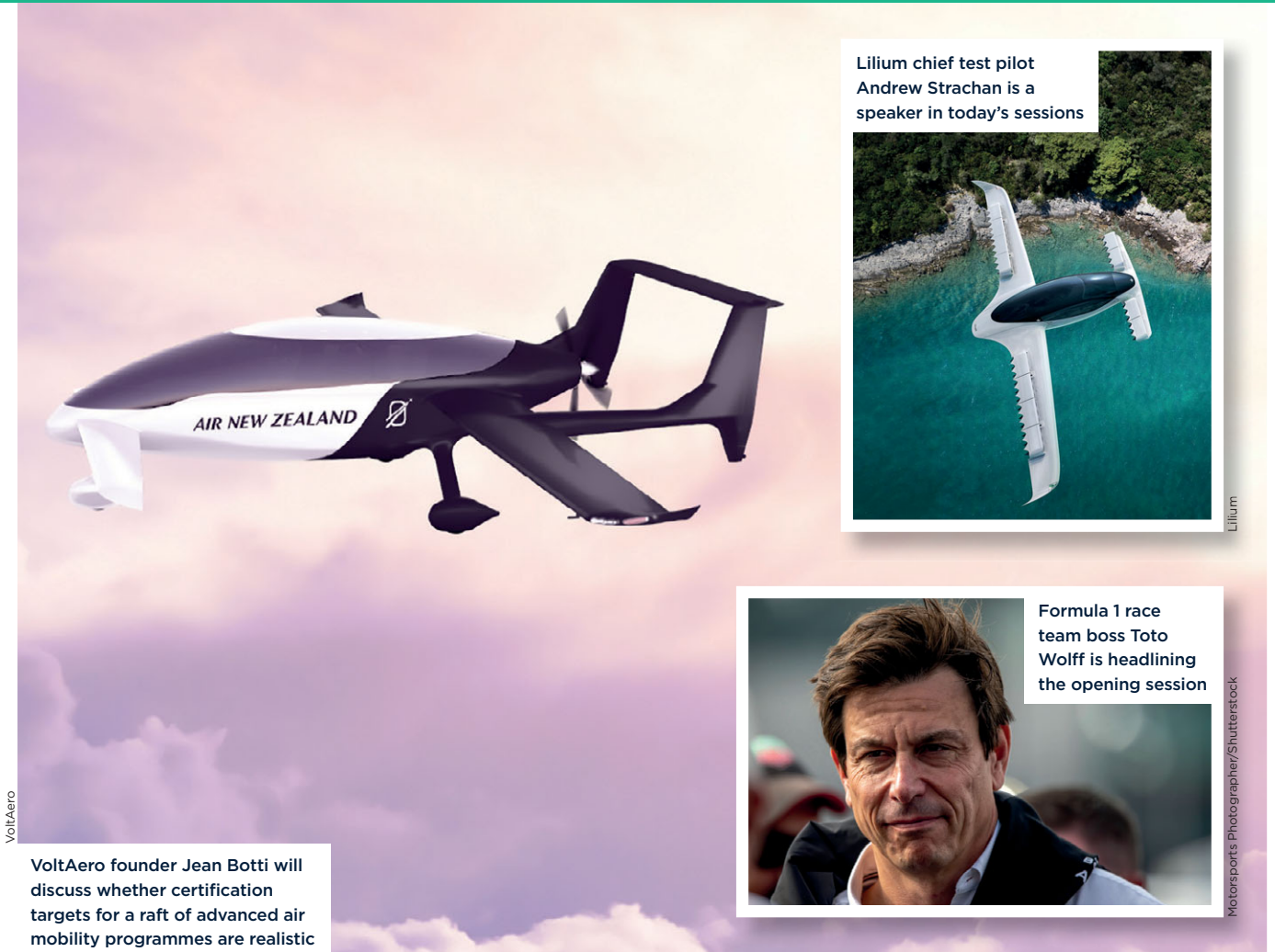
Joining NBAA's Ed Bolen and EBAA chairman Juergen Wiese at today's opening session - which begins at 08.30 - is team principal, chief executive and co-owner of the Mercedes-AMG Petronas F1 team Toto Wolff.

The Austrian, who is a former racing driver and a billionaire tech entrepreneur, has helped steer Mercedes to become the most successful team in F1 history, with an unprecedented eight consecutive Constructors' World Championships and seven drivers' titles.

Susie Wolff is also a former racing driver who now focuses on gender diversity within the sport and beyond. As managing director of the all-female driver category F1 Academy, she has helped to open the sport to more women.

The Sustainability Summit begins at 14.00 with a session on the Keynote & Innovation Stage titled Cleared for Takeoff: the Flight Plan for eVTOLs. The speakers are Andrew Strachan, the chief test pilot with eVTOL developer Lilium and Diana Siegel, chief financial officer of Electra.aero, which is pioneering not an eVTOL but an eSTOL aircraft, electrically powered and able to take-off on very short airstrips such as sports fields.

Alternatively, in the Sustainability Theatre, the focus is on sustainable aviation fuels, with a panel promising



VoltAero founder Jean Botti will discuss whether certification targets for a raft of advanced air mobility programmes are realistic

Lilium chief test pilot Andrew Strachan is a speaker in today's sessions

Formula 1 race team boss Toto Wolff is headlining the opening session

Good to talk

to address the "myths and realities" around SAF. It includes Ian Moore, chief commercial officer of VistaJet parent Vista, Charles Etter, a technical fellow with Gulfstream, and representatives of two fuel suppliers, Neste and Total Energies.

Away from the environmental debate, if data is your thing, turn up at the Conference Theatre Y29 at 16.00 to hear from three specialists in number-crunching analytics and data: Harry Clarke of Avinode, Richard Koe of WingX, and Jetnet iQ's Rolland Vincent.

On Wednesday, the Sustainability Summit begins at 10.00 with a panel on carbon offsetting in the Sustainability Theatre. Over on the Keynote stage, panelists will attempt to answer the question: When will eVTOLs fly?

That theme continues in the same venue at 11.30 with a session called AAM Certification in 2025: Realistic or Not? An impressive line-up features Jean Botti, founder of hybrid electric aircraft start-up VoltAero and a former chief technology officer with Airbus; Kevin Noertker of Ampaire, another

hybrid electric pioneer; Sebastian Borel of Lilium; Eray Altunbozar of AirCar, a Turkish urban air mobility developer; and Jia Xu, chief technology officer for Honeywell's advanced air mobility business.

At 11.30 in the Sustainability Theatre, there is a chance to Take a Trip to the Stratosphere in the company of Raphael Domjan, Swiss explorer and founder of SolarStratos, a project that aims to reach the second layer of the Earth's atmosphere with a solar-powered aircraft.

At 13.00 the sobering subject of air safety comes to the fore with a session on runway excursions, one of the biggest causes of hull losses in aviation. Hear from two of its leaders what progress the Global Action Plan for the Prevention of Runway Excursions, or GAPPRE, is making towards its objective of eliminating the scourge of potentially calamitous landing overruns.

At 15.00, attention switches back to SAF in the Sustainability Theatre, and specifically on European Commission initiatives to encourage and police the market, including the "Book and claim" process.

The proceedings for the day end at 16.30 with two rival sessions. At the Keynote & Innovation Stage, there is a session on cybersecurity.

Meanwhile, in the Sustainability Theatre, an expert from IATA will explain how the business aviation sector can contribute to the UN's Sustainable Development Goal that relates to the poaching and trafficking of protected species of flora and fauna. At the event, the EBAA will be formally committing to the Buckingham Palace Declaration, which commits signatories to fighting a crime that is worth up to \$23 billion annually.

As always, on the final day of the show, the spotlight turns to the younger members of the profession. The Career Day begins at 10.00 with a chance to hear and ask questions to Mack Rutherford, a Belgian-British pilot who broke the world record to be the youngest person to fly solo around the world aged 17.

At 11.00, find out how to break into business aviation with a chance to pick up advice from a panel of industry professionals, both young and experienced. ▶



Domjan aims to reach stratospheric heights on a solar powered aircraft

SolarStratos R. DOMJAN

Much of private aviation flew through the pandemic relatively unscathed and into 2023 in robust health. As EBACE begins, can the industry maintain its steady course amid global economic turbulence?



Last year's event was the first EBACE in three years

Back in business

Murdo Morrison

The business aviation industry is today converging on Geneva for its second post-Covid EBACE anxious to discover if weakening traffic numbers – and a wider economic malaise across the globe – will send last year's impressive recovery into reverse. There are concerning signs, but the outlook remains broadly positive.

This year's event is the 21st since the National Business Aviation Association (NBAA) and its European counterpart EBAA established EBACE in 2001 (The 2020 and 2021 iterations fell victim to pandemic restrictions). More than 50 aircraft are on display this week along with around 400 exhibitors. Organisers expect 12,000 delegates.

Data from consultancy WingX and Eurocontrol suggests business aircraft traffic in Europe has been in year-on-year decline since August 2022, with the gap widening early this year. However, take this in context. The last quarter of 2021 and 2022's first half saw the industry

rebound impressively from the pandemic, before economies felt the impact of inflation fuelled by the Ukraine conflict.

The manufacturers certainly have begun this year in bullish mood after a good previous 12 months for most. General Aviation Manufacturers Association (GAMA) figures for 2022 showed that all the major airframers boosted output and revenues – the latter partly the result of inflation, but also because they had to deviate less from list prices.

While business jet deliveries for the full year increased by just two aircraft – to 712 – the amount of revenue manufacturers made from those was up 4.5%. Turboprops fared even better. Overall billings for fixed-wing piston-, turboprop-, and turbine-powered aircraft at \$22.9 billion were the highest since the \$23.5 billion achieved in 2019.

A flurry of new product development means the biggest manufacturers are all sitting on healthy backlogs, which should cushion them from any slight, economic uncertainty-induced dip in orders in 2023 and beyond. Dassault has commitments for 87 Falcons, one

of its highest in recent years, boosted by the imminent introduction of the 6X and 10X variants.

With its Global 7500 model selling particularly strongly, and despite winding down production of its Learjet range last year, Bombardier expects to increase overall deliveries by "a minimum of 15%" in 2023, equating to "more than 138 jets",



Varsano: Using business aviation changes your life and you won't want to go back

the Canadian company said in February. Chief executive Eric Martel described the company as "operating in a sweet spot" as the market continues to recover.

Gulfstream too is targeting a 20% boost in 2023 deliveries to 145 jets, helped by the expected certification of its G700 in "mid-2023". Meanwhile, Textron Aviation said in January that signs of a slowing in business aviation activity did not reflect in a "material change" in demand for the Wichita-based company's aircraft.

For the airframers, meeting production targets rather than drumming up demand has been the biggest challenge for the past 12 months or so, as shortages of materials prompted by Russia's invasion of Ukraine and shutdowns in China, combined with skilled workers failing to return to the workplace after the pandemic period, have continued to bedevil suppliers everywhere.

Despite this, there are indications the situation might be improving. At its annual results briefing in March, Dassault chief executive Eric Trappier expressed confidence that

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the company would achieve its production targets in 2023, despite continuing delays in the delivery of components and raw materials. He said skilled labour shortages remained the “number one concern”.

Not all believe that this brake on production as customers clamour for deliveries has been altogether a bad thing. In its 2022 results presentation, GAMA's chairman Eric Hinson suggested that supply chain constraints helped impose a “governor” – or speed limiter – on what might be unsustainable demand and stopping the market overheating.

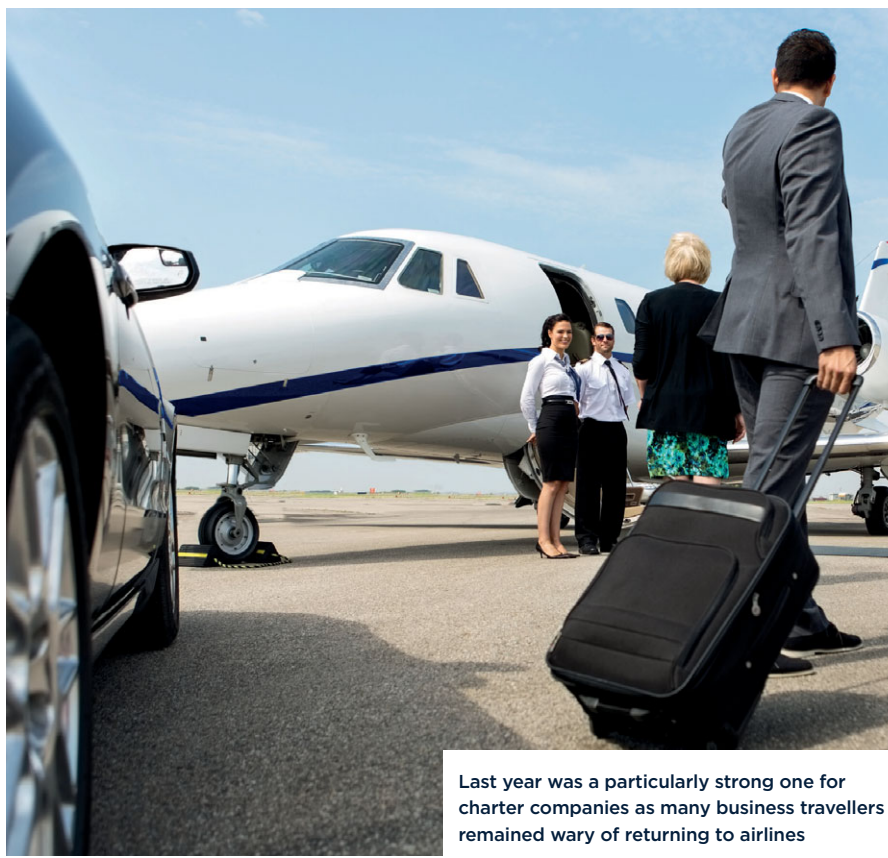
A healthy 2022 has left many operators upbeat about continuing recovery. Speaking at the recent British Business and General Aviation Association annual meeting in London, George Galanopoulos, chief executive of Luxaviation UK, described the previous 12 months as an “excellent year” during which “we’ve never seen so much demand – we even managed to raise our prices”.

Rita Domkute, chief executive of Lithuanian-based operator KlasJet, reckons that the private charter market will be 5-10% higher this year than 2019. However, after the trauma of the pandemic, not all are rushing to re-fleet. Alex Durand, chief executive of UK helicopter charter firm SaxonAir, says that despite a strong 2022, the company is “debating whether we reinvest or just stay as we are”.

Gregg Brunson-Pitts, founder of US brokerage Advanced Aviation Team, says 2023 has continued where 2022 left off with “lots of charter requests” from clients, who range from political campaign teams to financial institutions. The post-Covid re-opening of Asia and the return of big music and sport events has seen international travel requests “really pick up from the second half of 2022”.

However, Brunson-Pitts says that what has changed going into 2023 is an increase in the availability of aircraft for charter, which he puts down to owners flying a little less and wanting to sweat their assets more amid concerns about the economy. “For the past two years, owners didn't really need our business. Now they want to engage with us again,” he says. “It's a return to normal service.”

Perhaps one of the strangest phenomena of the recovery in 2022



Last year was a particularly strong one for charter companies as many business travellers remained wary of returning to airlines

was the shortage of used aircraft as supply constrained manufacturers struggled to meet demand for new equipment, and buyers soaked up whatever assets were available on the market. However, there are signs that activity in the pre-owned sector is beginning to return to pre-Covid-19 patterns.

“When more than 10% of any model is on sale, it's a buyers' market. Under 10%, it's a sellers' market,” says Steve Varsano, founder of prestige London aircraft brokerage The Jet Business. “Last year, it was 2-3% and that was skewed to older types. For some newer models, there was nothing available.”

He also detects “a return to normality” in 2023 because of wider economic uncertainties among potential aircraft buyers. “More jets are coming available and those are not selling so quickly. It's coming back to what we are comfortable with and can flourish in,” he says. “Last year was not a market we liked being in.”

Zipporah Marmor, vice-president aircraft transactions at Canadian brokerage and charter specialist ACASS, and chair of

the International Aircraft Dealers Association, agrees. “Buyers are starting to become more rational,” she says. “The frenzy of the last 12 to 24 months has calmed down a bit and we see this as healthy for our industry.”

Other issues that will be in the spotlight at EBACE include how to meet carbon reduction targets, through short-term tactics such as using sustainable aviation fuel, or, longer term, adopting disruptive propulsion or transport technologies. Related to this is the question of how to deal with a growing movement that sees private aviation as inherently damaging to the planet and society.

Some might view the “flight shaming” lobby as a tiny minority of very vocal environmentalists, but mainstream media has been weighing in, criticizing a number of celebrities, politicians and other high-profile individuals for their use of private jets to travel short distances (albeit sometimes to illustrate their apparent hypocrisy doing so while preaching the virtues of a green lifestyle).

The NBA's long-running “No plane no gain” campaign sought

to show how important business aviation is to a productive economy as a time-saving tool for entrepreneurs and other wealth creators. It may have convinced some, but now many believe the industry must change tack and prove that it is taking serious steps towards putting its environmental house in order.

Expect announcements around the availability or take-up of SAF to be a major theme of EBACE this year. A Sustainability Summit is taking place over the first two days of the show, with sessions on how to increase the supply of SAF as well as carbon offsetting and how the sector can communicate its achievements better to the wider public.

Russia is another challenge. Western sanctions strengthened after February last year prohibited any of the major manufacturers – or parts producers – from supplying Russian owners or operators. It has had an effect. In its 2022 results statement, for instance, Dassault said aircraft destined for the country represented up to 15% of its backlog just before tightened sanctions took effect.

As has been widely suggested, business aviation had a gentler pandemic than its commercial aviation cousin. It continued to fly those who could afford it but also – as Covid-19 restrictions began easing – attracted first timers. Many of these who did not want to use airlines for health reasons or because of cancelled flights and airport chaos as demand ramped up in 2022.

The stickiness of these business aviation newcomers once the airline market continues to improve its service post-pandemic is a big question for the industry in 2023. Fractional ownership and jet cards have been democratizing business aviation for decades. However, frustrations with flying commercial saw many more seek out private flights last year.

While the half a million people with a net worth of at least \$30 million will continue to be business aviation's core constituency, The Jet Business's Varsano reckons at least some of those who formerly flew first or business class on scheduled airlines will remain loyal. “Once you realise a private aircraft is a time machine, it changes your life,” he says. “You won't want to go back.” ▶



Expect SAF to be a major theme of this year's show

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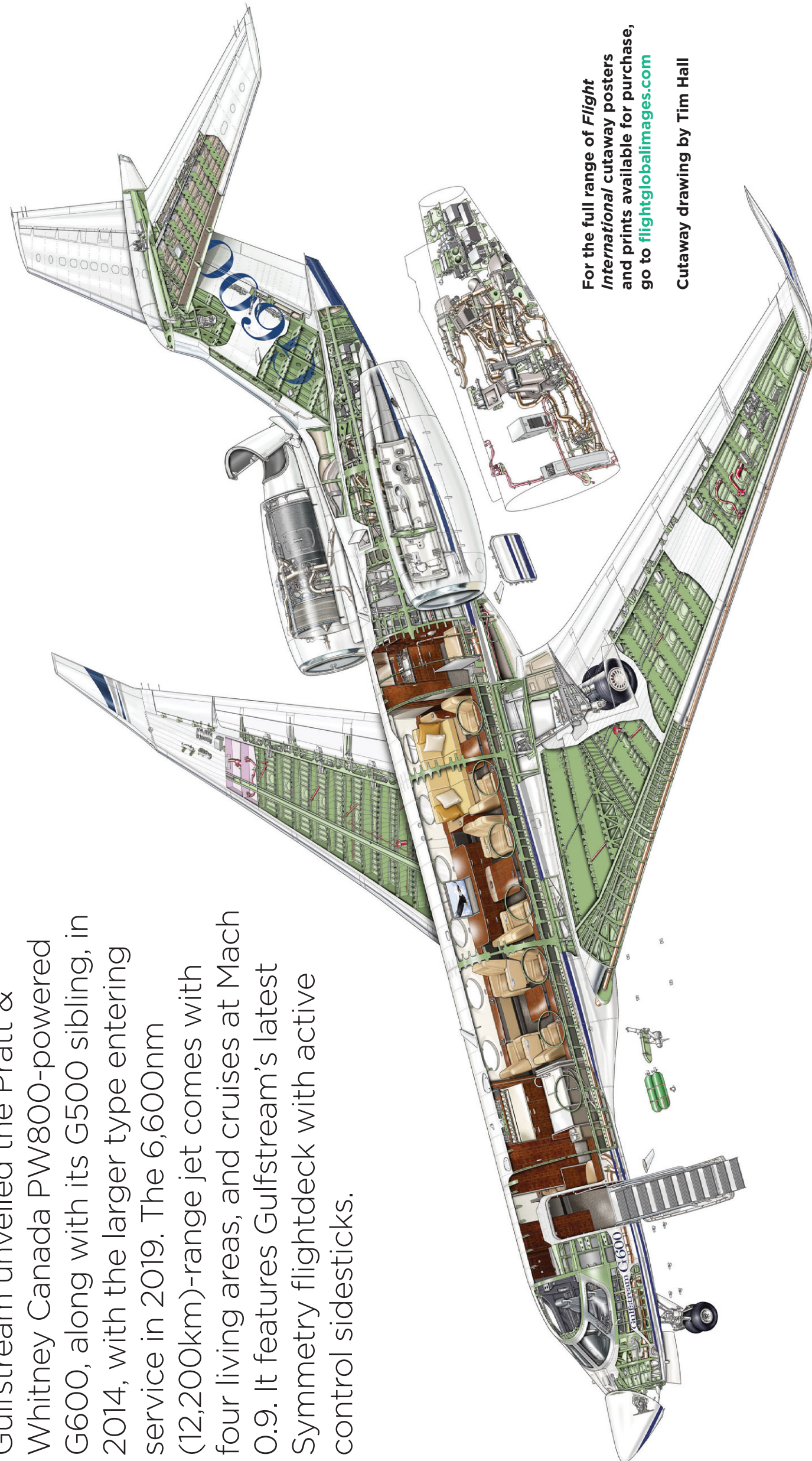
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Gulfstream G600

Gulfstream unveiled the Pratt & Whitney Canada PW800-powered G600, along with its G500 sibling, in 2014, with the larger type entering service in 2019. The 6,600nm (12,200km)-range jet comes with four living areas, and cruises at Mach 0.9. It features Gulfstream's latest Symmetry flightdeck with active control sidesticks.



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