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FLIGHT EVENING NEWS

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light fantastic

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Honda Aircraft

HondaJets can carry up to seven passengers and are powered by twin overwing 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.

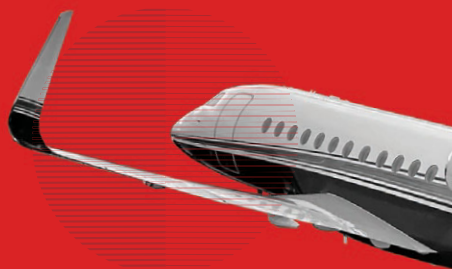
Other updates for the Elite II include new ground spoilers to accommodate the jet's increased weight.

"The HondaJet Elite II once again pushes the boundaries of its category on all fronts of performance, comfort and style," Yamasaki says.

Yamasaki, a veteran of Honda's automobile business, took over at the airframer after Fujino reached Honda's mandatory retirement age of 62. Fujino led a team that devised the HA-420 in the late 1990s, ahead of the light jet's first flight in 2003 and certification in 2015.

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Shape shifter

Bombardier chief executive Eric Martel sits in the Nuage seat and shows off the Nuage Cube stool, one of the new interior furniture features on the optional three-zone cabin design for the Global 7500 and 8000, unveiled at the show this morning. See story P3



Honda's light fantastic

Jon Hemmerdinger

Honda Aircraft's HA-420 HondaJet is to get a series of enhancements as the Elite II. It comes as Hideto Yamasaki (pictured) this morning made his NBAA debut as chief executive after taking over in March from Michimasa Fujino, the visionary behind the disruptor light jet brand.

The Elite II gains more range, a newly designed spoiler, and several cabin upgrades.

In addition, Honda Aircraft plans to bring new automated cockpit technologies to the HondaJet in 2023, including autothrottle

and autoland capabilities, the Greensboro, North Carolina-based airframer announced this morning.

"The HondaJet Elite II is the fastest, highest and furthest-flying aircraft in its class, achieving a whole new level of performance that redefines what it means to be a very light jet," says Honda Aircraft.

Honda Aircraft has also boosted the fuel capacity of the Elite II, with maximum take-off weight (MTOW) also rising to 5,035kg (11,100lb), from 4,940kg on the previous-generation Elite S, which was revealed in 2021.

The changes extend the type's range to 1,547nm (2,865km) with four people aboard - a 110nm increase over its Elite S predecessor.



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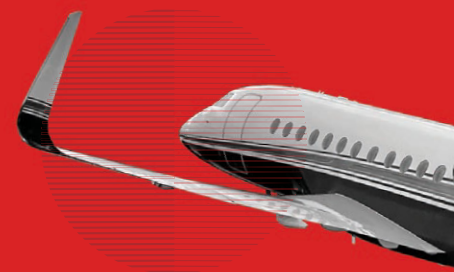
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6X on final approach

Dominic Perry

Dassault is confident its Falcon 6X will enter service in line with its revised target of mid-2023 as certification testing of the ultra-wide-cabin business jet wraps up.

Speaking at a press conference this morning, Dassault chief executive Eric Trappier (pictured) said the Falcon 6X was now "in the final phase of certification" with pilots from the European and US regulators flying the twinjet.

Canadian and European certification has also been obtained for the Falcon 6X's Pratt & Whitney Canada PW812D engines, with Federal Aviation Adminis-

tration approval "pending", says Carlos Brana, executive vice-president civil aircraft at Dassault.

Despite the continuing difficulties in the supply chain – issues that prompted the airframer earlier this year to push back the jet's service entry – Brana believes the revised target will be hit: "The schedule is tense, but we are working on it so we are quite confident."

Dassault is now assembling the 19th Falcon 6X at its facility in Merignac near Bordeaux, France, while three examples are at its completion centre in Little Rock, Arkansas, with a fourth to be inducted "very soon", says Brana.

Meanwhile, assembly of long-lead items for the ultra-long-range Falcon 10X is

under way: assembly of the forward fuselage will "begin before the end of the year," says Trappier, and the first composite wing is undergoing fatigue and static testing. Service entry is due in late 2025.



Business aviation: is it progressive or pariah?

Aerospace analysis Richard Abouafia (pictured right) could not have been more succinct in summing up what is perhaps the most challenging issue facing the global aerospace industry.

"How do we avoid becoming the next tobacco, in the public mindset? How to we avoid becoming a pariah industry?" Abouafia, managing director at AeroDynamic Advisory, said this morning at NBAA's pre-show Newsmakers Breakfast.

He was speaking about the aviation industry's carbon output and, more specifically, the perception that the sector lacks a straightforward means of doing much about it.

Abouafia posed the questions to an executive well-versed in the details of the discussion: Boeing chief technology officer Marc Allen (left).

"The only answer is to demonstrate what we... have been doing all along, which is to keep making aviation more sustainable, more efficient," Allen responded. "And [to] do it in a way that is out front in delivering value, and environmentally sound."

Abouafia's question cut to the heart of the sustainability problem: aircraft burn incredible amounts of jet fuel, and no practical propulsion alternatives currently exist.

Still, Allen says Boeing and the broader industry are moving in the right direction, noting Boeing is pursuing several technologies he says can make a difference.

Those include use of sustainable aviation fuel and development of novel aircraft designs, such as a truss-braced-wing aircraft concept Boeing has been developing with NASA. Additionally, Allen says autonomous systems such as those being developed for air taxis by Boeing-backed Wisk can allow aircraft to fly more efficient routes.

Bombardier's suite spot

Bombardier this morning unveiled a three-zone cabin for the Global 7500 and in-development Global 8000 ultra-long range business jets. The move follows demand from its customers for larger single suites rather than the traditional four-zone layout that currently features on Global 7500s. First examples of the executive suite will be fitted in 2024.

A key feature of the new cabin is the Nuage Cube – an innovative, versatile piece of furniture that during flight can be moved about the cabin and used as a stool or small table.

Each of the Executive cabin zones are 3.7m (12ft) long – compared with 2.7m in the four-suite layout – and are configured with eight windows and bulkhead dividers for privacy.

The office suite features four Nuage

seats, each boasting its own independent full-size table.

The conference suite is designed for video conferencing or presentations with a large credenza and flip-up monitor.

Finally, the C-Suite is designed for "calm and relaxation" and features a divan and pocket doors for "added privacy".

"The Executive cabin provides Global 7500 and Global 8000 customers with the productivity configuration they need to transform their aircraft into the ultimate business tool," says Bombardier chief executive Eric Martel.

The 8000nm (14,800km)-range Global 8000 was formally launched in May as Bombardier's new flagship product. Scheduled to enter service in 2025, it is a modified version of the 7,700nm-range Global 7500 which it will replace.



Clean start

AEM Group's Alexander Craig gives a final buff to one of the aircraft at the static display ahead of the show's opening tomorrow morning.

Third FSI sim for Praetors

FlightSafety International (FSI) will offer a new full-flight simulator for the Embraer Praetor 500 and Praetor 600 jets to meet the growing demand for training on the pair, the companies said this morning. The simulator, which is the third from the training company for the Praetor 500 and Praetor 600, will be located in Orlando. Operations will begin in the second quarter of 2023.

"With Praetor jet deliveries increasing consistently, we have realised the need to offer additional capacity for training to our customers worldwide," says Johann Bordais, chief executive, Embraer Services & Support.

Honeywell foresees business jet boom

Jon Hemmerdinger

Honeywell has released a bullish 10-year forecast for business jet deliveries on the eve of the show, upping its previous annual prediction by 1,000 units. Its latest report estimates that aircraft manufacturers will deliver 8,500 new business jets, worth \$274 billion, between 2023 and 2032. Those figures are up about 15% from Honeywell's report last year, which estimated 7,400 deliveries, worth \$238 billion, over 10 years.



Jimenez-Serrano: Traffic levels some weeks this year exceeded 2007 peaks

"There was pent-up demand from Covid - probably the industry was expecting a hit that didn't materialise, and now these supply chains have to catch up to demand," says Honeywell strategic planning manager Javier Jimenez-Serrano.

Manufacturers across the aviation industry have been scrambling to shore up supply chains that creaked during a pandemic recovery characterised by tattered logistics networks, worker shortages and inflation. Honeywell still expects airframers will deliver about 700 new business jets in 2022. In 2021, data from the General Aviation Manufacturers Association put the figure at 611, excluding

single-engined and airliner-based types. Honeywell predicts delivery figures will jump 17% year-on-year in 2023 and increase an average of 2% annually over the decade.

The 2022 Outlook is Honeywell's 31st annual report. The company bases it largely on aircraft operator surveys.

Over the next five years, operators expect to acquire new jets in numbers equivalent to 17% of their current fleets, up three percentage points from the 2021 findings, the report says. Those "purchase plans" are now "on a par with 2019 levels".

"The business aviation sector is expected to re-

cover to 2019 delivery and expenditure levels by 2023, which is much sooner than previously anticipated," says Heath Patrick, president of Honeywell's aftermarket business in the Americas.

"The business aviation industry is greatly benefiting from a wave of first-time users and buyers, due in part

to changing habits brought on by the Covid-19 pandemic," Patrick adds.

Those "first-time users" include customers driven to private travel by airline-service cuts during the pandemic, and concerns about catching the virus in crowded airports.

Honeywell's market optimism partly reflects its finding that 74% of new users plan to travel as much by private aircraft in 2023 as they did in 2022.

Such demand pushed business aviation flight activity, during several weeks this year, to levels exceeding historic highs in 2007, says Jimenez-Serrano. Flight activity declined after 2007 amid the recession that followed, and due to social pressure, he adds.

Honeywell predicts full-year 2023 flight activity will finally exceed the 2007 benchmark.

It also expects continued strength from the used business jet market, with operators intending to acquire used jets over five years equivalent to 28% of their current used fleets.

"High demand for used jets will keep pressuring the already low inventory of jets available for sale," Honeywell says.

Honeywell's 2021 and 2022 surveys included questions about sustainability, though this year's outlook is the first to report those metrics. Half of aircraft operators surveyed say they have taken steps to reduce carbon emissions - up 30 percentage points from last year's survey. Those steps include flying at slower speeds and "increasing passenger capacity", Honeywell says.

ACJ eyes market for plenty TwoTwentys

Airbus Corporate Jets (ACJ) sees a booming US business jet market as offering the perfect sales opportunity for its family of VIP airliners, particularly the ACJ TwoTwenty.

Research commissioned by the airframer, alongside analysis of Wing X data, paints a picture of a sector enjoying a period of strong growth - one that appears set to continue as US corporates increasingly turn to business aviation for their transport requirements.

Figures from aviation data provider Wing X reveal there were around 2.76 million business aircraft departures in the USA during the first eight months of 2022 - a rise of 12.3% over the same period in pre-Covid 2019. Increases in activity were observed during every month of the period against the corresponding months in 2019.

And, according to ACJ's survey

of 53 high-level executives at US stock market-listed companies, the surging interest in business jet use is set to continue.

In all, 72% of respondents said they expected their organisations to make greater use of business aviation in the period to 2024, with 34% anticipating a dramatic increase in use.

Chadi Saade, vice-president commercial at ACJ, sees that interest in business jet use translating into higher demand for its aircraft.

In particular, as US corporates look to replace their existing fleets, they will turn to the A220-based ACJ TwoTwenty given its size, range and list price, Saade argues. "It clearly positions the TwoTwenty in a sweet spot whereby it is the only aircraft that enables you to upgrade while keeping intercontinental range," he says.

"The others will continue selling,



Airbus has sold a pair of TwoTwenty jets this year

but I'm really optimistic to see more and more American VIPs going to the TwoTwenty."

He also sees strong potential to sell the larger A220-300 in an all-business-class configuration for the transportation of big groups such as sports teams.

Saade says ACJ has performed

well in 2022, selling five aircraft so far - two TwoTwentys and three ACJ320neo-family jets. "I'm very optimistic that it's going to increase in the next few weeks," he adds.

"We are already at five, so if we finished the year at seven or eight I'd be delighted. And who knows, maybe more."

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Full force Gulfstream

Manufacturer at show with entire range, including show debutants

Jon Hemmerdinger

Gulfstream has roared back to NBAA after a three-year hiatus, arriving in the Sunshine State with a full line-up, including show debuts for the G700 and G800.

In fact, all but one of its in-production or developmental jets are on the static display – the exception being the G400, which remains in its early stages but is present in the form of a cabin mock-up.

“We are excited to be back. We have our full fleet on display,” says Gulfstream chief marketing officer Jeannine Haas.

But the static stars are undoubtedly the G700 and G800. The presence of two of the former – both production-test aircraft – is especially fitting considering Gulfstream unveiled the type during its last NBAA appearance, at 2019’s edition in Las Vegas. Meanwhile, the G800 – represented by a flight-test aircraft – was launched at an event at the airfram-



Two G700s and single G800 are part of manufacturer’s exhibit

er’s Savannah headquarters in 2021.

Gulfstream aims for the first 7,500nm (13,900km)-range G700 to enter service by mid-2023, followed by the 8,000nm-range G800 in early 2024. Both jets can carry 19 passengers.

“Each aircraft sets a new standard for the industry, in terms of safety, high speed, performance, environmental efficiency and an unmatched cabin experience,” Haas says.

Gulfstream has also not forgotten about its 4,200nm-range G400 – launched alongside the G800 last year – which is being shown off with a cabin mock-up.

“We’ve already started some manufacturing of the G400, and it’s progressing very well,” Haas says. “The aircraft has good, solid demand – off to a great start.” Deliveries are scheduled to begin in 2025.

Gulfstream is also showcasing its super-midsize 3,600nm-range G280 and its three long-range, large-cabin jets: the 5,300nm-range G500, 6,600nm-range G600 and 7,500nm-range G650ER.

Gulfstream has reported incredibly strong demand recently, with parent General Dynamics recording a mid-year aerospace backlog of \$5.8 billion. To meet that demand,

Gulfstream is expanding its G400/G500/G600 manufacturing footprint in Savannah.

It aims to keep the momentum going by sending its two production-test G700s from NBAA on a “world tour”, with the jets visiting some 20 cities in Mexico, Europe, Turkey, Southeast Asia, Africa, the Middle East and India, says Gulfstream senior vice-president of worldwide sales Scott Neal.

“It’s an opportunity for us to show the airplane to markets around the world, generate some excitement – and to hopefully take some orders in the process,” he says.



Where flight
is formed

What's next for Nexus

Dominic Perry

After more than a year of silence, Textron eAviation finally revealed at the show today the proposed design of its Nexus electric air taxi and intends to start building the initial prototype next year.

But despite offering a first glimpse of the size and shape of its urban air mobility vehicle, the airframer is in no rush to bring Nexus to market, foreseeing service entry around 2030 – at least five years behind some of its peers.

Originally conceived by sister company Bell in 2019, Nexus was first envisaged as a small hybrid-electric vehicle with six tilting ducted fans to provide lift and forward thrust. That then morphed into a full-electric aircraft, with two fewer ducted fans and a small wing to provide lift in forward flight.

But the latest iteration of Nexus – the first to be disclosed since the project transferred into Textron eAviation in 2021 – is a far cry from either of those designs: gone are the ducted fans, to be replaced by two fixed rotors mounted on the aircraft's twin tail-booms, augmented by four tilting rotors on the wing.

And, whereas the earlier designs were relatively compact, the new Nexus has grown substantially: it now boasts a 15m (50ft)



Air taxi is scheduled to enter service around 2030

wingspan and a maximum take-off weight in the region of 3,630kg (8,000lb) – up to 910kg heavier than previously. Despite the size, Textron eAviation is designing the vehicle to carry three passengers plus a single pilot on journeys of up to 100nm (185km) at a cruise speed of 120kt (222km/h).

Larger

But not only is the Nexus now bigger than its forebears, it is also larger than the electric vertical take-off and landing designs being touted by both start-ups and aerospace giants – many of which are intended to offer similar, or better, performance and arrive on the market much sooner.

Assembly of the initial prototype is due to begin next year at Textron eAviation's site in Wichita, Kansas, leading to a first flight "in the next couple of years", says chief executive Rob Scholl.

He says the redesign of the Nexus was driven by the fact that "ultimately we have to meet a certain flight safety threshold and a certain economic threshold for our customers."

"Our bigger aircraft is largely a result of what we think is a pragmatic view of where battery technology is and where it's going [plus] the systems you have to wrap around it, given the experience we have with Pipistrel," he says, referring to the Slovenian light aircraft manufacturer that was acquired by parent company Textron in April and which now sits in the eAviation business.

"If you look at the aircraft structure, ours is going to be a little bigger – that reflects our experience with crash-test requirements and fatigue testing of passenger travel."

Passenger comfort has also played a part in the aircraft's growth, says Scholl,

who says the larger cabin may help customers come to terms with flying in a new kind of aircraft.

Scholl is also unconcerned that the Nexus will be later to market than the aircraft being developed by its rivals: for example, Vertical Aerospace intends to have its four-passenger VX4 enter service in 2025, while Airbus is working to a 2026 target for its CityAirbus NextGen.

Realistic

"We think our design reflects a realistic aircraft that will ultimately be successful in the marketplace. So while some people might be able to get to the market a little bit earlier, we think we are building a pragmatic aircraft that will work in the marketplace for our customers."

He points out that significant hurdles remain to be overcome before such vehicles can enter the market at any scale, including

regulatory, infrastructure, public acceptance, and technological issues. On top of which there are economic considerations for both manufacturers and operators, he says, notably around the pace of battery development and industrialisation.

"That affects both the manufacturing of the aircraft and the end operation because if it's wildly expensive to replace a battery system every six months because we are not building enough of these cells then that's an issue," says Scholl.

"It's not just the aircraft – someone has to scale up to produce the motors or actuators economically. When you are at the bleeding edge of technology, which a lot of an air taxi is, that's usually expensive, and so we have to work collectively to drive the technology forward."

Meanwhile, Pipistrel is continuing with its own product development. This includes a certificated version of its Panthera avgas-powered four-seater – to be followed at a later date by a hybrid-electric variant – and the Nuuva V300, a 300kg-payload, 300nm-range unmanned cargo drone that should make its maiden sortie in 2023.

Besides offering unique products in its own right, Pipistrel's work is contributing to the wider aims of the business, says Scholl, for instance designing the batteries on the Nexus.

In brief...

Redding partners Avfuel

Redding Jet Center, based at the north Californian airport, has become an Avfuel branded FBO partner. As well as supporting business aviation customers, the FBO provides a base for aerial firefighters.

Jet Aviation's expansion

Jet Aviation has broken ground on a new 3,700sq m hangar at its Bozeman, Montana facility, scheduled for completion in the third quarter of 2023. The new hangar will be able to accommodate any large cabin jet, says the General Dynamics-owned company. The company is also due to complete the rebuild of a hangar in Houston in early 2023, and building a new hangar at its Scottsdale FBO.

Two more for WT's winglets



Winglet specialist Winglet Technology plans to extend its supplemental type certificate (STC) for the Cessna Citation Sovereign to include the Sovereign+ and Latitude. The US authorities issued the STC in 2017, followed by their counterparts in Europe in 2020.

"Our transitional winglet kit for the legacy Sovereign is a nice upgrade for both the Sovereign+ and the Latitude.

We have seen interest in our winglets from owners of each product line, and it is a natural follow-on to amend our STC to include the derivative models," says Bob Kiser, Winglet Technology's president.

The company maintains that its winglet allows the modified aircraft to climb direct to flight level 450, and achieve a step climb from FL450 to

FL470 at a weight 1,360kg (3,000lbs) heavier than an equivalent model without the winglet.

The Wichita-based company says it is looking for a launch customer for each type. Winglet Technology already holds an STC to install its elliptical winglet design on the Citation X, and the feature is standard on the Citation X+.

Winglet Technology

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In brief...

ACA marks membership

The Air Charter Association is exhibiting at NBAA after a recruitment drive that has seen companies from nine new countries join. The ACA says it now has members in more than 50 countries.

"We are delighted with the global expansion of the ACA and continue to maintain the highest quality of membership, through stringent due diligence checks completed on all new applicants," says chairman Kevin Dicksbury.

Fargo goes far with MRO push

Fargo Jet Center is expanding its presence at Hector International Airport in North Dakota with an 11,000sq m (112,000sq ft) hangar and office complex.

As well as increasing FJC's maintenance operation, the new facility will serve as the headquarters of sister company Weather Modification International and house FJC's aerospace engineering department and flight school.

"This expansion will help accommodate the growing aviation needs of the Fargo region and better serve clients that bring their aircraft to us from all over the world," says Jim Sweeney, FJC president.

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Keystone: Managed fleet of more than 30 aircraft



Murdo Morrison

Greg Raiff's career as a business aviation entrepreneur began when he chartered a Boeing 747 to take fellow high school students to the Bahamas to mark their graduation. He sold his first company for \$7 million while at college.

Over the next more than 20 years he had further success with Private Jet Services (PJS), a brokerage arranging large-aircraft charters for sports teams, political campaigns and touring rock bands.

Now, after buying Utah-based Part 135 management and charter operator Keystone Aviation earlier this year, Raiff's newly formed Elevate Aviation Group - which includes PJS and Keystone - is making its debut on the NBAA exhibition floor.

New Hampshire-based Elevate, says Raiff, is a "fully integrated aviation platform which is not asset intensive" - he means that the

company has no intention to own its own aircraft. It will offer management, charter brokerage and maintenance services.

Keystone operates a managed and charter fleet of more than 30 aircraft, with a Gulfstream G550 and G650 joining this year.

The purchase also came with maintenance facilities in Salt Lake City, Utah and Scottsdale, Arizona. These have approvals for most major business aviation platforms from the Pilatus PC-12 to Bombardier Globals, Dassault Falcons, and Gulfstreams.

Raiff is keen to expand with further acquisitions, in what he describes as a fragmented US MRO sector. "We are continuing to invest in growth by speaking to businesses that are complementary to us and share our values," he says.

However, Elevate will not simply "grow for the sake of it", he insists. "We have seen other companies do that and struggle. We feel good about where we are and are ready to get onto that climb.

I genuinely believe there is room for a platform that provides a boutique service where charter customers and aircraft owners know we have their interests first," he says.

Is the fact that Elevate will now have both charter end-users and owners of aircraft as its customers a problem? No, maintains

Raiff. The business has two sales teams which each deal exclusively with brokerage and management clients.

He is convinced Elevate's ambitions will attract plenty of interest this week, despite the company's previous relatively low profile. "This our big coming out party," he says. "We plan to show the industry we are here."



Raiff: Showing the industry we are here

Inmarsat raises the bar

Satellite communications specialist Inmarsat is working on enhancements to its Jet Connex on-board broadband service to reflect what it says are changing market needs since the pandemic.

New customer offers will "raise the bar" by allowing passengers to "access the most data-hungry applications simultaneously", says Kai Tang, the company's head of business aviation.

Traditionally, connectivity providers have focused on delivering video streaming and other entertainment packages. However, the Covid-19 period saw demand for video conferencing platforms rise to record levels, pushing up the requirements for bandwidth and reliability, says Tang.

Inmarsat's Ka-band-based broadband is available on more than 1,250 business jets and resellers including Collins Aerospace, Honeywell and Satcom Direct offer it as part of

their connectivity packages.

The launch of seven more satellite payloads in the next five years, taking the total fleet to 12, will boost bandwidths, says Inmarsat.

Inmarsat currently partners with Honeywell to provide its service through the latter's JetWave terminal, but it is also teaming with Satcom Direct and Orbit to offer alternative terminals from next year. Several manufacturers, including Bombardier, Dassault and Gulfstream, offer Jet Connex as a line-fit option.

Inmarsat began in the 1980s as a United Nations-backed initiative to improve safety at sea through satellite communications. It launched into business aviation with Jet Connex in 2016.

In November, rival Viasat announced merger plans with Inmarsat. The deal is set to close before the end of the year.

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Atlantic playing at home as BACE returns to Orlando

Murdo Morrison

Atlantic Aviation, the USA's second largest FBO chain, is once again playing host as the convention's static display takes shape at Orlando Executive Airport. The Texas-based group is also an FBO operator at Las Vegas Henderson, home to the outside exhibit in alternate years.

It comes less than a year after Atlantic merged with Ross Aviation, rebranding Ross's 30-odd sites to take the combined network into three figures, and consolidate its status as, what chief executive Lou Pepper calls,



Pepper: We are local everywhere

a "solid number two" behind market leader Signature Aviation.

Atlantic's latest expansion has been in Dallas Love Field, where it has completed its acquisition and rebranding of Textar Aviation, one of the largest FBOs on the airport. The company says it plans more upgrades, including a new terminal building and hangar, and that the move means Atlantic is now present at 15 of the top 20 business aviation airports in the USA.

Before Texas, it was the Caribbean. In August, it acquired Blue Heron, an FBO at Providenciales in the Turks and Caicos, adding to its existing two facilities in the region, both in the Cayman Islands.

Atlantic's growth has been super-charged since Pepper, backed by a small equity group, purchased the firm in 2000. At the time, it had just five locations, including Chicago, Houston and Teterboro. Ten years after financial group Macquarie took over in 2004, the portfolio stood at 70, and in 2020 ownership transferred to investment house KKR, just ahead of the coming together with Ross.

With sites in most key cities and leisure destinations, Pepper says there are no



An aerial view of Atlantic's facility at Orlando Executive Airport

hard plans to drive further acquisitions in what he admits remains a fragmented, mom and pop-dominated industry, although he does not exclude anything - including internationally - "if opportunity presents itself".

One of the characteristics that defines Atlantic, says Pepper, is that "we are local everywhere". He explains: "We focus on the community, respecting local architecture, local customs. What works in Aspen might be

different to what works in Salt Lake City."

While Atlantic offers customers hangar space at all its facilities, Pepper admits that adding maintenance capability is not a priority. "We offer it at some locations, if we are required to, but it is not our core business," he says.

While Atlantic is "agnostic" when it comes to working with fuel suppliers, the business has secured a deal with Avfuel to supply sustainable aviation fuel at sites

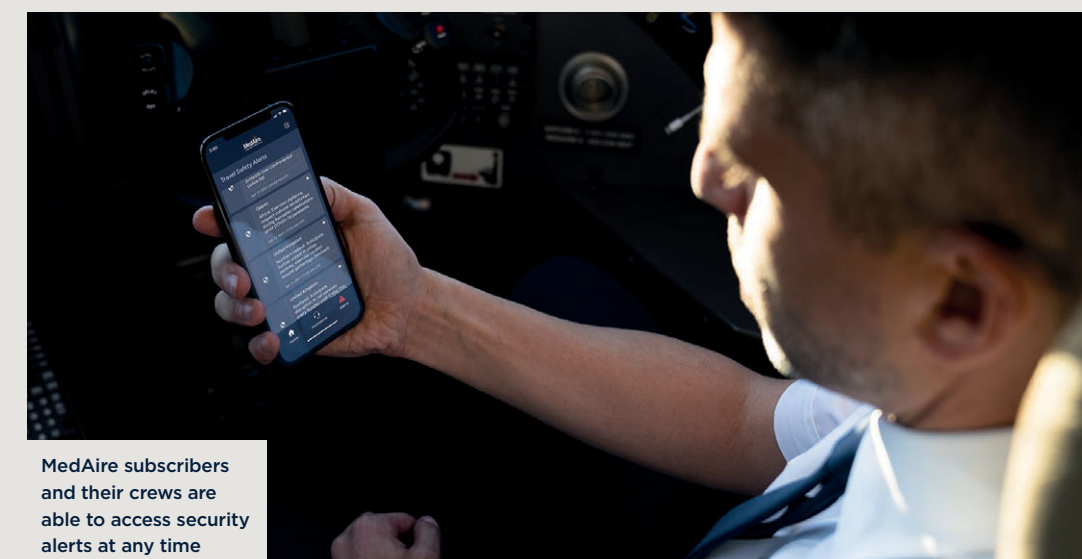
including Aspen, Burbank, Carmel, Los Angeles International, Napa and Orlando. While SAF is still a small market, Pepper is excited about its potential.

"There is not so much around at present, but the government is behind it and I expect that in a much shorter period than many might think we are going to see a lot more SAF," he says. "It will have a tremendously positive effect on the industry's carbon footprint."

Staying alert to security threats with MedAire

For more than two years, the biggest preoccupation of business aviation operators flying overseas was usually complying with pandemic regulations and having a plan for passengers or crewmembers if they became ill or had to quarantine.

Now, with Covid-19 largely in the rear-view mirror, there is a new worry for many companies venturing abroad for the first time since the pandemic: how has the security threat changed in the intervening period? That is the view of medical support specialist MedAire, which is promoting at the show two new additions to its 360 portal designed to help customers manage security risks when they fly to foreign countries.



MedAire subscribers and their crews are able to access security alerts at any time

The first, in partnership with security firm Bond, puts clients in immediate touch with a security specialist any time they feel in an uncom-

fortable situation, such as in a taxi, that has not yet developed into a crisis. The agent stays on live video, providing advice in real time

and able to alert emergency services if circumstances deteriorate.

The second is a communication tool called Crew

Check that allows a company's operations office to interact with crewmembers on a single platform.

MedAire's business aviation customers are responsible for around 4,000 aircraft, and the company manages an average of 10 calls a day.

These range from in-flight medical issues and advance security questions to issues around crewmembers or passengers falling ill in a foreign country and seeking advice, says chief executive Bill Dolny.

MedAire sells its service on a subscription model that provides round-the-clock support. "We think of ourselves as being that good friend that you call whenever you are going somewhere new," says Dolny.



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Jetcraft: Demand is softening after a record year in 2021

Jon Hemmerdinger

As this year's show opens, aircraft brokers and dealers say the market for used business aircraft remains robust, the result of an elevated-demand and constrained-supply environment that took hold during the pandemic.

At the same time, however, the companies suggest the market has recently shown signs of levelling off – a trend confirmed by recent market reports. How much the temperature will drop remains unclear, but one analyst thinks prices are set for rapid declines.

Used aircraft brokerage Jetcraft says a surge in first-time buyers and a growing ultra-high-net-worth population, especially in Asia-Pacific, will help the used aircraft trading market maintain a “steady upward trajectory” over the next five years.

Jetcraft, which released its latest five-year market forecast ahead of the convention, says demand is softening following a record year for transactions in 2021

and a strong start to 2022. It expects “normal depreciation levels” to return in 2023.

Last year saw a 40% increase in pre-owned transactions over 2020, to reach \$14.5 billion, driven largely by large and midsize jets, says the firm.

Bombardier, which comes to NBAA having recently launched a new pre-owned business-jet sales programme, says the used market remains strong despite recent cooling.

“The pricing on pre-owned airplanes [is] very stable right now,” says Bombardier vice-president of pre-owned sales worldwide Peter Bromby. “The activity is still there, just not the feeding frenzy we had last year.”

Bombardier rolled out its Certified Pre-Owned Aircraft programme in July 2021, aiming to secure a larger foothold in the used segment. Executives have said the segment boomed due partly to a shift from commercial to private travel amid the coronavirus pandemic. Under the programme, Bombardier buys, inspects, updates and sells used Bom-

bardier business jets.

Upgrades include fresh coats of exterior paint and significant cabin refurbishments, such as reupholstered seats, refinished entryways and replated cabin metals, says Thomas Fissellier, Bombardier's director of pre-owned aircraft acquisition and sales support. The company also equips its used jets with modern cabin connectivity systems and upgraded avionics – resulting in aircraft that are in “like new” condition. It resells the aircraft with one-year airframe warranties.

“Our certified pre-owned airplanes will always be at the top of the list to look at,” says Bromby.

Bombardier declines to say how many used aircraft it has sold through the programme. However, in early October, its website listed five jets for sale, including Global 6000s, Challenger 300s and a Challenger 605.

Fissellier says the recent strength of the second-hand market has made finding and acquiring aircraft difficult. “Every plane acquisition has really been a fight.”

But things are changing.

“2021 was an exceptional year. Should we start to see a little bit of a slowdown after this exceptional year? The answer is yes,” says Fissellier.

Brian Foley, founder of aerospace consultancy Brian Foley Associates, foresees substantial market changes.

“I would anticipate used business jet inventory rising and pricing falling very rapidly from this point forward,” says Foley.

He notes that other “bubble assets are all beginning to decline now due to the shaky economic and geopolitical climate”.

“Housing, used cars, stocks – you name it,” Foley says.

Indeed, some market data shows a recent reversal of trends, with inventories creeping up and prices starting to slip.

The inventory of for-sale used business jets hit a low in March, at 2.3% of the fleet, according to data from aviation research firm AMSTAT.

Since then, however, availability has inched higher, hitting 2.7% in September. Historically, 10-12% of the global fleet is for sale, says Foley.

The average asking price

of used jets reached a recent high of \$5.45 million in August, then nudged down minimally in September, AMSTAT figures show.

Data from Sandhills Global, which operates aircraft charter, sales and valuation businesses, shows that used jet inventories are climbing, with values declining in August but inching higher in September.

Jet inventories jumped 3.7% from August to September – the eighth consecutive monthly increase – but remained 14% greater in September than one year earlier, according to Sandhills.

Inventories are lowest for midsize and super-midsize jets, and highest for light and large-cabin jets.

“Asking values for used jet aircraft this September approached, but did not quite exceed, May 2022 highs,” Sandhills adds.

Specifically, values bumped up 3.4% between August and September (after declining 0.9% between July and August). Year-over-year in September, used jet asking values are up 22.4%, according to Sandhills.

SPAC to the future

Flexjet plots expansion by merging with special acquisition company to go public next year



Flexjet's fleet includes Embraer aircraft

Jon Hemmerdinger

EMs and other suppliers at the show will be hoping to benefit from an ambitious expansion strategy unveiled last week by one of the USA's largest fractional ownership operators, Flexjet.

The Cleveland-based company announced on 11 October plans to go public by selling public shares through a merger with a special purpose acquisition

company or SPAC. Flexjet will combine with public firm Horizon Acquisition in the second quarter of 2023, emerging as a public company valued at \$2.6 billion, it said on 11 October.

Flexjet says proceeds from the deal will leave it with capital needed to expand in the red-hot business aviation market.

"Transaction proceeds are expected to fund fleet, programme and geographic expansion, as well as significant infrastructure expansion, including maintenance-support facilities and private terminals," Flexjet says.

Flexjet operates a fractional-aircraft ownership business and related enterprises, including an aircraft-leasing division. Its fleet includes some 250 aircraft, including Bombardier Challengers, Gulfstream G450s and G650s, and Embraer Phenoms, Legacy and Praetors.

Flexjet turned a \$52.9 million profit in 2021, down from \$66.2 million in 2020, and anticipates generating \$2.3 billion in 2022 revenue,

according to an investor report. Flexjet believes accessing public investment will give it a platform for further growth.

"Having capital and currency will position us to expand market share at an accelerated pace in an opportunistic environment," says Flexjet chair Kenneth Ricci. "We are making this decision at a time when we believe the marketplace is expanding at a more aggressive rate."

Several aviation com-

panies have gone public in recent years through SPAC mergers. Also known as "blank check companies", SPACs generally lack operations, existing for the purpose of identifying and bringing public promising private firms.

Notably, Flexjet competitor Wheels Up became public by merging with a SPAC in 2021. Several developers of electric air taxis - Archer Aviation, Eve Air Mobility, Joby Aviation and Vertical Aerospace - have pursued the SPAC route.

SmartSky off to flying start



Helfgott: Plans to expand

Air-to-ground (ATG) connectivity start-up SmartSky is at the show for the first time since declaring its continental US-wide network up and running.

The company has already announced a supplemental type certificate for the retrofit of its system on the Textron Aviation Cessna Citation X, and is "engaged with all the other OEMs at some stage of negotiation", says chief executive Dave Helfgott.

SmartSky, which is taking on ATG market leader Gogo, has already secured contracts with two large operators, Fly-Exclusive and Jet It, with several more in line to sign up, says Helfgott.

The company is offering custom-

er demonstration flights during the show on one of Fly-Exclusive's Citation Xs.

SmartSky sells its technology - which includes installing an antenna underneath the fuselage - through intermediaries including Honeywell and Avionics, as well as independent maintenance, repair and overhaul businesses.

Helfgott says SmartSky's equipment on hundreds of transmission towers throughout the country means it has coverage of 96% of business aviation flights. The gaps - mainly over the Rockies in the Northwest - will be "filled in soon", he says.

Although its network does not cover Alaska or Hawaii, Helfgott says there are plans to expand coverage into parts of Canada, Mexico and the Caribbean.

Aspire goes Global



Device provides high-speed voice and data communications

The US Federal Aviation Administration has given Honeywell supplemental type certificate approval to fit its Aspire 400 satellite communications system on Bombardier Global Express jets.

It is Honeywell's first aftermarket STC for Aspire 400. The company says it is hopeful about receiving equivalent green lights from regulators in Canada and Europe.

According to Honeywell, Aspire 400 provides high-speed voice and data communications for cockpits and cabins in a compact and lightweight package. The system also offers broadband data to enable electronic flight bag, telemedicine and other IT applications.

"The approval of this STC is a significant achievement for Honeywell and Bombardier Global Express operators and owners," says Mark Goodman, senior director, cockpit communications for Honeywell Aerospace. "Aspire 400 provides pilots with a highly reliable and secure link to support enhanced cockpit applications to drive operational efficiency."

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FlyExclusive fractionals close to sold out

Charter operator launched Citation CJ3+ shared-ownership scheme this year



FlyExclusive is on track to take fleet to more than 100 aircraft by the end of the year



Photography: FlyExclusive

Murdo Morrison

Charter operator FlyExclusive is close to selling all shares on its incoming Cessna Citation CJ3+ fractional ownership programme, even though Textron Aviation will not deliver the first of 30 new aircraft until the second quarter of 2023, according to founder Jim Segrave.

The Kinston, North Carolina-based company, which ordered the CJ3+ jets in April – to add to its 90-strong, mostly Citation charter fleet – aims to take on the industry's shared-ownership giants, NetJets and Flexjet.

Already the country's fourth largest ad hoc and block charter operator, Segrave believes that, after a strong 2022 so far, FlyExclusive is on track to take its fleet to more than 100 aircraft by the end of the year.

Segrave has "been stunned in many ways" by the take-up of the fractional

shares. "We have 145 contracts out with customers, at some phase of closing," he says. "It's remarkable, given that most of the planes are still nearly a year away."

The fact that he is not launching the fractional programme from a standing start is bolstering his confidence in the new venture. Early shared-ownership clients will have access to FlyExclusive's charter fleet, which includes the CJ3 and slightly larger Encore.

This will be crucial to guaranteeing aircraft availability, Segrave believes. "The big advantage customers have is that if they buy into our programme, they have access to the rest of our aircraft, at club member rates," he adds.

He expects around a quarter of fractional customers to be existing users of FlyExclusive's charter services. "Our club membership programme is a great stepping stone into fractional if you need more than 25 hours a

year," he says.

The rest he reckons will be either new to the segment or switching from other fractional providers. The entry level for the fractional programme will be 40 hours, but larger shares offering 100 to 150 hours will be on offer.

Segrave says the company's biggest problem on the charter side is not finding customers, with many of those who used business aviation for the first time during the pandemic staying loyal. "We have more demand than we can cope with," he says.

Instead, challenges include shortages and delays in parts supply that affect dispatch reliability. There is also a dearth of flightcrew across the industry, although Segrave maintains that the company's size and reputation ease the difficulty, and that 100 pilots have joined this year.

The company is exhibiting at BACE, where it

Segrave has been 'stunned' by take-up of fractional offer

will be promoting its third party maintenance services. The company extended its maintenance facility by 4,650sq m (50,000sq ft) in June as part of an effort to bring 80% of its servicing in-house, from 20% traditionally, and improve dispatch reliability.

It has hired 145 technicians in the past six months and plans to add 100 by the end of the year, and is working three shifts every day, says Segrave. Early next year, the company will break ground on an additional 7,430sq m unit to take its overall maintenance footprint to "over 200,000sq ft" by 2024.

Although he expects in-house work to account for 90% of capacity, there is scope to offer maintenance services to what Segrave calls "retail customers", especially the busiest periods

for the charter operation. He adds: "Selling third-party maintenance services will be a big focus at NBAA."

Under the agreement with Textron, FlyExclusive will take delivery of five CJ3+ aircraft next year with the remainder arriving by 2025. Segrave expects eventually to have a fractional fleet of up to 80 Citations, including possibly larger types.

Segrave set up his first charter operation in 1994, before selling it to Delta AirElite, a subsidiary of Delta Air Lines, in 2009. After a spell running the business for Delta, he left and set up FlyExclusive in 2015. Delta AirElite was later rebranded, before Wheels Up acquired it in 2020.

FlyExclusive has two aircraft on the static display at Orlando: a Citation CJ3 and a Citation XLS.

Bluetail speeds conformity checks with cloud solution

Bluetail, which offers operators a platform to digitize paper records and store them in the cloud, is releasing its latest module at the show.

MACH Conformity will help cut by a half the time it takes to perform conformity inspections for aircraft joining the fleet, says the Phoenix-based company.

The software's features allow

operators to "digitally paper clip" US Federal Aviation Administration (FAA) forms to other documents in a binder.

"Just doing all the paper records search and conformity steps required by the FAA can add weeks to the process of onboarding additional aircraft," says Stuart Illian, chief operating officer of Bluetail.

The company says it designed the product with customers including Solarius Aviation, Wheels Up, Jet It, Wing Aviation, and Mach Point Aviation.

"We are grateful for all the industry knowledge our partners so generously shared with our development team," says Greg Baynham, vice-president of applications and delivery.

Flexjet's G650 first

Flexjet has registered its first Gulfstream G650 in Europe, with a second one due to join the fleet of the fractional operator within six months. The company says the success of its G650 in its US operation convinced it to add the type to its European fleet, the first time the large-cabin jet has been available in the region on a shared-ownership programme. The aircraft arrived in Malta, on whose register it will fly, on 23 September.



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AIRBUS

It is a busy time for the engine manufacturers in business aviation, with a number of important programmes in gestation. We review some of the key ones, by manufacturer

Power contenders

Murdo Morrison

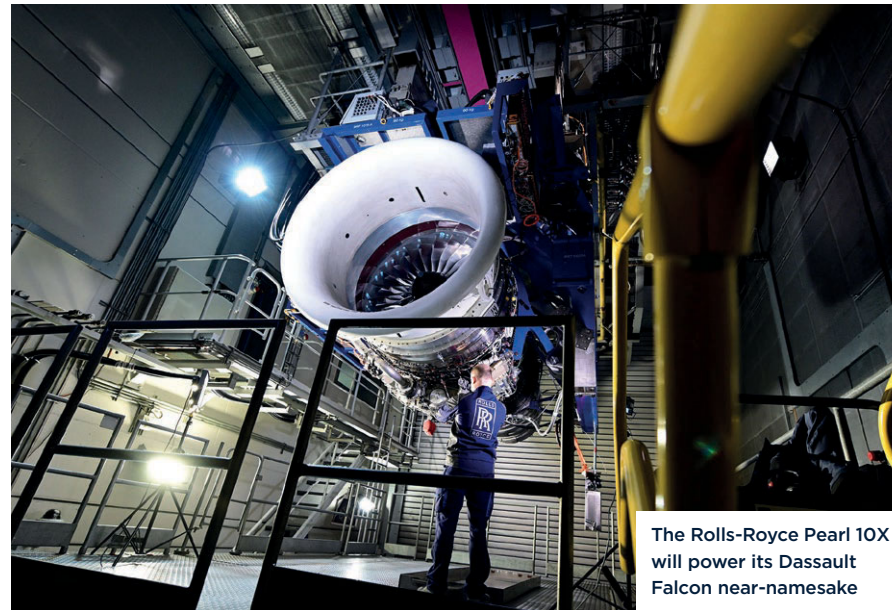
Rolls-Royce

Rolls-Royce is celebrating at the show the recent certification of the Pearl 700, the latest variant of its Pearl family of engines for the in-development Gulfstream G700 and G800. A product of the UK company's business aviation unit in Dahlewitz, Germany, the Pearl – versions of which also power the Bombardier Global 5500 and Global 6500, as well as the new Dassault Falcon 10X – has helped propel Rolls-Royce back to the forefront of the sector.

The Pearl 700 combines the Advance2 core with a new low-pressure system, which R-R says provides an 8% increase in take-off thrust and 5% in efficiency compared to the BR725 on Gulfstream's G650 and G650ER. Until Gulfstream turned to Pratt & Whitney Canada for its G500 and G600, and later the G400, R-R had been its go-to engine provider for more than half a century. In September, R-R celebrated delivery of its 1,000th BR725 to Gulfstream. There are more than 500 G650s and G650ERs in service.

Meanwhile, testing continues on the Pearl 10X that will power Dassault Aviation's latest and largest type, the Falcon 10X. First runs on the 18,000lb (80kN) thrust-rated engine took place earlier this year. The Pearl 10X is the first R-R powerplant selected by the French airframer, which announced the 10X in May last year, with certification targeted in 2025. The 10X will compete with the G700 and G800 as well as the Bombardier Global 7500 and 8000.

Ahead of the Farnborough air show, Rolls-Royce hinted that it is contemplating a move into the super-midsize market, a 10,000lb to 11,000lb-thrust segment that



The Rolls-Royce Pearl 10X will power its Dassault Falcon near-namesake

P&WC and Honeywell dominate. Chris Cholerton, president of civil aerospace, said that the space "hasn't been disrupted for quite a while" and still offered "quite high value" to the engine-maker. He added that any engine would likely be a new-build design, rather than a derivative of the Pearl.

Pratt & Whitney Canada

The Canadian arm of the US engine manufacturer recorded its latest success when Gulfstream selected the PW812GA to power the new G400, launched last year. The derivative achieved Transport Canada certification in mid-September. P&WC's PW814GA and PW815GA power the G500 and G600, respectively, while the PW812D is the engine on the Dassault Falcon 6X that is due to enter service in mid-2023.

On the turboprop side, P&WC launched the latest version of the PT6, the E-Series, at NBAA 2019, and has produced over 300. This

year, it is showing the newest addition, the PT6E-66XT, which powers Daher's TBM 960. P&WC says the -66XT is the first engine with a dual-channel integrated electronic propeller and engine control system in general aviation. Meanwhile, Textron chose the PT6A-65SC for the new Textron Cessna SkyCourier, and Daher the PT6A-140A for the Kodiak 900.

GE Aerospace

GE Aerospace's Passport engine powers Bombardier's Global 7500 as well as its newly launched stablemate/replacement, the Global 8000. In May, the Canadian manufacturer claimed to have flown a test example of the 8,000nm (14,800km)-range Global 8000 at beyond supersonic speed, although the type, due to enter service in 2025, will have a certificated top speed of Mach 0.94. The aircraft will vie with the Gulfstream G800 as the longest-range business jet.

At the other end of the scale,

the Catalyst engine that powers the Textron Beechcraft Denali has been in flight test for almost a year, with the first example of the single-turboprop taking to the air last November. After teething problems, GE's Italian arm Avio Aero, which is leading the European-developed programme, says the Catalyst is now back on schedule, with the Denali expected to enter service next year.

Safran

Despite its dominance of the commercial narrowbody market through its CFM International joint venture with GE Aerospace, and its strength in the military and rotorcraft segments, Safran's recent venture into business aviation did not end well. The two large-cabin aircraft programmes its Silvercrest was due to power, the Cessna Hemisphere and the Dassault Falcon 5X, were cancelled because of the engine's failure to hit its promised performance targets.

Instead, the French manufacturer appears to be putting its focus on the electric market. It is developing the EcoPulse, a hybrid demonstrator based on the TBM 900 series, with Airbus and Daher. The EcoPulse's P&WC PT6 engines will be augmented by a Safran electric motor. Diamond Aircraft has also selected Safran Electrical & Power to supply an electric motor for the eDA40, a battery-powered derivative of its single-engine four-seater.

GE Honda

The joint venture between GE Aerospace and the Japanese industrial giant developed the HF120 turbofan for the Honda Aircraft HondaJet. The distinctive light jet, with its engines mounted on pylons over the wing, entered service in 2015. At last year's NBAA, Honda Aircraft unveiled a 10-passenger concept called the HondaJet 2600, which will straddle the light and midsize segments, but has not revealed details on a potential powerplant.

Honeywell

One of the biggest players in the midsize and super-midsize segments, Honeywell's HTF7000 series powers Bombardier's latest Challenger 3500, as well as the Embraer Praetor 500/600, Gulfstream G280 and Textron Aviation Citation Longitude. However, with all these aircraft in service, Honeywell has no new engine developments in the business aviation market. ▀



Global 8000 will have same GE Aerospace Passport engine as Global 7500



Gulfstream's G400 is the latest application for P&WC's successful PW800 series

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Envisioning the future of flight

Anthony Rossi, vice-president sales and marketing at Pratt & Whitney Canada, explains what drives the engine manufacturer and what we can expect at this year's show

Service, simplicity and sustainability

Q You are making some important announcements about investments in your aftersales network. What are these and what is their significance for P&WC customers?

A Yes, we are making two announcements at NBAA regarding our customer service network that demonstrate progress on some of our key priorities.

First is the introduction of a European MRO for our PW800 engine customers in collaboration with MTU Aero Engines, which is an important step in expanding our capabilities for that engine family. This is especially timely as we await the entry into service of the Dassault Falcon 6X, powered by the PW812D. The new facility will be located at Berlin Brandenburg Airport and will complement the work being done by our North American PW800 MRO, our facility in Bridgeport, West Virginia.

The second announcement concerns our new Services Hub tool. We have 200 engine models in service - this equates to 400 different aircraft model/engine model combinations. We have 70 different customer service/maintenance solutions. Plus, we have 66,000 engines in service now powering 42,000 aircraft. We needed a digital tool to help customers identify what solutions

were available for their particular aircraft/engine. Services Hub does just that. We are giving demos at our booth.

Q P&WC had a couple of big wins on new business jet programmes in the past few years, namely the PW812D on the Dassault Falcon 6X and the PW812GA for the Gulfstream G400. How are the certification campaigns going?

A There has been tremendous momentum within the PW800 family, and we are very pleased with the rapid progress being made. As you noted, the PW812GA was selected by Gulfstream to power the G400 in October last year and it received type certification from Transport Canada on 14 September.

The PW812D for the Dassault Falcon 6X has also been achieving important programme milestones, especially with regards to certification requirements: Transport Canada certified the engine in December 2021, followed by EASA validation. We are anticipating type certification by the FAA for the PW812D shortly, paving the way for the entry into service of the Dassault Falcon 6X.

Q How much does that engine family benefit from technology developed for the Pratt & Whitney Geared Turbofan commercial engine?



A The PW800 derives its core from the geared turbofan (GTF) which itself is a game changer, reducing fuel burn and CO2 emissions by up to 20% for single-aisle aircraft, and NOx emissions by 50%. The PW800 programme was able to learn and benefit from the extensive testing - many thousands of hours - that was done on the common core helping us build an engine that's remarkably durable.

Q You unveiled the PT6 E-Series at NBAA 2019, and you are showing the latest edition to the series, the PT6E-66XT that powers the new Daher TBM 960, here in Orlando. What is special about that engine?

A Most of the feedback we are receiving from owners and operators of aircraft powered by the PT6E-Series engine family is the tremendous impact it has on the flying experience. As you know, it's the first in general aviation space to feature a dual-channel integrated electronic propeller and engine control system. In service, worldwide, the PT6 E-Series engine family continues to raise the bar in engine performance, control systems, data intelligence and service solutions. The digitally enabled single lever simplifies engine operation and allows for true

precision-controlled auto-throttle. This provides for a more intuitive way of flying, from engine start to propeller and engine control, which reduces operation and pilot workload.

Q The PT6 will shortly celebrate the 60th anniversary of its first shipment and has been the dominant GA turboprop engine for decades. Now that it faces competition, what are you doing to ensure the PT6 family remains relevant in the future?

A I think the above answers this question as well. The PT6 E-Series engine family is reinventing the general aviation segment, just as its predecessor models have done over the past six decades. Additionally, PT6A models that have been in the market for a number of years are still attracting new platforms. In July, Daher selected the PT6A-140A engine to power the new Kodiak 900 single-engine turboprop. We recently celebrated the delivery of the 1,000th PT6A-42A to Piper for its M500 and M600 series aircraft, a programme that shows no signs of slowing down.

Q Finally, what role does sustainability and the push for a net-zero carbon industry play in P&WC's thinking and new product development?

A Sustainability is absolutely central to our technology development strategy and we are committed to supporting our customers achieve the goal of net-zero emissions by 2050.

As a leading developer of aircraft propulsion systems, we are focused on continually advancing the efficiency of our engines, for example with our hybrid-electric flight demonstrator programme in Canada. We are also enabling the transition towards cleaner fuels like SAF and hydrogen, including testing our engines with 100% SAF and developing novel propulsion technologies, which are optimized for hydrogen. Keep in mind that we have already led the way in making our engines 70% more efficient since the dawn of the jet age, and we see still see potential to go further. ▶



PW800 will power two new aircraft programmes



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For the past decade or more, business jet manufacturers have sought to own or influence the whole customer experience. This has led to major investments in MRO, either through acquisitions or new-builds

Murdo Morrison

In recent years, business aviation manufacturers, particularly those behind the longest-range, largest cabin jets, have been tightening their grip in the maintenance, repair and overhaul sector, through acquisition or investing in their own bricks and mortar networks. The thinking is that MRO is a lucrative revenue stream in its own right, but controlling the aftersales operation also helps OEMs retain a relationship with an owner through the life of his or her aircraft.

The vertical integration fashion began in earnest with Gulfstream parent General Dynamics' 2008 purchase of Jet Aviation, the world's leading business aviation services company with interests in aircraft management, FBOs, and large-jet completions. Gulfstream intended the addition to complement its in-house MRO operation, with the Zurich-based business keeping its own brand and platform-agnostic approach.

However, it has been Gulfstream's French rival Dassault Aviation that has been arguably most active in recent years, snapping up in 2019 maintenance businesses from ExecuJet, TAG Aviation, and RUAG. The acquisitions added around 19 facilities to Dassault's global network, which at the time comprised two sites in Europe – at Paris Le Bourget and Bordeaux-Mérignac – and three in the USA at Little Rock, Reno and Wilmington.

As chief executive Eric Trappier admitted in 2020, the French firm was late in coming to the party. Following General Dynamics' initiative with Jet Aviation, which saw many Dassault owners having their jets serviced at what was effectively a competitor-owned business, "we wanted to do something and get a better network worldwide to understand the market", he said. "Our mistake is we should have done it before."



Bombardier has been expanding extensively in Asia-Pacific as well as London

Service charge

Dassault's latest move has been to rebrand the former TAG Maintenance Services – which had retained its identity – Dassault Aviation Business Services (DABS). It stresses that DABS will continue to support "multiple OEM brands". The division – which includes the business jet MRO

operations of RUAG in Switzerland – runs operations in Geneva and Farnborough, as well as satellite sites in Basel, Lugano and Sion in Switzerland, Paris, Lisbon, Luton near London, and Luanda in Angola.

As with General Dynamics and Jet Aviation, Dassault has kept a very hands-off relationship with what is now ExecuJet MRO Services. As part of the acquisition, the MRO operation was spun off in 2019 from Luxaviation-owned ExecuJet, which remains in the aircraft management and charter and FBO space, and still shares several facilities with its former sister business. Somewhat confusingly for customers, the two separately owned enterprises are both still called ExecuJet.

However, Dassault has no plans to rename ExecuJet MRO Services, recognising the strength of its brand in its key markets, says its chief executive Graeme Duckworth, who was a co-founder of the business in South Africa in 1991. "What was most important to Dassault was our footprint," he says. "But they also recognised that it was only possible for us to remain profitable because we cater for other OEMs. We don't

favour any OEM over another."

In fact, ExecuJet MRO Services still caters for more Bombardier aircraft than any other make, says Duckworth. This is a legacy of a partnership early this century between ExecuJet and the Canadian airframer that saw the former company not only provide maintenance for Bombardier owners in the likes of the Middle East, Australia and South Africa, but act as its sales representative too. Although the venture formally ended in 2008, many relationships with operators have remained.

One of the facets of ExecuJet MRO Services that appealed to Dassault was its presence in emerging markets, where the French manufacturer had little existing MRO representation, says Duckworth. The business is expanding its operations in the United Arab Emirates and Malaysia, where it is building a new facility at Dubai's second airport, Al Maktoum International, as well as at Sultan Abdul Aziz Shah airport in Subang, near Kuala Lumpur.

Bombardier, by contrast, has largely focused on developing its own service centre network, with

recent major investments in new or expanded facilities in London, Singapore, Miami, and Melbourne, Australia. However, in 2020 it did buy out its partners in Berlin Brandenburg-based Lufthansa Bombardier Aviation Services – Lufthansa Technik and Luxaviation – to give it complete ownership of one of its key maintenance sites in Europe.

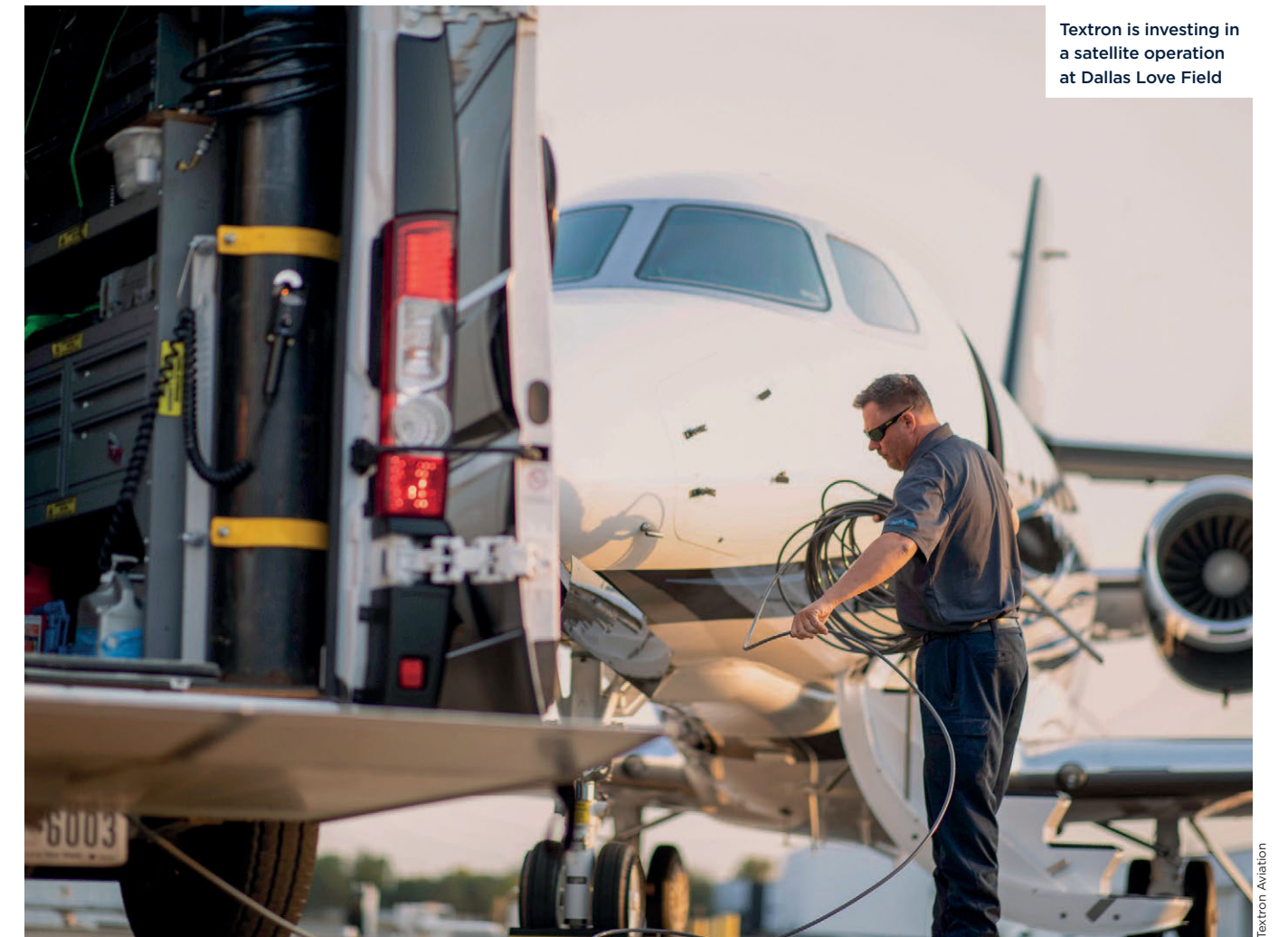
Bombardier had been due to unveil its new site at London Biggin Hill at a ceremony on 9 September – but the Queen's death forced the cancellation of the event. The hangar – capable of housing 14 Global aircraft – replaces a smaller, but still substantial facility at the business aviation airport, which Bombardier moved into six years ago, replacing previous Qatari tenant Rizon Jet. The new building is similar in size to a facility in Miami that it will open later this year.

Bombardier has also been active in Asia-Pacific, with a service centre at Melbourne's Essendon Fields Airport that opened on 28 September. The manufacturer says Australia is a crucial market with more than 80 Bombardier business jets in operation in the country. That followed the inauguration of a facility at Singapore's Seletar Aerospace Park. The latter quadrupled the size of Bombardier's former hangar to 26,000sq m (290,000sq ft), and is capable of supporting 2,000 jets annually.

Gulfstream, the other "big three" OEM, has also been active in its own right. After cutting the ribbon on a new European maintenance hub at London's Farnborough airport in 2020 – replacing its smaller predecessor at Luton – and another facility at Phoenix-Mesa Gateway in Arizona, the Savannah-based manufacturer will open this month a 15,000sq m customer support centre at Fort Worth Alliance airport, able to house nine large-cabin aircraft.

At the show today, Textron Aviation said it is unveiling later this year a 1,100sq m satellite service centre at Dallas Love Field to cater for operators of its Beechcraft, Cessna and Hawker brands. That follows a series of investments in its European service network this year, including an expansion of its Dusseldorf parts distribution facility and its Stuttgart line station, as well as the addition of a mobile service location in Madrid.

Embraer in June inaugurated two new hangars at its Sorocaba service centre near Sao Paulo, doubling its



Textron is investing in a satellite operation at Dallas Love Field

area to 40,000sq m. Three hangars are for MRO, while the third will be for aircraft parking. "There is consistent growth in executive aviation in Brazil and we see great opportunities for the service sector," says Johann Bordais, chief executive of Embraer Services & Support. Among the capabilities Sorocaba offers is the conversion of Legacy 450s into Praetor 500s.

Smaller OEMs have also been investing in MRO. Pilatus in September acquired Skytech and its sites in Maryland and South Carolina. Skytech had represented the Swiss brand for almost 30 years, and will continue as an independent firm with responsibility for servicing and sales of PC-24s and PC-12s – as well as other brands – on the East Coast. Pilatus, which already has a Colorado-based subsidiary, says owning Skytech will allow it to "expand its direct involvement in the US market".

Honda Aircraft announced in July the addition of four authorised

service centres to take its global network to 21 locations. Two new centres in the USA – Hillsboro Aviation near Portland and Mather Aviation in Sacramento, take the Japanese airframer's North American network to 12. Meanwhile, Honda has also added Dviation Technics in Selangor, Malaysia to be its exclusive service provider in Southeast Asia, and Signature TechnicAir in Bournemouth, UK.

It appears certain the trend by the OEMs to absorb more of the third-party global MRO infrastructure will continue, as will investments in in-house capabilities and capacity globally. With business aviation continuing on a high after the Covid-19 crisis, manufacturers appreciate more than ever the importance of fast, local, efficient and good-value aftermarket service to keeping the customer content, no more so than when it comes to aircraft on the ground (AoG) situations.

That is perhaps a crucial reason

the airframers have not tried to make their MRO chains – especially those they run under separate brands – exclusive. They acknowledge that MRO shops have to be profitable, and this invariably entails taking in third party work. However, they also realise the importance of getting a customer airborne again as quickly as possible, especially with an AoG, and this often means relying on facilities owned independently or by rival manufacturers.

Unlike franchised car dealerships, for example, when your \$50 million aircraft is unable to fly because of a technical glitch or part that needs replaced, there may not be a manufacturer-owned MRO in the same country, or even the same continent. Despite the rush to top-down integration, it is in everyone's interest – airframers and operators alike – that the MRO network remains as accessible as possible, regardless of the name over the door. ▶



Duckworth: We could only be profitable by catering for other OEMs

Dassault Aviation



Gulfstream's European hub at Farnborough



ExecuJet's new-build facility in Dubai

ExecuJet

Demand for the latest ultra-long range, large-cabin jets is strong. However, for the three airframers, convincing customers about the appeal of their products is not their biggest concern

Big jets... big challenges



Bombardier plans to have the Global 8000 ready for service entry in 2025

Jon Hemmerdinger

Divergence between supply and demand has left manufacturers of large-cabin business jets with flush backlogs – and plenty of problems that need solving.

In short, demand is through the roof but supply is stuck at ground level.

That is the reality facing companies such as Bombardier, Dassault Aviation and Gulfstream – and, indeed, their counterparts in the commercial aviation sector.

Despite the Covid-19 pandemic (or perhaps because of it) business jet makers have been rapidly taking

new orders for the \$70 million-plus machines that occupy the upper echelon of the private-travel market, adding billions of dollars to their backlogs. Demand has also prompted the three main players to up their games by rolling out even-

more-expensive models, including those that crack the 8,000nm (14,800km)-range barrier.

But such strong underlying dynamics belie real challenges. Owing to factors including Covid-19, inflation, economic slowdowns

and geopolitical tension, business jet manufacturers are coping with significant supply chain troubles. Those challenges have left them scrambling to maintain production at current levels and raised questions about their ability to meet demand.

Daily battle

“Manufacturers in the large-cabin segment will find themselves unable to execute to keep up with demand at a time of surging orders,” says analyst Brian Foley, founder of aerospace consultancy Brian Foley Associates. “There will be few alternatives for those wanting delivery of a new large-cabin aircraft in the near future.”

“There’s a lot of talk out in the market about interest rates, inflation, the stock market, recession potential and so on”

Jason Aiken Chief financial officer, General Dynamics

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Gulfstream's G800 boasts a maximum range of 8,000nm

Foley's observations are mirrored in recent comments made by executives at the airframers.

"Supply chain is definitely... an ongoing issue for the industry," Jason Aiken, chief financial officer of Gulfstream parent General Dynamics, said during a 27 July earnings call. "It's a daily battle." "Dealing with supply chain pressure is a new normal," Bombardier chief executive Eric Martel said on 4 August, also during an earnings call. "Over the last few months, we have been very active in... assessing where it makes sense to repatriate or consolidate small work packages or parts, to ensure our production line can operate as efficiently as possible."

The airframers join companies across aerospace in facing parts shortages. Insiders say pandemic-disrupted logistics networks (and China's lockdowns) are to blame, as are a lack of enough skilled workers, and economic sanctions against Russia imposed by Western powers in response to Moscow's February invasion of Ukraine. The aerospace industry shrank rapidly in 2020 because of the pandemic and has struggled to regain footing.

As a result, Foley notes, business aircraft manufacturers are largely keeping 2022 production output flat at 2021 levels. They have far to go before returning to pre-pandemic

production rates.

Bombardier, for example, delivered 49 aircraft in the first half of 2022 and anticipates ending the year with more than 120 deliveries, including about 40 of its flagship Global 7500. Similarly, the company delivered 120 aircraft last year. By comparison, the Montreal manufacturer delivered 142 business jets in pre-Covid 2019.

Martel says suppliers in various areas of the chain are struggling to ramp up. He also cites "risk" associated with the supply of engines. Executives at other manufacturers have also recently highlighted such equipment troubles, including Boeing chief executive David Calhoun, who has cited engine shortages as a central factor limiting 737 production.

Martel insists Bombardier is working through supply shortages. He says the company aims to increase production by 15-20% in 2023, which would equate to somewhere around 140 aircraft deliveries.

"We have been extremely meticulous in planning, in detail, every ramp up, taking into account that we don't want to have too much backlog - or not enough," Martel says. "On top of it, we are taking great note of what the strains in the supply chains are today."

In a proactive move, Bombardier this year acquired Schriilo, a

California company that produced a Global 7500 wing component. Schriilo had been struggling financially - so to prevent a shortage, the airframer simply bought the firm, including its machinery, intellectual property and inventory. Schriilo's staff are now Bombardier employees, it says.

Gulfstream's 2022 delivery target mirrors Bombardier's. The Savannah airframer delivered 47 jets in the first half of 2022 and expects to hand over roughly 123 aircraft this year, nearly flat from its 119 deliveries in 2021, General Dynamics has said. Those figures remain significantly depressed from 2019, when Gulfstream handed over 147 aircraft.

Supply-driven production constraints are at work, say executives. In January, General Dynamics chief executive Phebe Novakovic said Gulfstream was dealing with short supply of wings, which it makes in-house.

Gulfstream has, meanwhile, worked through other complications. In May, the US Federal Aviation Administration (FAA) significantly limited G500 and G600 operations, prohibiting the jets from landing in wind speeds exceeding 15kt (28km/h) and wind gusts of more than 5kt. The move was in response to two hard landings during windy conditions caused by erroneous activation of the jets' angle-of-attack (AoA) "limiter" function, which is designed to prevent stalls.

Development delays

Gulfstream developed a software fix which the FAA and European Union Aviation Safety Agency approved in mid-September. But the problem has trickled into its delivery stream.

In the second quarter, the airframer handed over only 22 aircraft. It had planned to deliver four more - all G500s/G600s - in the period, but customers deferred taking those aircraft pending "removal of the FAA wind directive". Gulfstream did, however, deliver nine G500s/G600s despite the operating restrictions.

82

Dassault's backlog of Falcon-family orders at the end of June 2022, equivalent to \$4.3 billion in value

The issue also has affected Gulfstream's development and certification of its flagship G700 and G800 ultra-long-range jets. General Dynamics had in April warned about possible delays to those certification programmes, citing FAA scrutiny of software.

Then, in July, Aiken said Gulfstream had reassigned "flight sciences engineering resources" from the G700 programme to work on resolving the G500/G600 AoA problem. As a result, the G700/G800 certification delay has "become a reality", he said.

Gulfstream now expects the G700 will be certified by mid-2023, with the G800 to follow about six months later. Previously, it was aiming to achieve the milestones by the end of 2022 and mid-2023 respectively. The company's first test G800 made its flight debut in late June, before being flown to the UK to attend the Farnborough air show in mid-July.

Dassault is facing similar supply chain and production hurdles. In July, the French company cited Russia's war in Ukraine and lingering Covid-19 effects as causing inflation and "uncertainty over the supply of energy, electronic components and materials".

The company, which also has a large defence aviation business, described the supply chain as "weakened". It called out shortages

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Vice President Global
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Supply chain issues could impact late 2025 schedule for arrival of Dassault's in-development Falcon 10X



Dassault Aviation

of raw materials, including aluminium and titanium. Sanctions against Moscow have thrown the titanium market into disarray, as Russia had been among the world's leading suppliers.

"We need to safeguard existing sources, or urgently find reliable alternatives. We are endeavouring to build up inventories to secure production for the coming years," Dassault added. "We have placed orders, but we will need to monitor physical deliveries over the next few weeks."

Amid such pressure, the airframer delivered 14 Falcon-series jets in the first half of 2022 - up significantly from six shipments in the first half of the previous year.

For full-year 2022, Dassault expects to deliver 35 Falcons. That would be up from 30 examples handed over last year, but down from 40 in pre-pandemic 2019.

The airframer has also been dealing with company-specific challenges on top of industry and

geopolitical troubles.

"Dassault missed the order surge" of recent years, says Foley, after cancelling development of its 5,200nm-range Falcon 5X in 2017. It shuttered the programme following problems with the type's Safran Aircraft Engines Silvercrest turbofan.

Seller's market

Dassault replaced the 5X with the 6X, launched in 2018, but the debacle put the company behind competitors, Foley says. The 6X, with 5,500nm of range, competes in the same segment as Gulfstream's G500 and G600, and Bombardier's Global 5500 and 6500.

In May, Dassault announced a six-month delay to the 6X's service entry, to mid-2023, blaming supply chain trouble.

Production constraints aside, business jet makers are having no trouble at all selling aircraft.

Dassault logged orders for 41 Falcons in the first half of 2022, up from 25 in the same period last year.

The company ended June with 82 Falcons in its backlog, worth €4.3 billion (\$4.3 billion), up from a €2.9 billion backlog with 53 orders one year earlier.

Bombardier's backlog surged by 37% in one year, to reach \$14.7 billion at the end of June. It holds orders equating to two years of production, Martel says.

Demand, he adds, has been particularly strong from US customers. Bombardier also sees "improving" sales activity from Europe despite the Russia-Ukraine war, and has seen reviving demand from the Asia-Pacific region following a two-year Covid-induced slowdown. Broadly, Martel calls the pandemic an "accelerator for people moving towards private jet" travel.

Similarly, General Dynamics' aerospace business (which is anchored by Gulfstream but includes aviation services provider Jet Aviation) closed June with a backlog worth \$18.8 billion, up 39% in one year.

Amid roaring demand, the large-cabin competitors have continued bettering each other by rolling out larger and longer-range models.

Gulfstream set a new range standard in October 2021 when it launched the G800, with an advertised maximum range of 8,000nm.

Not to be outdone, Bombardier shot back in May by revealing plans to bring the long-promised Global 8000, also with 8,000nm of range, to service in 2025. The platform will be a modified version of the Global 7500, which has 7,700nm of range.

Dassault is also targeting the ultra-long-range market with its in-development Falcon 10X, a 7,500nm-range aircraft pegged for a late 2025 service entry. But in July, Dassault warned of delays, saying the 10X "calendar is tight because of difficulties related to Covid, with its impact on the supply chain".

Still hot

There is some evidence the large-cabin segment has cooled of late, amid inflation, a US recession and stagnant economic growth in Europe, says aerospace analyst Richard Aboulafla of AeroDynamic Advisory.

"It was white hot. Now it's just hot," he says. "It has eased a little bit."

But if souring economic conditions are worrying the leaders of business jet manufacturers, they are not showing it. Martel does not foresee a spike in order cancellations and says Bombardier is "in a great position" to weather a potential economic slump.

General Dynamics' Aiken agrees. "There's a lot of talk out in the market about interest rates, inflation, the stock market, recession potential and so on," he said in July. "We have not yet seen any impact of that, in terms of our order pipeline."

"We remain very confident and steadfast in our outlook for the next couple of years," he adds. ▶



AirBeamImages

G500 (pictured) and G600 deliveries were slowed due to FAA operating restrictions

The Hub of Business Aviation



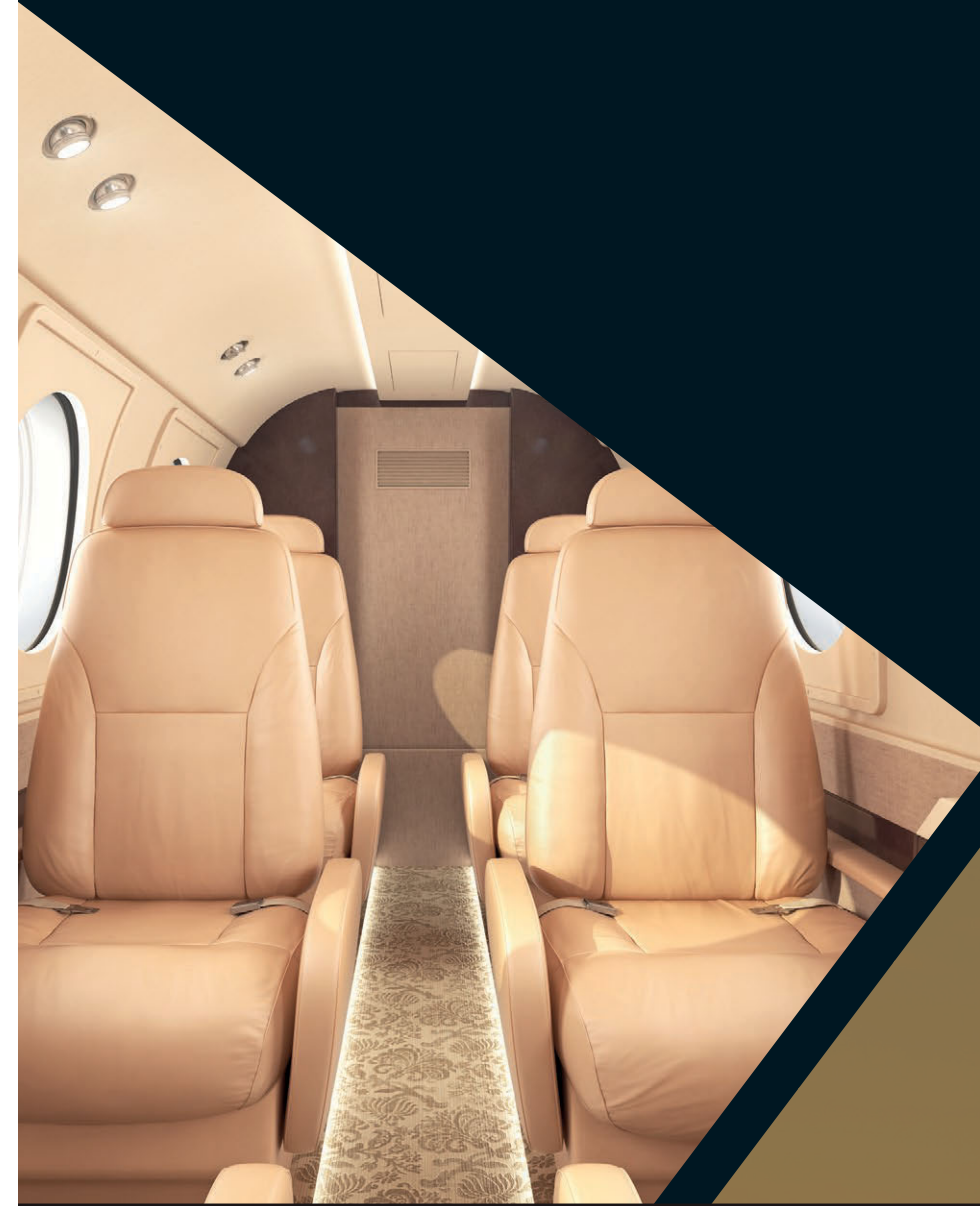
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We profile two aircraft sure to catch the eye on the static display – Gulfstream’s G700 and Bombardier’s Challenger 3500

Sustainability and disruptive technology will be high on a packed discussion agenda at this year’s event

Big two contenders



Gulfstream 700

One of two new ultra-long-range types from Gulfstream, the G700, will be a highlight of the manufacturer’s static display. Delivering a range of 7,500nm (13,890km) at Mach 0.85, the aircraft boasts, Gulfstream claims, the most spacious cabin in the sector. The Savannah-based airframer is developing the G700 alongside the even-longer-range G800 – its capability of 8,000nm at M0.85 will be an industry record. Gulfstream expects the G700 to enter service next year, with the G800 following six to nine months later. In September, engine-maker Rolls-Royce announced it had achieved European certification for the Pearl 700 that powers both types.

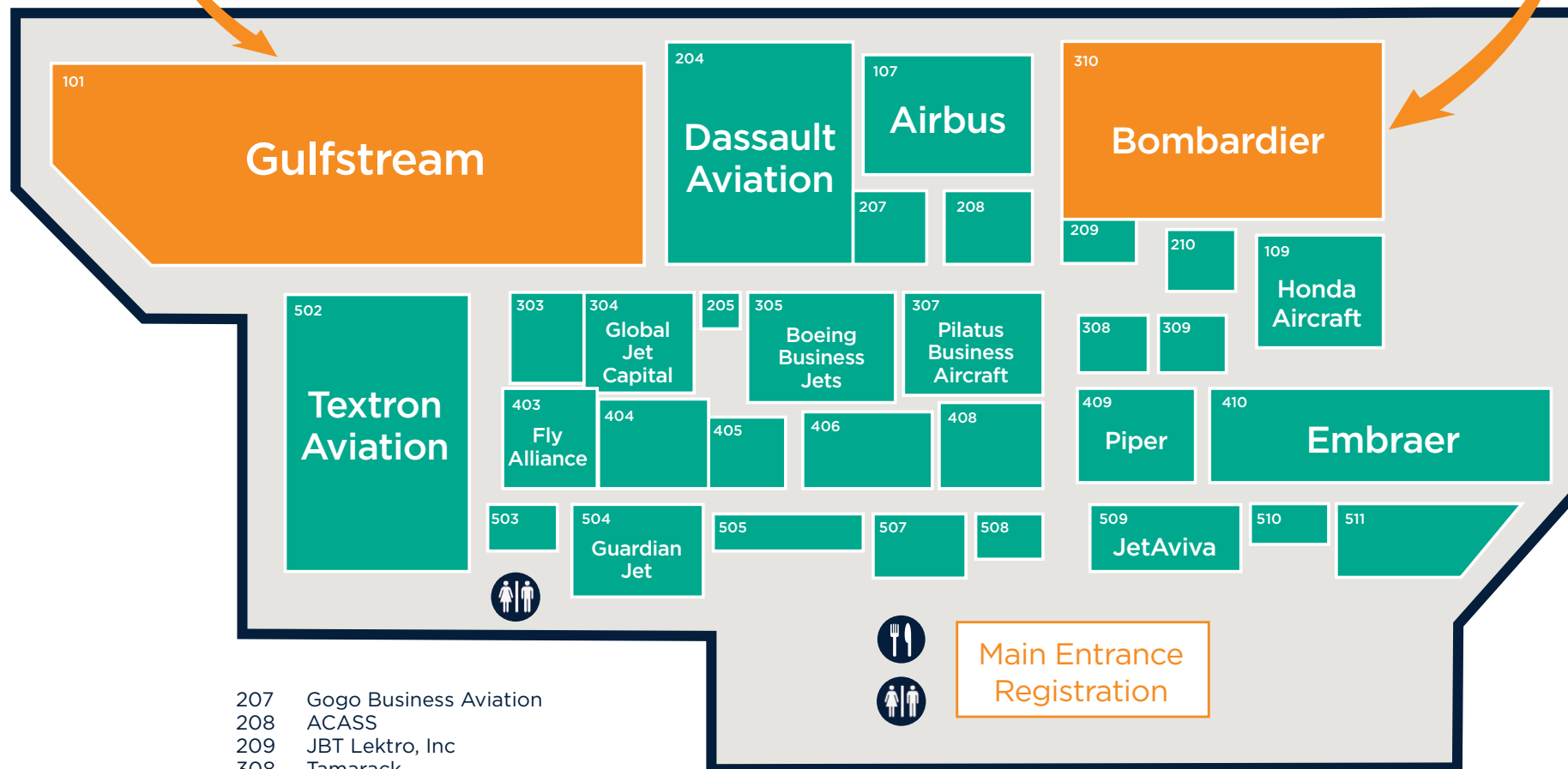


Challenger 3500

Bombardier is displaying the Challenger 3500 destined for its launch owner after confirming on 20 September that the type has entered service. Bombardier announced at last year’s show that long-term customer Les Goldberg would be taking the first example of the latest version of the super midsize jet, an update to the Challenger 350. The type, launched in September 2021, features a number of features previously standard only on larger Globals, including the Nuage seat. Just ahead of last year’s NBAA, Bombardier announced a firm order from an undisclosed customer for 20 Challenger 3500s.

STATIC DISPLAY OF AIRCRAFT AT ORLANDO EXECUTIVE AIRPORT

Note: Details correct at the time of going to press



- | | |
|--|--------------------------|
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| 208 ACASS | 503 SmartSky Networks |
| 209 JBT Lektro, Inc | 505 Cirrus Aircraft |
| 308 Tamarack | 507 Tecnam |
| 510 Daher Aircraft | 508 Aviat Aircraft |
| 511 Nextgen Aviators by Dynamic Aviation | |
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Talking about tomorrow

Murdo Morrison

This year’s convention has returned to its alternate-year home, Orlando, for the first time since 2018 after the Covid-19-forced cancellation of the 2020 edition. This is the first NBAA BACE in three years that will be fully open to overseas exhibitors and attendees. While the return of the show in October 2021 drew a large and enthusiastic domestic audience, only a handful of foreign visitors made it to Las Vegas because the USA was still imposing border closures.

The industry’s push to become more sustainable and the advanced air mobility (AAM) sector are major themes of this year’s convention, as they were at its European counterpart EBACE in May. While disruptive propulsion technology will doubtless be a topic of discussion, sustainable aviation fuel (SAF) remains the best short-term hope for the industry in its drive to cut its carbon footprint. However, as in Europe, the fuel remains expensive and in short supply at airports.

In August, President Joe Biden signed into law the Inflation Reduction Act, which includes a tax credit for producers of SAF, a move NBAA welcomes. “We have long advocated for this blenders’ tax credit as a vital step to fulfilling our industry’s pledge to achieve net-zero CO2 emissions,” says president and chief executive Ed Bolen. “Implementation of this credit marks genuine progress towards increasing



sessions covering everything from employment matters and aircraft maintenance, to operations and safety and sustainability. Things kick off, as always, at 08:30 tomorrow with the keynote session, featuring this year a famed NASCAR driver, one of the USA’s leading scientific commentators, and the two men who run the major aerospace regulators on both sides of the Atlantic.

Dale Earnhardt Jr (pictured top) won back-to-back Infinity Series titles in 1998 and 1999. He is the third generation of his family to race in the championship, following his father and grandfather. He amassed 26 career victories including the 2004 and 2014 Daytona 500s. Joining him will be Neil deGrasse Tyson (pictured bottom), an acclaimed astrophysicist, who will “present compelling perspectives about America’s reach for distant horizons”. The author of a number of books, he regularly sells out theatres with his talks.

Completing the day one keynote panel are acting administrator at the Federal Aviation Administration Billy Nolen, and European Union Aviation Safety Agency executive director Patrick Ky (bottom, left). Nolen is a former airline captain and US Army pilot, who joined the FAA in January after spells as a senior executive with WestJet Airlines and American Airlines. Ky has run EASA since 2013, his latest role in a long career that spans posts at a number of French and European aviation bodies.

Sessions later in the day include, at 11:00, a discussion on the climate risks facing business aviation, and, at the same time, a chance to ask questions of a panel comprising senior leaders from the FAA and National Transportation Safety Board. At 13:00, appropriately lunchtime, there is a workshop on food safety. It will look at what flight departments can do to protect food they serve passengers and crew.

Finally, at 14:00 join NBAA colleagues for a coffee social at Booth 1289, featuring book signings with flying school legends John & Martha King and heroine captain of Southwest flight 1380 Tammie Jo Shults. The first 100 attendees get a free signed copy of both books. **Full details of all tomorrow’s events and those throughout the convention are on the BACE section of the NBAA web site.**

SAF production, promoting greater availability, and reducing costs to end users.”

The USA is meanwhile making strides towards creating the operational and regulatory environment for a new breed of electric vertical take-off and landing (eVTOL) air taxis, with Congress recently passing the Advanced Aviation Infrastructure Modernization Act. The legislation authorises funding for so-called vertiports and other public transport facilities to support AAM operations. Two workshop sessions at BACE focus on the AAM opportunity for the business aviation sector.

The Orlando event will also feature the Emerging Technology Zone, highlighting AAM aircraft and technologies. “These platforms hold the promise to revolutionise short distance, zero-emissions transport in the near future,” says NBAA director of aircraft displays Joe Hart. “NBAA-BACE, like business aviation, always has an eye to the horizon. We’re excited about showcasing these



promising emerging technologies that point our industry’s way to a bright future.”

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