

# EBACE Convention News

June 2021

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## A GREEN FLIGHT PLAN FOR BIZAV

by Chad Trautvetter

If it weren't for the pandemic, EBACE 2021 would have been held in person last month and the prevailing topic would have been sustainability. Still, this issue was reflected in the virtual EBACE Connect, with six of its 11 sessions having all or a major portion of their discussion focused on sustainability in business aviation. Additionally, a virtual European Business Aviation Sustainable Aviation Fuel (SAF) Summit was held in late April as a run-up to EBACE Connect.

Though Covid-19 is still an immediate concern, the business aviation community's next biggest hurdle is the environment. In fact, the European Green Deal seeks to make Europe—which has the world's

second-largest business aircraft fleet—carbon neutral by 2050. And the U.S.—the largest business aviation market—could be close behind in setting emissions goals.

Fortunately, business aviation leaders saw this coming more than a decade ago. In 2009, NBAA, EBAA and other organizations sought to reduce business aviation's carbon emissions via the Business Aviation Commitment on Climate Change. This initiative pledged a 2 percent improvement in efficiency per year from 2010 to 2020, with carbon-neutral growth from 2020 onward and a 50 percent reduction in carbon emissions by 2050.

“Business aviation has long been focused on emissions reduction, and to date the industry

has made enormous progress,” NBAA president and CEO Ed Bolen told *AIN* as EBACE Connect was winding down. “Looking to the future, SAF is the cornerstone to achieving our emissions goals as both a solution for today and the bridge to the emission-reducing technologies of tomorrow.”

Sustainability topics covered at EBACE Connect included SAF and other alternative fuels such as hydrogen, electric aircraft, new technology, and carbon credits. You'll find summaries of these sessions and stories about a range of other topics affecting the business aviation community in Europe and elsewhere in this special edition of *EBACE Convention News*. ■

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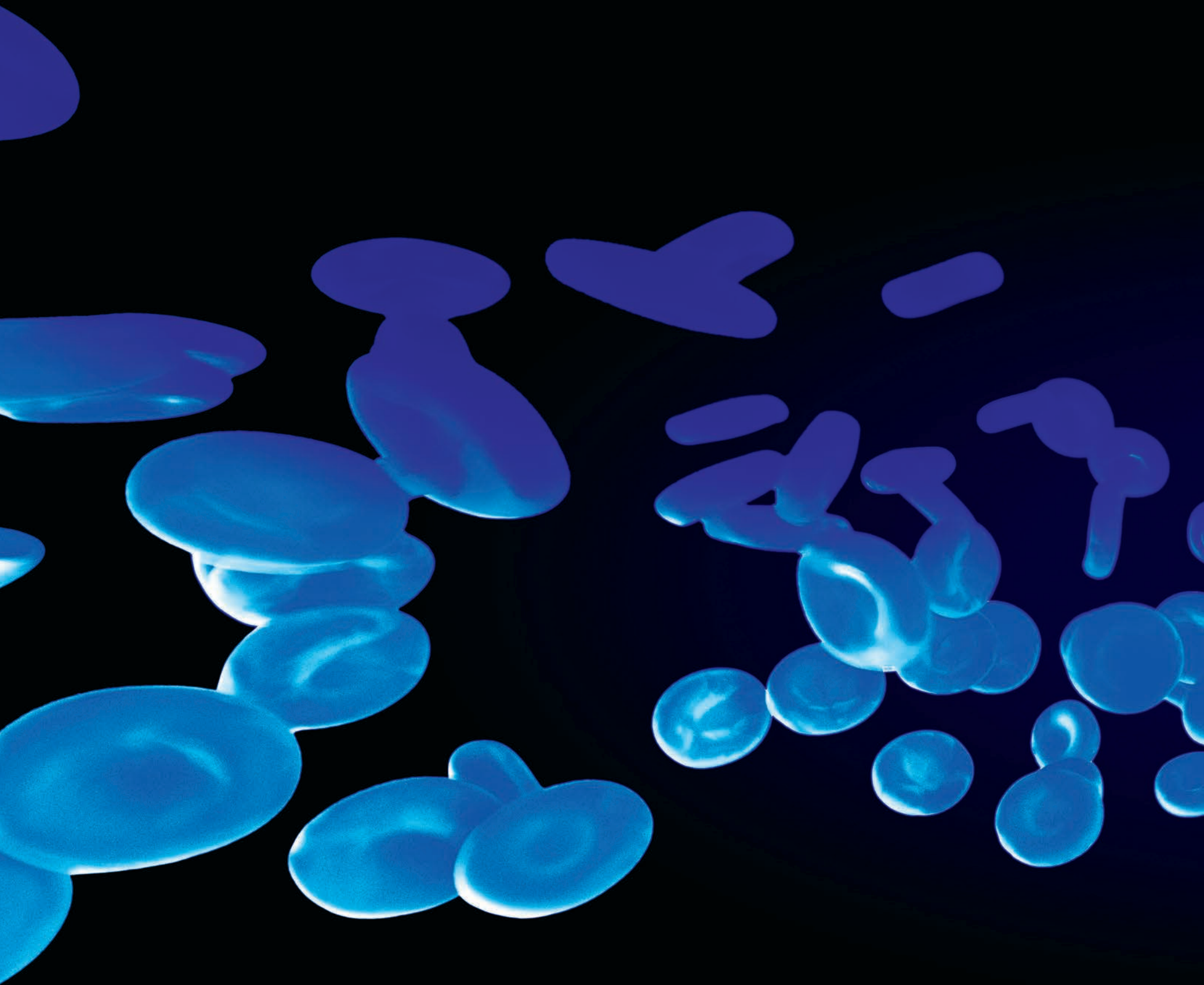
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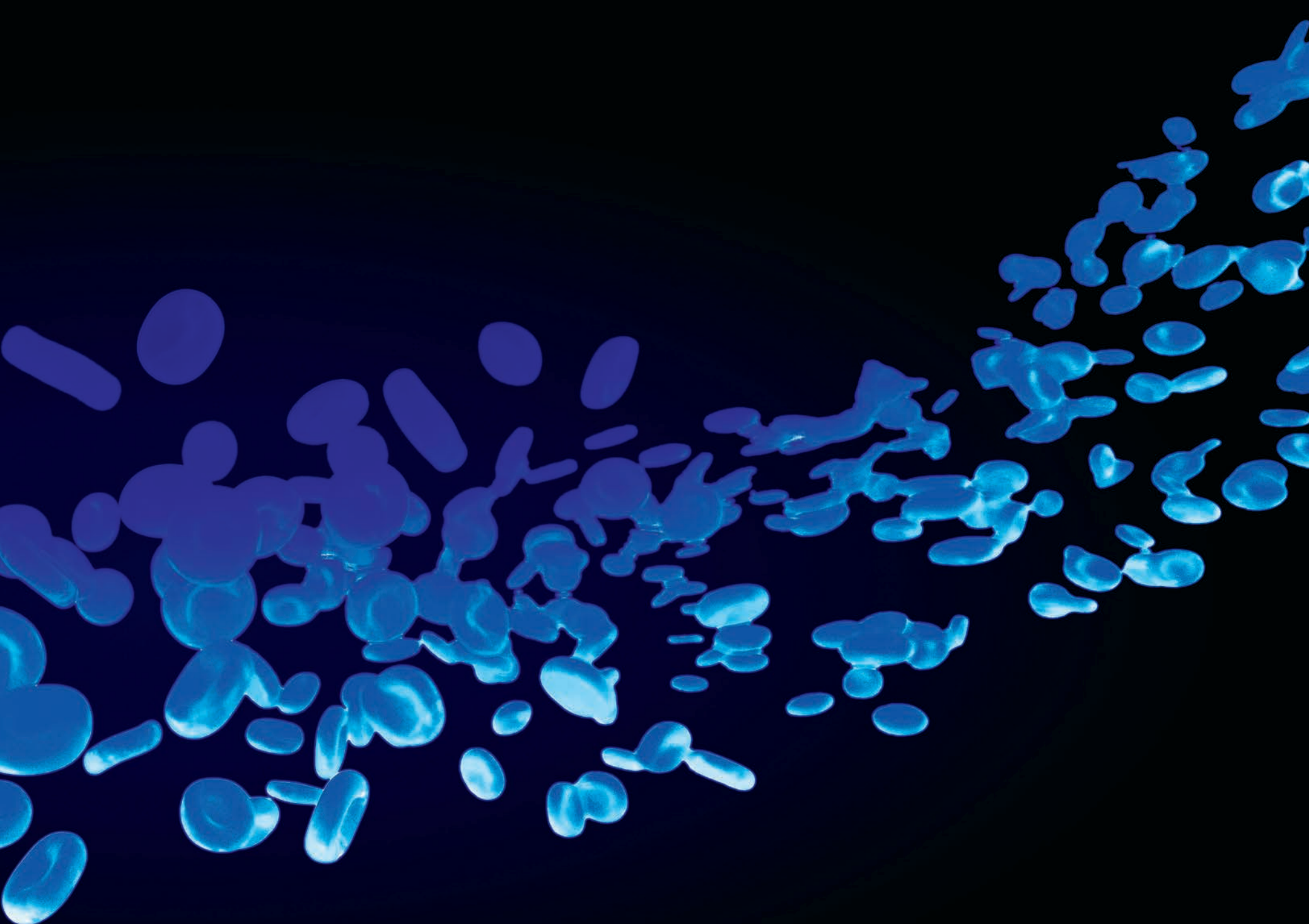
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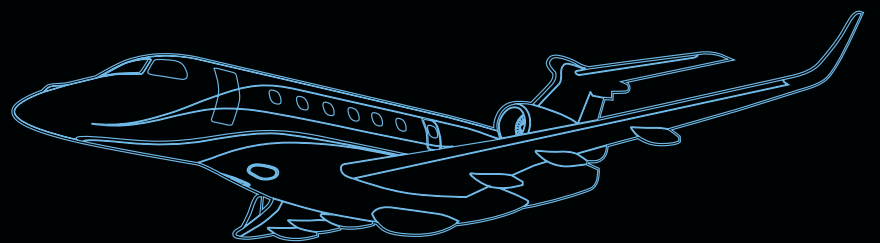


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BY EMBRAER



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# Lindbergh pushes bizav's environmental leadership

by Charles Alcock

In the May 18 keynote presentation at EBACE Connect, aviator and philanthropist Erik Lindbergh challenged the business aviation sector to step up its leadership role in making the industry more environmentally sustainable. He told NBAA president and CEO Ed Bolen that the Charles and Anne Morrow Lindbergh Foundation will roll out a series of prizes to incentivize innovation towards carbon neutrality through its ForeverFlight initiative, which is backed by the X Prize Foundation and its \$100 million funding from Elon Musk.

“We will have multiple prizes to overcome barriers [to its net and true zero-carbon goals], and we’re not sitting in the back waiting for something to happen that we might not like,” said Lindbergh. “Europe is leading the way in sustainability issues and we in the U.S.

need to move in that direction.”

Lindbergh also confirmed his intention to mark the centenary of the first solo flight across the Atlantic in 1927 by his grandfather, Charles Lindbergh. He told the EBACE Connect audience that he aims to make the flight from New York to Paris in a low- or zero-carbon aircraft, adding that a hybrid-electric model will probably prove to be the most feasible option.

The EBACE Connect keynote session also featured advocacy for electric aircraft and new fuels and propulsion systems. Lindbergh, who is chairman of hybrid-electric propulsion pioneer VerdeGo Aero, encouraged business aviation executives to be part of this new wave.

“The advent of electric distributed propulsion and the ability to put thrust anywhere on an airframe lets you have



Erik Lindbergh (right) addressed the keynote session of the EBACE Connect event with NBAA president and CEO Ed Bolen.

completely new missions like eVTOL and eSTOL,” he maintained. “Over the next five to 10 years, these new aircraft will change the way we move around the planet, starting with short and medium-range missions.”

While the new aircraft are working their way towards service entry, Lindbergh endorsed Bolen’s call for business aviation to continue to be at the vanguard for adopting sustainable aviation

fuels (SAF). “There will be new biofuels, and potentially hydrogen and other alternative fuels like ammonia but these are new and unproven,” he commented. “SAF has shifted from using palm fuels and now companies are taking fuel stocks that are more sustainable. This is the bridge that will get us to these other fuels and crazy new batteries, so we have to use what we have now and slowly transfer to what’s coming.” ■

# Scientists leave no stone unturned for sustainability

by Charles Alcock

What will it take to make aviation more environmentally sustainable? Just about anything and everything seemed to be the answer from a May 19 EBACE Connect session on the issue.

The EBACE audience heard how Airbus has scientists with its BlueSky team tapping microbiology for techniques such as using microbes and enzymes to “brew” new aircraft fuels using waste that can’t otherwise be cleanly disposed of. According to senior research project leader Patricia Parleviet, the European

aerospace group is leaving no stone unturned in the quest for sustainability, with teams also working in fields such as quantum computing and sensing, as well as biomimicry (looking for inspiration from birds and insects). The one propulsion technology she did rule out was nuclear energy due to the harmful waste it generates.

The Munich, Germany-based Airbus scientist’s message was closely echoed by other speakers, who called on business aviation to channel circular economic

principles to seek progress that aims to support sustainability at every stage. With this in mind, Anita Sengupta, a former NASA engineer who has launched a hydrogen fuel cell developer called Hydroplane, argued that electric batteries for aircraft are not “an evolutionary path” because of how they are produced and disposed of at the end of their useful life.

California-based Hydroplane is working on a new hydrogen fuel cell system to power aircraft operated on shorter regional routes. According to Sengupta, her team could be ready for an initial flight test on an unspecified aircraft within 18 months, and could potentially be available to start operating “in a European island nation” by around 2023 or 2024.

Sebastiano Fumero, an advisor with the European Commission (EC), said that organization has launched a consultation with alternative fuel producers to encourage new ways to increase production rates for sustainable aviation fuel (SAF). “With what we hope will be a fast recovery [from Covid] for the industry, it will be hard to make enough for aviation,” he said.

According to Fumero, the EC’s new public-private joint undertaking is appealing for new ideas and partners not only from within aviation but also from the energy sector and other industries. He said that European regulators also are considering plans to require a minimum percentage of SAF to be blended with jet-A. ■

## Shell now IBAC's first European PS3 enrollee

Shell Aircraft has become the first operator in Europe to enroll in the International Business Aviation Council’s (IBAC) new International Standard for Business Aircraft Operators (IS-BAO) Progressive Stage 3 (PS3) program. IBAC launched the PS3 option in 2020 after a beta team of operators designed and tested the program over two years.

PS3 allows operators to access the Stage 3 safety system, share data, and take advantage of opportunities to mentor and share best practices. IBAC calls the one-day Progressive auditing process—featuring a credentialed Progressive auditor based in the operator’s region—a key benefit.

Shell Aviation became IS-BAO Stage 1 in 2004 and progressed to Stage 3 in 2007. Shell Aircraft operates three Dassault Falcon 8Xs based in the Netherlands and it offsets its emissions using carbon credits.

“We are so glad to see this new PS3 concept come together and excited about integrating it into our department,” said Shell director of corporate aviation, Stan Medved. “Sharing important safety data and spending more time with the progressive auditor will provide more learning opportunities on both sides, providing a more collaborative environment that will allow us to further strengthen our safety culture.”

G.P.



EBACE Connect’s sustainability session was moderated by Rohit Jaggi (top left), deputy editor of the Financial Times. Participants included Airbus scientist Patricia Parleviet (lower left), Hydroplane CEO Anita Sengupta (top right), and European Commission advisor Sebastiano Fumero (lower right).

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Faradair Aerospace's Bio Electric Hybrid Aircraft will be able to carry up to 18 passengers or carry cargo on utility missions.

## Advanced air mobility pioneers present to bizav

by Charles Alcock

The business aviation community got a virtual introduction to some of the pioneers of so-called advanced air mobility (AAM) during an EBACE Connect session on May 18. Speakers from four electric aircraft developers explained how their plans to transform the air transport business model have made strong progress while other aviation sectors have been held back by the Covid-19 pandemic.

In the UK, Faradair Aerospace is about to complete the design of its Bio Electric Hybrid Aircraft (BEHA) and start structural engineering work. Over the past eight months, the company has added major new partners, including propulsion providers Honeywell and MagniX, as well as expanded its workforce at a new headquarters at Duxford airfield.

“We are going to see a democratization of the regional air travel model,” CEO Neil Cloughley told the EBACE Connect audience. “Covid has brought a huge opportunity. We’re seeing a lot more interest in sustainability and new business models because technology is proving itself [in terms of value to society].”

According to Cloughley, MagniX’s Magni500 electric motors will have achieved certification in time for the first full-scale BEHA prototype to start test flights in 2024. Honeywell is supplying a turbogenerator that will be able to run on sustainable aviation fuel and/or jet-A.

The company hopes to achieve Part 23 type certification by the end of 2026 and by 2030 expects to have at least 300 of the 18-seat aircraft in commercial service, with a mix of passenger and cargo missions.

Cloughley said operators will be able to reconfigure the interior for these different roles in little more than 15 minutes.

Pipistrel chief technology officer Tine Tomazic revealed plans for three different versions of the Slovenian company’s planned Miniliner family of electric aircraft. The standard model would carry a single pilot and up to 19 passengers and be able to operate from 2,600-foot runways, flying four 220-mile missions on a single charge (with a 45-min diversion margin for each trip).

“It is like a minibus and will have 40 percent lower direct operating costs than today’s commuter aircraft, and it will be much quieter,” said Tomazic. He argued that by taking the AAM approach, aviation can be far more productive, becoming “more like the fast-food industry than a Michelin-starred restaurant that is still peeling potatoes with a scalpel.”

Later this year, Pipistrel will begin flight testing its new four-seat Panthera 152 aircraft. This program is being supported by the European Union’s Mahepa program and will start operating with hybrid-electric propulsion before transitioning to all-electric power at a later date.

From California, Dan Dalton, v-p for global partnerships with Wisk Aero, reported that progress with the startup’s Cora two-seat, autonomous aircraft has been boosted with expertise supplied by Boeing and its Aurora Flight Sciences subsidiary. Boeing, which co-owns the Wisk joint venture with Kitty Hawk, last year said it would wrap up its Boeing Next technology incubator project, which had been working on several eVTOL designs. Evidently, this move has freed up expertise that is now being redirected to Wisk’s program.

Dalton acknowledged that Wisk likely will not be the first to start commercial

air taxi services, mainly due to its insistence on going straight to autonomous operations. He also confirmed that the company will soon unveil plans for what it calls its “sixth-generation” aircraft, and this is expected to be a larger, longer-range eVTOL model.

Meanwhile, flight testing of the Cora is continuing in New Zealand, where Dalton said Wisk is enjoying a high degree of cooperation from the government, industry partners such as Air New Zealand, and local communities. This is allowing it to evaluate the autonomous, all-electric model in controlled airspace alongside other aircraft.

Germany’s Volocopter, which on Monday announced its own plans for a new eVTOL model called the VoloConnect, also participated in the EBACE Connect session. CEO Florian Reuter said that the multirotor architecture of its aircraft is low risk from a certification point of view because its 18 rotors, each with their own electric motor, provide a high degree of safety redundancy.

According to Reuter, Volocopter primarily conceived its eVTOL aircraft to be operated autonomously but took a strategic decision to put a pilot on board to fast-track commercial operations, requiring the addition of a control stick. “When we first talked with the regulators, they asked how we could be sure that flight testing would be safe and we were able to show them failure modes from hundreds of flights [made with the autonomous control system] to demonstrate how the [flight] computer dealt with them,” he explained. “This gave them a lot of comfort before we even put a pilot on board, so there is definitely a paradigm shift [towards autonomy].” ■

## ACH deals with challenging but resilient market

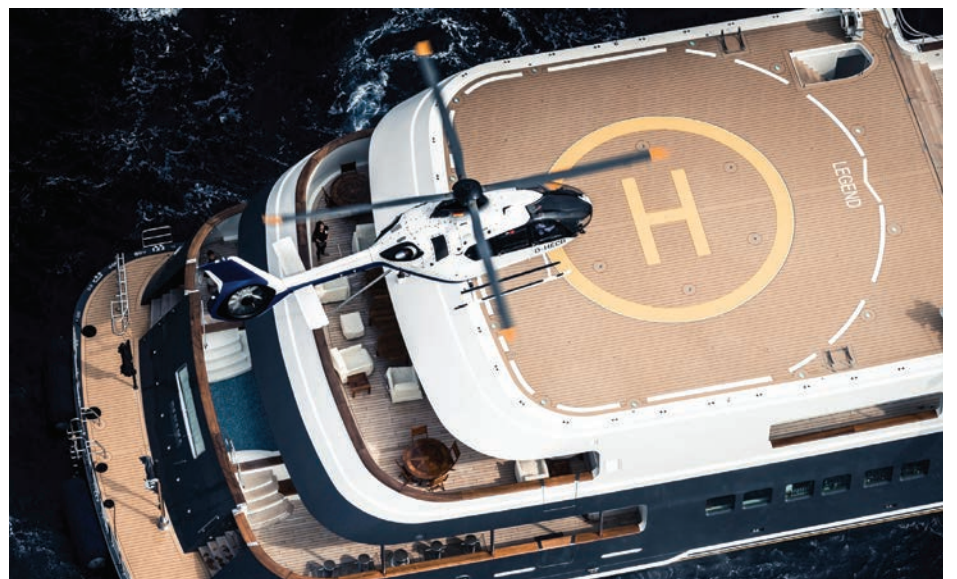
by Jerry Siebenmark

While Airbus Corporate Helicopters (ACH) had to navigate the global pandemic in 2020, the company managed to “maintain a good level of bookings” by netting 62 orders for the year, which is down by about 10 percent from the previous two years, said Frederic Lemos, head of ACH. Even with the softened demand, that means “we’ve been grabbing market share from the competition,” added Lemos, who reviewed the company’s business activities on the eve of May’s EBACE Connect.

While the pandemic has prevented many face-to-face meetings with customers because of travel restrictions, the personal and business aviation sector “has demonstrated a great resilience.” With 28 Airbus Helicopters customer centers around the world, “we’ve been able to maintain a certain level of proximity with

our customers and still continue to accompany those wanting to acquire a helicopter.”

Lemos noted that the company has developed a 70 percent share in the yachting market with its ACH135 and ACH145 models primarily satisfying that niche. Demand in that market should remain robust, he added, as 78 yacht projects with helidecks are in the pipeline. “Yachting as a whole has also been pretty much resilient,” he added. “Customers [are] looking more and more to isolate on their yachts...and it’s probably what they will do next summer, trying to have more privacy and not mixing with large crowds.” ACH is considered “a trusted adviser” in the yachting market, a reputation developed through interactions in the early stage of yacht construction with designers, manufacturers, and customers, he said.



Airbus Corporate Helicopters has developed a 70 percent share in the yachting market with its ACH135 and ACH145 models primarily satisfying that niche.

Lemos also briefly reviewed the ACH160 program. While the all-composite intermediate twin received EASA type certification in July, its FAA type certification has been hampered by Covid. “It’s been even more difficult because of these travel restrictions to be

able to exchange and progress and make the necessary flight tests,” he said, “but we are in this mode of delivery progress and certification and will indeed this year deliver the aircraft.” He said the first U.S. copy of the ACH160 will go to a customer in New York. ■





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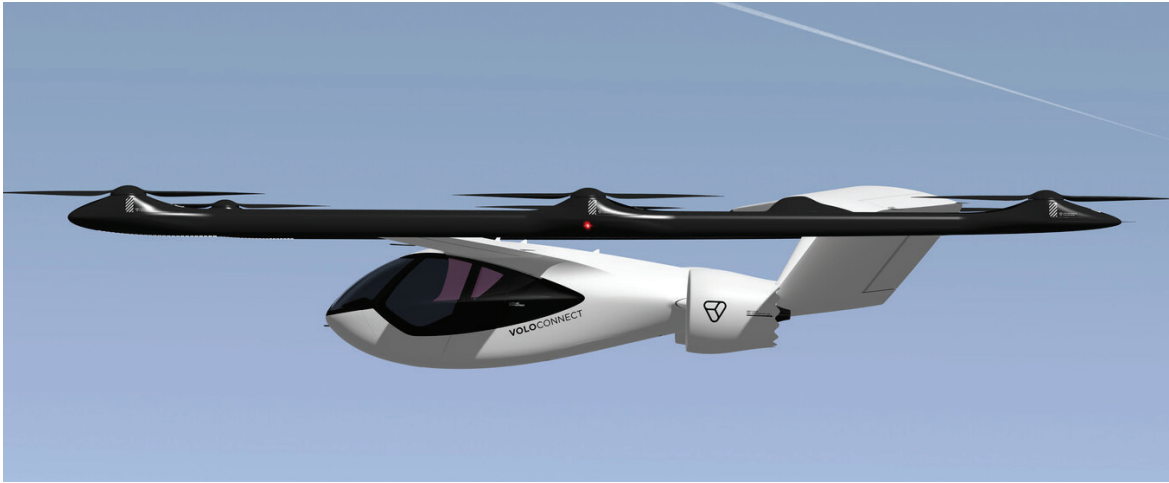


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Volocopter's new VoloConnect eVTOL aircraft will have a range of up to around 60 miles.

## Volocopter launches larger, longer-range eVTOL aircraft

by Charles Alcock

Volocopter has announced plans to bring a larger, longer-range eVTOL aircraft into operation by 2026 to serve markets beyond those addressed by its VoloCity model. The all-electric VoloConnect will have four seats, with a range of up to 60 miles and a cruise speed of 110 mph (rising to a top speed of around 155 mph).

Unveiling the new lift-and-push concept during the EBACE Connect event on May 18, the German company said its engineering team, led by chief engineer Sebastian Mores, has been working on the design for more than two years and has filed

several patents for the technology used. The aircraft features a wing connected to a V-shaped tail by a pair of parallel beams supporting six sets of electric motors and rotors. To the rear of the fuselage, there is a pair of ducted fans to support cruise flight.

Like the two-seat VoloCity, Volocopter intends to certify the VoloConnect under EASA's new Special Conditions-VTOL rules. The VoloCity is limited to a range of just 22 miles and a speed of 60 mph. The company is also developing an autonomous freight-carrying version called the VoloDrone, which will have the same performance in terms of

range and payload. All three models will feature batteries that can be quickly swapped between flights, but the company has yet to demonstrate this capability.

"We can now cover all segments of the \$290 billion urban air mobility market," Volocopter CEO Florian Reuter told reporters. "We will offer a seamless end-to-end customer experience through our VoloIQ digital platform."

Volocopter sees the VoloCity aircraft accounting for \$110 billion in revenues from urban services by 2035, with the VoloConnect operations between cities bringing in an additional \$60 billion. The company anticipates that the VoloDrone will generate \$120 billion in revenues by that time, including \$50 billion from "on-site transport," \$30 billion from "urban parcel" deliveries, and \$40 billion for flights in remote areas.

Reuter confirmed that the company

aims for the smaller VoloCity aircraft to begin commercial operations before the end of 2023, with Paris and Singapore still likely to be the cities in which its air taxi services launch. He said the company has ambitions to build and operate as many as 100,000 aircraft.

Earlier this year, Volocopter raised a further \$240 million in its latest private funding round, taking its total capital raised since its launch in 2011 to almost \$400 million. "We see huge interest, including from the public investment community, and we are confident we can raise the necessary [further] funding," Reuter said. "We are having interesting conversations with numerous investors for different [investment] routes."

Several of Volocopter's rival eVTOL developers have announced plans to raise significant amounts of funding through initial public offerings via mergers with special purpose acquisition companies. Volocopter has long been rumored to be considering this approach as well. ■

*For more information about the advanced air mobility industry see our special report on page 42.*

### Charter experts discuss market after pandemic

As the Covid pandemic begins to fade, more new customers have been drawn to private aviation, particularly charter. In an EBACE Connect panel on May 18, experts examined what they believe are issues facing the industry.

Ian Moore—chief commercial officer of VistaJet, which purchased XOJet last year—sees an opportunity for light business jet/short-haul flights as commercial airlines have contracted their routes. "We feel that that area and that market is something that the XO brand can go after in a combination of working with the operators that already have light jets in that market but also adding light jets ourselves."

He ties the growth that the market has experienced over the past year to clients who have tried private aviation for the first time. "It's all of our jobs to keep them in the industry," Moore said.

Bernhard Fagner, CEO of Austria-based light jet operator GlobeAir, spoke about factors concerning "one-click" charter pricing, noting that the European market is very supply-driven. He suggested the establishment of a centralized inventory database. "Our pricing varies roughly 20 percent up and down depending on the demand," he said, adding that variables such as crew availability must also be considered, in addition to aircraft costs. "This is a real-time pricing factor," he added. **C.E.**

## Guidor app helps fleets fly efficiently

by Matt Thurber

Toulouse, France-based Skyconseil is offering EBACE Connect participants a free six-month trial of its Guidor software, which helps dispatchers and flight crew optimize flight paths to avoid hazardous weather and improve efficiency and situational awareness. Guidor is available for Apple iOS and Windows devices, although full functionality is currently possible only with iOS. However, the company does plan to add the full feature set to its Windows version.

According to Skyconseil, while worldwide aviation traffic decreased significantly during the Covid pandemic, projections call for traffic levels to resume climbing. This will make it difficult for the aviation industry to meet objectives for emissions reductions by 2050. At the same time, hazardous weather remains a serious threat and will become increasingly challenging due to impacts from global warming.

To mitigate these problems, Skyconseil's Guidor app is designed to help customers fly optimized trajectories and adjust flight plans dynamically to adapt to rapidly changing weather. Skyconseil has partnered with IBM's Weather Company, aeronautical



Skyconseil's Guidor app is designed to help operators reduce aircraft emissions.

information management provider M-click, and connectivity expert Atmosphere to provide services to Guidor users.

The Guidor app helps pilots view detailed information about weather phenomena, including real-time turbulence, and it is updated automatically via onboard airborne connectivity systems. Aircraft position information is plotted on the Guidor moving map, delivered via external GPS connected to the iPad or from an aircraft interface device that is connected to the aircraft's avionics.

Guidor shows both a moving-map display with the flight-planned route and weather

overlays and also a vertical depiction to help pilots choose an optimum altitude. Users can slide back and forward in time to see how the weather changes in relation to the aircraft's past or projected position. Built-in tools let users optimize the route by changing waypoints, altitude, and speed to see how that affects fuel consumption.

Airports are shown with color-coded graphics to indicate weather conditions, and Guidor shows a constantly updated dynamic list of airports with the flight time to each, in case a diversion becomes necessary. Users can also hand draw a "no-go" area on the map, and Guidor will automatically route around that restriction.

Guidor isn't just for pilots; it can be deployed with ground-based decision-support personnel such as dispatchers. Companies can also use Guidor to track a fleet of aircraft.

Skyconseil estimates that flight operations that use Guidor can lower operating costs by an average of 1 percent and also reduce carbon emissions significantly. Guidor can be used anywhere in the world, according to Skyconseil. ■

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# London Oxford Airport adds 15th hangar, new fuel farm

by Curt Epstein

London Oxford Airport (EGTK) has embarked on a major infrastructure development project, the centerpiece of which will be the airport's 15th hangar. When completed in the third quarter, the 6,000-sq-m (63,000-sq-ft) structure will include two bays with offices and workshops and will be capable of sheltering up to six large-cabin business jets.

The UK facility will be used predominantly by the airport's established tenants, many of which are currently occupying WWII-era hangars, as well as for space to store larger business jets, which has been limited at EGTK. Those eight-decade-old hangars will be progressively replaced with new ones based on customer demand, according to the airport, which is home to several MRO operations. To further support their activities, London Oxford has bolstered its electrical grid, allowing "significantly more power onto the site."

While the airport has also expanded its ramp to make room for more aircraft parking, it also recently added seven new ICAO/EASA/CAA-compliant helipads, which will

serve tenants such as Airbus Helicopters (whose UK headquarters is on the field) and other rotorcraft operators, as well as complement operations at the co-owned Edmiston London Heliport, the capitol's only CAA-licensed heliport.

In addition, a new fuel farm will quadruple the storage capacity of the original facility while also providing future storage space for sustainable aviation fuel. A centrally located fire station is under construction as well.

"In a new post-pandemic economic environment, it's crucial that the UK ramps up its capacity to provide growth and further employment, especially in high value, high-skilled and knowledge-based industrial sectors," said Will Curtis, the airport's managing director, adding that the timing of the development is crucial as business aviation and aerospace are set to rebound. "Now that we have put in the infrastructure for growth, we can build further facilities with relative ease and speed and further bolster employment opportunities." ■



A new 6,000-sq-m hangar under construction at the UK's London Oxford Airport will add much-needed large business aircraft shelter to the airport and the London-area in general.

## Embraer appoints new UK service center

Embraer has appointed Jets Bournemouth as its newest authorized service center supporting Phenom 100 and 300 light jets. Located at Bournemouth International Airport in southern England, the EASA Part 145 repair station will perform scheduled and unscheduled maintenance, component and part exchange, and inspections at different levels of complexity for customers in Europe, Middle East, and Africa.

"This new partnership with Jets...will help to bolster the network of the ever-increasing fleet in the Western European region, offering an additional option for maintenance of the Phenom 100 and Phenom 300 aircraft,"

said Frank Stevens, Embraer's MRO global v-p of services and support.

Founded 17 years ago, Jets also holds Part 145 approval for Hawker 700s through 900XPs, as well as Bombardier Challenger 600-series aircraft. "We are delighted to enter the next chapter of our relationship with Embraer, being chosen as the latest authorized service center in the UK," said Jets CEO and accountable manager Daniel Rogers. "Jets looks forward to providing industry-leading service from AOG and line support through to heavy base maintenance that ensures the Phenom family of aircraft remain the best-selling business jet in its class for many years to come." **J.S.**

## News Clips

### VistaJet Aims To Be Carbon-neutral by 2025

VistaJet has not only committed to becoming the first carbon-neutral business aviation operator by 2025, but also released a white paper as a roadmap for the broader aviation industry to go beyond its current goal of a 50 percent emissions reduction by 2050.

"The industry as a whole must step up to combat climate change and its impact today—it's the right thing to do and we all have to act now," urged VistaJet founder and chairman Thomas Flohr.

The company plans to meet its target by offering a certified carbon offset program; adopting the use of more sustainable aviation fuels (SAF); adding more efficient aircraft to its charter fleet; and using more sustainable in-flight products. Further, the company has pledged to move to use renewable electricity at its facilities and will publish annual greenhouse gas accounting and climate risk reports.

VistaJet's carbon offset program introduced in January 2020 has already helped to make big gains toward the carbon-neutrality goal, with 80 percent of its customers opting to purchase carbon credits to offset aircraft emissions on their flights. The company has also removed more than 90 percent of single-use items across its fleet and replaced them with sustainable alternatives. Additionally, it partnered with SkyNRG in September to increase global access to SAF and invested in flight-optimization technology that has reduced fuel consumption by an average of 8 percent per flight.

### Munich Airport Greenlights Sustainable Fuel

As of June 1, sustainable aviation fuel (SAF) is now continuously available at Germany's Munich Airport as part of its pledge to become CO<sub>2</sub> neutral by 2030. The blended drop-in fuel is being delivered to the airport's 42,200-cu-m tank farm by various fuel providers on behalf of the airlines. It then travels via a 17-km pipeline to the airport ramp, where it is pumped into the airplanes by fuel farm manager Skytanking Munich and other refueling services.

Both commercial and private aircraft draw from that same fuel supply, but FBOs at the airport such as ExecuJet and Signature Flight Support will not be able to offer the environmental credits for the SAF usage to their customers as the fuel is being purchased by the airlines, which will be entitled to receive the emissions-accounting benefits from that fuel.

"By approving our refueling facilities for sustainable aviation fuel, we are enabling airlines to reduce their CO<sub>2</sub> emissions," said Munich Airport CEO Jost Lammers, adding that "green fuels" have a key role to play on the way to complete decarbonization of air transport. "We expect the share of these sustainable fuels in total energy consumption in aviation to increase continuously in the coming years."

### Flexjet's Operations Go Carbon-neutral in U.S., Europe

Flexjet's year-to-date flight operations in the U.S. have been carbon-neutral and those in Europe have been carbon-negative through its partnership with 4AIR and at no additional cost to its customers, the fractional provider announced. Flexjet has been purchasing verified credits via 4AIR that fund solar, wind, and other projects that offset carbon emissions from its flights.

In the U.S., Flexjet said, it will offset an estimated 400,000 tonnes of carbon emissions this year alone. Meanwhile, Flexjet Europe is offsetting 300 percent of the carbon dioxide equivalent for every flight to reflect CO<sub>2</sub> emissions and other pollutants, including water vapor, aerosol sulphate, and nitrous oxides. The company is also working with 4AIR to offer shareowners the option of upgrading their environmental commitment by using sustainable aviation fuel for their flights where it is available.

"Flexjet has long been on the leading edge of applying innovation to its operations, and our partnership with 4AIR brings that same spirit to protecting the environment," said Flexjet CEO Michael Silvestro. "In supporting carbon offset projects around the world, Flexjet can offer peace of mind that today's efforts are having an immediate positive impact on the environment."

### DC Aviation Joins EBAA Networking Program

Stuttgart, Germany-based DC Aviation has joined the European Business Aviation Association's (EBAA) peer-networking Ambassador program. The program allows industry leaders to participate in closed workshops and forums to address pressing issues and opportunities for business aviation.

"It is extremely encouraging to see that several leading business aviation companies have joined together to make an additional commitment to EBAA and the industry," said EBAA secretary-general Athar Husain Khan. "We look forward to working closely with our Ambassadors towards improving the industry and society."

Complementing the initiative, the newly launched virtual platform ambassador.ebaa.org will share stories about EBAA Ambassadors, celebrate their achievements, and allow space for discourse on making a change for the better. So far, 15 companies have joined the program, including leading OEMs, trip planners, operators, and service and maintenance companies.

"DC Aviation has been a supporter of EBAA's work for many years," said DC Aviation CEO Michael Kuhn. "We are fully aligned with their goals and are extremely happy to take our support to the next level by becoming an EBAA Ambassador. Being an ambassador allows us to show our commitment to the industry and gives us a platform to showcase such projects as the efficient [lighting] upgrade in the hangar in Stuttgart, the Covid spectrometer, and Covid-19 testing at our facility in Dubai."

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# SEA Prime weathers the Covid storm

by Curt Epstein

Business Aviation in Italy continued its recovery in the first four months of 2021 with year-over-year activity that was nearly 37 percent above the depths it reached in early 2020, when the Covid-19 pandemic was starting to reach full effect in the country and lockdowns were taking place across Europe.

“That is remarkable, considering January and February 2020 were pre-pandemic months,” said Chiara Dorigotti, CEO of SEA Prime, which manages the private aviation infrastructure at Milan Linate and Malpensa Airports under the Milano Prime brand. “Our airports never closed operations even during the hard-luck down months in March and April 2020.”

Speaking at EBACE Connect in May, she noted that while the private aviation traffic numbers at the two airports are still down from 2019, they are on a trend to return to normal by next year.

Since the beginning of 2021, while Europe’s private flight activity has been up by 10.6 percent, Italy has been a front runner, with movements up nearly 37 percent. “The traffic, however, has been merely domestic and inter-European, but we are gradually seeing an increase of intercontinental traffic,” explained Dorigotti, adding that business at the Milano Prime general aviation terminal at Linate is up nearly 31 percent compared to the previous year, with a triple-digit increase in the first weeks of May alone.

With the increasing efficacy of the Covid vaccines, the company is expecting that trend to continue through the remainder of the year with the news that several of the city’s signature events, including Design Week, Fashion Week, and the Formula One Grand Prix are on track to return as live events.

According to Fabio Baiardo, the company’s operations manager, SEA Prime instituted a full range of Covid mitigation measures in response to the pandemic that hit the region quite hard. Among them are improved cleaning and sanitation; enforcement of social distancing; personal protection equipment for passengers, operators, and employees; paperless documentation; and the timely and constant flow of information regarding new traveler requirements to handlers and operators, all of which earned it Hygiene Synopsis Certification from safety and quality audit provider TÜV Italia.

In addition, the company started a partnership with Gruppo San Donato, the largest private hospital operator in Italy, to perform Covid nasal swab testing immediately after arrival or before

departure at the Milano Prime terminals at Linate and Malpensa. Through this agreement, passengers and crewmembers can also arrange this service at their hotel or at home and have easy access to medical services provided by San Donato.

As a result of the pandemic, and in recognition of the levels of health and safety offered, Milano Prime is now able to offer its terminal services at Malpensa to passengers traveling on commercial charter flights, such as sports teams. Thus far it has handled approximately 150 such flights, consisting of 6,000 passengers, said Marco Funel, SEA Prime’s commercial manager. In another indication of activities slowly returning to normal, in June the company will hold its first static aircraft display at Linate since before the pandemic hit.

“In the first phase of the crisis, our focus was not on the expansion of the business but how to survive and understanding how to go on,” explained Baiardo. After the lockdowns subsided, the company began to reengage with its sustainability goals, including acquiring a pair of new BMW i3 electrically powered vehicles, which are used for “follow me” duties at both airports.



After the darkest days of the Covid pandemic, Milano Prime and its parent company SEA Prime are seeing light at the end of the tunnel.

Lastly, to accommodate the needs of Italian aircraft maintenance and management provider and long-term tenant Sirio, SEA Prime will construct a new 4,500-sq-m (48,500-sq-ft) hangar at Linate, which will be able to accommodate aircraft up to ACJs and BBJs. The €10 million (\$12 million) facility, the 11th hangar on the Milano Prime ramp, will be completed in 2022.

While Sirio—which was purchased by Kenn Ricci’s Directional Aviation in 2018—has had its own hangar at Linate since 2001, its space is split between its maintenance activities and aircraft storage on behalf of its aircraft owners. This new purpose-built hangar that will feature offices, conference rooms, a parts warehouse, and a built-in crane system for moving heavy components will remedy that. ■

## Brexit fallout shutting down LPV approaches at UK airports

While the loss of unfettered access to the EU market has been a huge loss and frustration to UK operators following Brexit, the country’s departure from the bloc will soon deal a blow for UK airspace users. Starting June 25, their ability to perform LPV approaches will be removed following the cessation on that date of the UK’s participation in the space-based EGNOS position-augmentation service, which supports approach guidance for landing aircraft.

LPV permits aircraft-guided approaches, operationally equivalent to a Category 1 instrument landing system, but without the need for ground-based navigation aid infrastructure.

In a letter dated March 18 to the Instrument Rated Pilots Organization, Secretary of State for Transport Grant Shapps

confirmed that the UK government could not agree to terms with the EU for continuing to use the service. “The government recognizes that after this date [June 25] airspace users will not be able to benefit from LPV approaches and instead, where possible, rely on lateral navigation procedures,” said Shapps.

He described the outcome of the discussion with the EU as “disappointing” and confirmed that the government has begun work on exploring alternative options for providing a commensurate navigation system. This includes discussions with the UK Space Agency for a dedicated UK replacement service. “But it is, unfortunately, going to take some time and considerable investment to implement,” said Shapps.

The CAA suggested 18 airports in the UK

are “likely impacted by the loss of access to EGNOS.” This includes London Oxford Airport, which has been “aspiring” to establish LPV approaches at the site for several years and said the loss of EGNOS access “takes us back to the drawing board.”

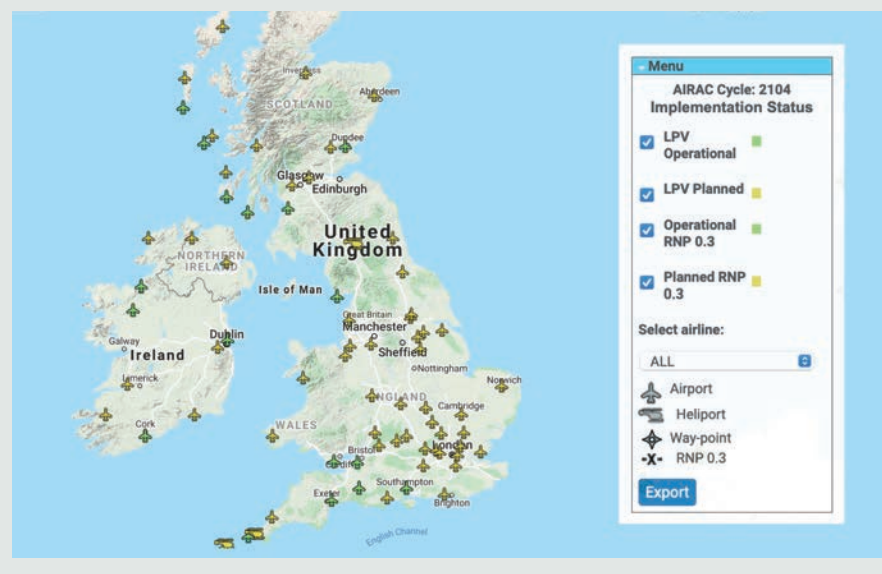
“Rather than pursuing a traditional ILS approach solution for the southern approach to our Runway 01—we already have ILS on Runway 19 for approaches from the north—the GNSS/RNAV alternative with an LPV-200 option was supposed to be easier and less costly,” said James Dillon-Godfray, London Oxford’s head of business development.

Making greater utilization of the southern approach, he added, “would have provided faster transition off the airways, creating less noise, fewer emissions, and enhanced capacity and flows.”

The BBGA’s Marc Bailey described the UK’s decision not to continue with EGNOS as “fundamentally flawed.” This move, he said, “shows a lack of understanding by the government about how important the facility is to the environment, safety, and the potential economic development of the UK aviation network.”

Despite Shapps’s admission in his March 18 letter that there is “little prospect of the UK government renewing negotiations with the European Commission on the matter,” Bailey has called on fellow associations—including AOPA, Airlines UK, and the Airport Operators Association—to help force a rethink. “It is not too late to admit that this was a mistake,” he said. ■

K.S.



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Pilatus is one of the numerous manufacturers that has struggled with supply chain issues during the pandemic.

# Supplier issues loom over industry recovery

by Kerry Lynch

As business optimism improves and business aviation prepares for a post-pandemic rebound, lingering issues surrounding supply chain threaten to slow progress and hamper a full recovery, industry leaders agree.

Business optimism has reached levels not seen since the 2003 to 2007 time-frame, according to Rolland Vincent, JetNet iQ creator/director and president of Rolland Vincent Associates. Speaking during a recent National Air Transportation Association webinar, he added that economic signs were very encouraging and some forecasts suggest “rocketship-like” acceleration.

Vincent also differentiated between this recovery and that of a decade ago with used aircraft transactions remaining strong and inventory low, and a return of interest in the light-jet sector. Even so, Vincent warned that it could take a few years before the OEMs return to pre-pandemic levels as supply chain constraints temper overall industry growth. He noted that most OEMs are forecasting flat growth at least for now.

General Aviation Manufacturers Association president and CEO Pete Bunce agrees with that sentiment. Bunce told *AIN* that while his “crystal ball is no better than the others, all the conditions are right with demand out there. With the backlog that we have, we could have a really good 2021 and 2022.”

The business and general aviation markets fared far better than the commercial sector during the pandemic, Bunce added. But he cautioned that supply chain issues remain an overarching concern for both corners of the market, noting that suppliers are intertwined in both markets.

Bunce first sounded the alarm about supply chain vulnerabilities right after global shutdowns began to roll in from the Covid-19 pandemic. A number of smaller suppliers were forced to halt operations in the face of positive Covid-19 tests or regional restrictions.

This has been particularly critical since the industry had transitioned to a just-in-time approach toward managing its production flow. This marked a change from the days of stockpiling parts for production predictability. Logistics had advanced to the point where ordering parts on-demand still provided predictability, even with a global base of suppliers.

Bunce warned early in the pandemic that the “supply chain becomes very critical to what the course will be as we go through the rest of the year.”

A year into the pandemic, some of the dynamics have changed but many of the same concerns linger. “It’s a combination of a lot of things,” Bunce said. Rolling shutdowns have continued globally and without predictability, preventing or stalling transport of parts, he noted. Some locals have shut down factories, backlogging work.

Airlines often will carry parts in their cargo belly space, but many routes have been curtailed, shrinking that capacity. During the pandemic, a significant amount of commerce moved online, requiring shipping “that is filling up all of the traditional cargo aircraft,” Bunce said.

In addition, some small shops have struggled to remain open as they have had outbreaks or faced financial difficulties. In other cases, companies have had to lay off workers, eroding the talent base with expertise that is hard to replace, he said.

Explaining the global nature of the supply base to a U.S. congressional panel in

March, Bunce stressed, “our supply chain is very fragile....[manufacturers] have had to stretch out delivery times because the supply chain is very disrupted.”

## An Across-the-board Issue

During GAMA’s State of the Industry annual press conference in February, Bunce noted this was a topic throughout his membership. “It’s across the board,” he said. In fact, a GAMA survey of its members earlier this year found that 70 percent of the respondents reported experiencing supply chain issues that had slowed production and deliveries. Meanwhile, 50 percent had noted that they had to either limit or shut down operations due to national, regional, state, or local decisions or for economic reasons.

Many manufacturers and other aviation businesses have publicly referenced those issues. GAMA chairman Nicolas Chabbert, senior v-p of Daher’s Aircraft division and CEO of Daher Aircraft and Kodiak Aircraft, called it one of the top issues for the association, adding that “the industry has had to adjust and mitigate so we can continue production.” He noted his company has faced these issues. “We see the demand. My concern is supply.”

Jet Aviation president Dave Paddock agreed. “We are facing new constraints,” he said during GAMA’s State of the Industry event. These constraints are particularly noted on the completions side, Paddock said. But maintenance activities also have experienced disruptions as it has been difficult to move parts and materials around the globe.

In its year-end results released in April, Pilatus Aircraft echoed those sentiments: “The biggest challenge was not only dealing with the pandemic itself but, in particular, finding answers to disrupted supply chains and the threat of production delays.”

Bombardier president and CEO Eric Martel said supply chain was an area where the company is constantly monitoring—“We’re talking about it every week.” He praised his team for managing issues that cropped up, particularly with

companies that might be in a country struggling with the pandemic or where transportation issues may be a bit more complex. However, he did say the company was watching the pricing of commodities as a result.

Many manufacturers have had to work with their suppliers to ensure a continued flow.

During the release of Spirit AeroSystems’s year-end results, president and CEO Tom Gentile outlined measures his company took to ensure a stable supply flow. “In the last 12 months, we have provided assistance to hundreds of suppliers. This support includes contract extensions, purchases of finished goods and raw materials, and vendor financing,” he said. “Our suppliers are critical partners to our success and this level of support is important as we work to secure our supply chain as production rates recover over the next few years.”

UK-based Ontic, which specializes in specialty legacy parts, has faced a similar situation. CEO Gareth Hall told *AIN* that the company had also reached out to its suppliers early on as concerns about their continued viability intensified, he said. Ontic even offered to pay for some of its parts up front to secure the future of its vendors, he said. While most declined, it was a necessary move for some and even with that offer, one small long-time business could not survive.

JetNet iQ’s Vincent noted that with the thousands of small companies aerospace manufacturers rely upon, it would take only a few to disrupt an entire production line.

## Labor Pool Another Concern

Vincent and Bunce also raised concerns about a key issue moving forward: the labor pool. With the downsizing that occurred over the last year, the fear is that labor—and along with it, expertise—is lost.

During the NATA webinar, Vincent emphasized that point. The industry slowed down so quickly that it rapidly shed its talent and disrupted the supply chain, he added. “We need to bring people back into our industry who have either been scared off or fired off. We also need to find younger talent.”

Bunce expressed concern that even if the supplier is a sixth or seventh tier, it might require specific expertise that could be lost to unemployment and then lured into another industry. “All of a sudden they get a brighter offer from some other industry that loves that expertise because these are highly skilled technicians,” Bunce said. “If they get sucked off to another industry, that hampers our ability to rebuild that expertise.”

To help buffer that trend, U.S. Congress in the \$1.9 trillion American Rescue Plan included a cost-sharing program to help aerospace manufacturers and maintenance organizations to retain or recall workers. Bunce, who strongly backed that measure, said, “This program will help strengthen our fragile supply chain, keep highly skilled workers in the industry, as well as support some of the smaller companies that need assistance to maintain operations.” ■



# Pandemic lessons: Ontic looks to support suppliers

by Kerry Lynch

While many manufacturers have struggled with logistics surrounding their supply chains throughout the pandemic, UK-headquartered legacy parts manufacturer Ontic benefited from relying on a largely local supply base. However, Ontic had also learned lessons from its reliance on a base of small suppliers, some of which were single sources for materials, according to CEO Gareth Hall.

Ontic—which produces and/or supports more than 7,000 parts for aircraft ranging from the Sikorsky Sea King and Bell 206 to the Gulfstream IV and Boeing 777 and engines such as the Pratt & Whitney JT15D—faced a range of uncertainties when the pandemic spread globally.

Its first focus was managing the employment base: ensuring that those who could work from home do so, enhancing cleaning guidelines (Hall called those helping with that effort the “unsung heroes” of the pandemic), and employing practices such as bubble groupings to limit virus spread opportunities.

Ontic determined that it was deemed an essential business, but it did shut down for a day “really just to kind of assess what we needed to do and make sense of the guidance because it was emerging. It was less than clear at the time,” Hall said.

However, its focus quickly turned to maintaining its supplier base, he noted. “Once we realized we could stay open and we can keep our people safe, our next concern is obviously the supply chain.”

With advancements in logistics, many manufacturers have turned to a global supply base and just-in-time delivery. But Ontic, which has operations in the UK, California, New York, and North Carolina, has largely relied on a regional and national supplier base. “There’s a lot of debate around supply chain,” Hall said. “Having a localized supply chain was

counterintuitive pre-pandemic because people wanted to use low-cost regions as a solution. But because our business model was basically low volume, high mix, high complexity, our supply chain is almost without exception localized.”

That turned out to be a “huge initial bonus for us” because Ontic did not have to navigate around cross-border restrictions. Ontic executives were able to visit most of its suppliers early on and “really get a sense” how the pandemic was affecting them.

“I wouldn’t say we weren’t impacted,” Hall added, but the primary concerns of obtaining the necessary materials and components for its manufacturing operations were reduced. However, the biggest risk revolved around the impact of the pandemic on smaller shops and the potential for closures from either the virus or financial constraints.

Worried about its suppliers suffering from cash-flow issues, Ontic approached its smaller suppliers and offered them prepayment to help get them through the initial part of the pandemic. “It was a really interesting response, not one you would expect,” Hall said. Roughly two-thirds turned down the offer, saying they did not need the prepayment at the moment but that Ontic should use that upfront cash to support others that were in need of it.

“I think that’s probably a different behavior than you would normally see,” Hall said, but he added that the response “probably defined the mood at the time.”

Ontic did end up making some significant investments with certain suppliers, relying on trust and goodwill, but it was “by far the right thing to do,” he said, adding that it has paid dividends both in terms of maintaining supply and helping businesses survive.

Ontic did lose one machine shop that closed permanently, Hall said, adding,



Ontic, which supports a range of legacy parts for a variety of products such as for the Pratt & Whitney JT15D, jumped in to support its smaller supplier base as concerns for the long-term viability of those shops began to surface during the pandemic.



With a \$230 million expansion set to begin at its Rotterdam refinery and a similar project already underway at its Singapore location, Neste expects its annual output of sustainable alternative fuel to exponentially increase by 2023.

## Neste moving forward with plans to expand sustainable fuel refinery

Major sustainable fuel producer Neste has finally greenlit a long-discussed expansion project at its Rotterdam refinery. Requiring an outlay of approximately \$231 million, the expansion, which is expected to be completed by mid-2023, will add another 500,000 tons of sustainable aviation fuel (SAF) a year to the plant’s annual capacity.

Neste’s current output capacity for SAF is 100,000 tons a year, but combined with upgrades underway at the company’s Singapore production facility, that total is expected to increase more than tenfold—to 1.5 million tons—each year by the end of 2023. There is certainly room for growth in the field, as SAF accounted for just 0.01 percent of all fuel used by the aviation

industry in 2019. The SAF component of the blended Neste fuel can offer an up to 80 percent lifecycle carbon-emissions reduction over the same volume of conventional jet fuel it replaces.

“We have made a commitment to support our customers to reduce greenhouse gas emissions by up to 20 million tons by 2030,” said Peter Vanacker, president and CEO of the Finland-based fuel supplier, citing SAF’s considerable potential in that arena. “As the aviation industry is likely to resume on a growth trajectory after its recovery from the Covid-19 pandemic, there is a growing need and urgency to act on aviation-related emissions.”

C.E.

“They had been in business for a long time.”

But overall the company was able to minimize that impact. Having said that, Hall also noted that the experience did cause an evaluation of how to approach its supply base. Ontic did consider acquiring some of the smaller, at-risk operations but concluded that that wasn’t necessarily a solution. As the major business for small suppliers, Ontic typically received really good service from them, he noted. “The downside was that during these circumstances, they became high risk because they didn’t have flexibility,” he said. “It made us go back and reassess which suppliers we have that could represent a single point of failure.”

Ontic is now looking at possibilities for multiple suppliers to build in redundancy and balance risk.

Hall was encouraged that taking some of the proactive steps to protect its supply chain will help the company come out in a strong position.

While Ontic relies on a supply base, it too is a supplier, of parts that OEMs no longer support. But Hall said the company did not encounter the issues that some large-component suppliers faced. Because Ontic primarily produces small

batches of relatively small parts, finding transport options was a little easier.

Regarding business demand, Ontic did not see “too much degradation” in its business aviation work, with most of the drop coming from its business involving airliners. However, military demand picked up, Hall said, and Ontic found that by cross-training its technicians, it was able to shift work to where demand was.

Ontic also saw customers moving up orders as it navigated through the pandemic and priorities changed. This caused some challenges to ensure it could meet shifting demand, Hall said. In addition, OEMs have begun to “rethink their strategies” toward their in-house product portfolios. This has spurred multiple conversations about transferring some of that work to Ontic, he said.

What might be more of value to them to keep in-house pre-pandemic may be different post-pandemic, Hall said. “There’s a number of organizations going through that review. Because of our unique position in the market and the relationships that we have with the OEMs, we are in a good position to participate in those conversations and then offer a solution.” ■

# Climate expert tells aviation to back carbon capture

by Charles Alcock

In debates over the best steps to achieving zero-carbon goals for aviation, some see sustainable aviation fuels (SAF) as a somewhat limited stopgap measure to be superseded by longer-term advances in propulsion technology, such as electric- and hydrogen-powered aircraft. However, according to Anthony Patt, professor of climate policy at Swiss university ETH Zurich, even those solutions won't be sufficient for aviation to play its part in achieving the Paris Agreement's goal of a net-zero world in 2050.

In an EBACE Connect webinar on net-zero carbon emissions last month, Patt made the case for aviation to get behind what he portrayed as more progressive initiatives such as direct air capture of carbon dioxide from jet-A fuel. He explained that this process can either involve storing the emissions underground to prevent climate damage or, better still, using what gets captured to make synthetic fuels from hydrocarbons.

The trouble is that, for now, these solutions don't come cheap. The CarbFix Project to store emissions underground in Iceland is resulting in costs that amount to around \$1.80 per liter of fossil fuel burned, which Patt said is around three times average global prices. He predicted that this cost should drop by as much as 80 percent by 2040, to just 35 cents per liter. "But you are probably going to have to accept a doubling in costs if you want to achieve true climate-neutral aviation," he warned the business aviation audience.

Using direct air capture to make synthetic fuels involves an easier process and, according to Patt, has unlimited potential to scale up. However, the cost currently amounts to around \$3 per liter, although it should drop to more like \$1 by 2030.

The main driver for reducing production costs will be lower electricity prices, the professor explained. And these are most likely to be achieved in sunnier parts of the world, like Australia and Saudi Arabia, which could mean additional costs associated with

transporting the resulting synthetic fuel to where it is needed by aircraft operators.

Patt urged the business aviation community to pay attention to new European Union legislation anticipated for this summer that will introduce requirements for minimum blends of synthetic fuel in aviation fuel. He predicted this will start modestly at just 2 percent in 2025, but is due to rise to 100 percent by 2050. In the meantime, he said, the industry can expect more aviation carbon taxes, even though he doesn't feel these are likely to be high enough to discourage demand for air transport.

For now, though, SAF seems to be the business aviation sector's clearest option for making some progress in reducing the industry's carbon footprint. Jet Aviation's

deputy accountable manager, Claudio Peer, reported growing interest among business aircraft owners, who have plenty of questions about how they can use the new fuel.

Peer also acknowledged the logistical challenges associated with all the carbon-reducing measures. "If we have to move it [SAF] from Singapore [where it is manufactured] to the other side of the world, it won't happen," he commented. "But I am sure we have a good chance to make it work if we put our heads together."

Jet Aviation said that, working with sister company Gulfstream, it has bought 1.4 million gallons of SAF since 2011. The business aviation services group plans to start offering the fuel at FBOs in Amsterdam and Rotterdam in the Netherlands. ■

## Europe's regulations help move technology forward

by Jerry Siebenmark

The regulatory framework that exists in Europe for certification of new airframes, powerplants, and other aerospace technology is flexible enough to adapt to electric- and hydrogen-powered aircraft and other advanced air mobility (AAM) technologies. But it's also a framework that needs additional regulatory capacity to keep pace with innovation, according to a panel of experts during an EBACE Connect seminar on May 19.

First and foremost, the panelists agreed, is that any new aviation technology undergoes the same level of safety scrutiny as any technology before it. "The regulations that are in place are on the one hand capable of both accommodating innovation [and] on the other hand ensuring that safety is being guaranteed," said Joachim Lucking, the European Commission's head of unit for aviation safety.

A good example of the accommodation of innovation is EASA's type certification in June of Pipistrel's Velis Electro two-seat trainer, Lucking added. "They have been able to certify the airplane despite the rules [that] were written in a pre-electric age," he said. "In addition to certification, they needed to create a number of rules around this in relation to operations of such an electric airplane, training of pilots, etc. And they have been able to deal with all these challenges by using the existing rules in a flexible way."

Robert Dingemans, PAL-V CEO and co-founder, said that "in general" EASA's regulatory framework has accommodated his company's development of the Liberty flying car, which in February received a "clear path" to certification from EASA. "That's what we found out," Dingemans said. "It takes time, about 10 years, but it works." Still, some adaptations to pilot training had to be made to the legal framework, he added. "I think the main

challenge we have, not the framework, is the capacity of the regulator side to really be able to deal with all these innovations."

Based on the observations he's made in his travels to other countries such as China and the U.S., "I think we have a big, big opportunity in Europe now to be one of the big leaders in this new advanced air mobility if we ensure that there's enough capacity of the regulator side," Dingemans said. ■



Textron Aviation announced the Cessna Citation CJ4 Gen2 in February.

## DALaviation named first Cessna Citation CJ4 Gen2 customer in Europe

DALaviation Switzerland is the first European customer for the Cessna Citation CJ4 Gen2, Textron Aviation announced on May 19. The \$10.75 million twinjet will be the third aircraft to join the Geneva-based charter operator's fleet, which includes a CJ2+ and a CJ1.

The Citation CJ4 received EASA type certification in 2011, and certification of the Gen2's interior is expected in June, the Wichita airframer said. Textron Aviation announced the Gen2 in February as an upgraded model with new folding airstairs with a lower step to the ground, step lighting, and handrail; added seating

options; new ambient lighting, and a galley with improved storage.

"Citation business jets have a solid reputation among our customers as reliable, high-quality aircraft, and we are proud to be the first company in Europe to add the CJ4 Gen2 to our charter fleet," said DAL-aviation founder and CEO Nicolas Trefeil. "Flexibility and wellness are top-of-mind for our customers as travel resumes, and our client base is growing as people are increasingly turning to charter services for an exclusive and comfortable flying experience. The CJ4 Gen2 will help us continue expanding our business." **J.S.**

### NEWS note

Pratt & Whitney (P&W) has launched a carbon offset service for operators of P&W-powered business jets with engines enrolled in its Eagle Service Plan (ESP) maintenance program. Through this carbon credit program, operators can offset their aircraft's carbon footprint.

"Pratt & Whitney has a long-standing commitment to offering environmentally responsible products and solutions to its customers—from being one of the first companies to certify its engines for use with sustainable aviation fuels to finding ways to minimize the impact of its operations and engines on the environment throughout their entire lifecycle," said P&W v-p of customer service Satheeshkumar Kumarasingam.

Under this program, globally recognized environmentally sustainable solutions provider South Pole, will estimate and compensate aircraft emissions for the customer, making the service convenient and transparent. Customers pay service charges on their ESP invoice based on flown hours and also receive a certificate confirming that their carbon emissions have been offset.

P&W parent Raytheon Technologies has also committed to offsetting emissions of its corporate aircraft fleet. ■



After recently receiving the first ACJ TwoTwenty fuselage at its plant in Mirabel, Canada, Airbus Corporate Jets anticipates handing over the first green aircraft to Comlux in early 2022 for completion.

## First ACJ TwoTwenty fuselage arrives in Mirabel

by Kerry Lynch

Less than nine months after Airbus Corporate Jets launched the ACJ TwoTwenty with six orders in hand, the first fuselage has arrived at the company's A220 final assembly line in Mirabel, Canada, keeping the aircraft on pace for induction into completions early next year and delivery by 2023, the airframer announced on May 17. Kicking off the EBACE Connect media day, Airbus Corporate Jets president

Benoit Defforge said the development of the TwoTwenty is "progressing in line with our plans," with final assembly anticipated to begin around mid-year and first flight later in the year, "which means it will be quick."

Airbus expects to hand over the first edition in early 2022 to Comlux, which is the exclusive outfitter for the first 15 aircraft. Defforge added that the development of

ACJ220 completions is also progressing according to plan and highlighted an aircraft configurator application that Airbus Corporate Jets has developed to enable customers to select interior layouts and styling.

While not announcing more orders for the newest member of its ACJ family, Airbus Corporate Jets executives were upbeat about the reception the aircraft has received, with Defforge saying the company has found the "sweet spot" for a model it is positioning as "an alternative to the traditional large-cabin business jet and the bizliner."

The ACJ TwoTwenty offers six VIP living areas for up to 19 passengers and a 5,650-nm range, but at a price that Airbus Corporate Jets executives say will be

under that of an ultra-long-range business jet. Defforge said the model has "opened the door...to a much wider market."

He was further encouraged by the momentum Airbus Corporate Jets is sustaining in 2021. While conceding that 2020 was a difficult year for Airbus, it marked one of the strongest at Airbus Corporate Jets, with six deliveries—matching the company's production plans for the ACJ family—and orders for 12. That marked a book-to-bill ratio of 2:1, Defforge noted.

In 2021, he added, "We started the year with the same spirit and the same customer engagement as 2020," including landing another order for an ACJ319neo and delivery of three ACJs.

The ACJ319neo order, from an unnamed customer, boosts the tally for that model to six. In all, Airbus Corporate Jets has received orders for 16 of the ACJ320 family from 12 customers. The latest order will have the ACJ319neo equipped with CFM International's LEAP-1A engines.

As for the deliveries reported thus far in 2021, two involve ACJ320s and another was for the ACJ350, marking the third of that model to be handed over.

Defforge also announced a partnership agreement with Latécoère Interconnection Systems (LIS) to develop an ACJ Smart LiFi (light fidelity) monitor. Designed as a plug-and-play system, the 4K monitor will incorporate the latest wireless communication technology to offer Wi-Fi, Bluetooth, and LiFi connectivity and provide for analog audio output and USB-C ports, as well as HDMI connections.

The system can be used for audio-video on-demand, casting, mirroring, web browsing, live TV, and videoconferencing. Airbus Corporate Jets will offer the monitor for retrofit and new cabin outfitting by year-end. ■

## KlasJet takes on 'most demanding' repatriation mission

KlasJet, an Avia Solutions Group private jet charter company, took on what it said was one of its "most demanding assignments" when it repatriated a group of Covid-19 positive workers from Ghana to South Korea. The mission lasted five days and required

10 flights—including aircraft repositioning and overfly permissions from 14 countries on three continents, crew positioning and safe accommodation, and Covid testing.

A mission that would normally take up to two weeks to plan instead took five

days, despite working through logistical, medical, and operational issues. Using a Boeing 737-500, KlasJet compartmentalized the aircraft to keep passengers, crew, and onboard medical staff from spreading the virus.

The mission required organizing multiple crews who needed to be tested, repositioned, transported, and accommodated in isolation. It also required specially prepared and packaged food to be delivered along with the requirement to dispose of any waste safely. Additionally, ground transportation had to be arranged in minute detail. In case any technical issues arose during the flights, an aircraft technician from KlasJet's sister company, FL Technics, accompanied flight crews.

KlasJet COO Ugnius Valiauga added that knowledge the operator gained before and during the pandemic prepared it for this mission. "Our teams are proof that we have the operational readiness and the right attitude to deal with whatever comes our way," he said. **J.S.**



Avia Solutions Group's KlasJet team pulled out all the stops to repatriate a group of Covid-19-positive workers from Ghana to South Korea, a five-day, 10-flight mission.

## NEWS note

After predicting a tough second-half of 2020 following the Covid-19 outbreak, Geneva-based charter broker Luna Jets finished the year with "the best performance in our 14-year history, mainly fueled by an all-time-high fourth quarter," said managing director Alain Leboursier. Revenue at Luna Jets rose 30 percent in 2020, translating to gains in market share and expectations for an even stronger 2021.

In 2020, the company organized more than 6,000 flight movements and expects that number to climb to 7,000 this year. Already, its private jet charter activity this year is 20 percent higher than pre-Covid levels, helped by a "record number" of new clients and increased demand for longer trips on larger aircraft, according to Luna Jets.

"As we see our existing clients starting to fly again and new clients taking off, we are therefore expecting a very strong summer 2021," Leboursier added. ■

# Bizav OEMs optimistic about new customers

by Kerry Lynch

Business aviation OEMs are increasingly optimistic about an industry rebound with reports of as many as one million customers flying private for the first time during 2020, but the company leaders believe they still face a range of challenges from ongoing restrictions and supply-chain shortages to workforce diversity. The heads of nine OEMs gave their views on how the pandemic has shaped the industry and discussed their outlook on the future during an EBACE Connect Keynote “Lightning Round with the CEOs” session.

“We were not really prepared for such a pandemic crisis,” conceded Dassault Aviation CEO Éric Trappier. “We had to adapt ourselves.” But, he added, the industry learned it could adapt during a major crisis.

Bombardier president and CEO Éric Martel noted that his company made this shift as it was transitioning to a pure-play business aviation company. “This was not without pain,” he said, adding that like the rest of the industry, “we needed first to take care of the safety of our people... that was a challenging time for all of us.”

Gulfstream president and CEO Mark Burns noted that his company made a decision to focus on health and safety, business continuity, and good stewardship, not only in terms of fiscal discipline but also to ensure that investments continued to be made throughout the pandemic.

“The first thing we learned is how much we missed seeing our customers face to face,” added Airbus Corporate Jets president Benoit Defforge. However, the industry was able to adapt, underscoring another key lesson: “The private aviation industry is quite resilient.”

Michael Amalfitano, president and CEO of Embraer Executive Jets, agreed with that sentiment, saying, “During the pandemic period, business aviation fared very well. The industry has proven to be resilient.” Business aviation provides for fewer “touchpoints,” attracting travelers during the pandemic.

“So, in turn, we have seen more first-time buyers than ever before, while corporations are also experiencing renewed interest in private aviation,” Amalfitano said.

Boeing Business Jets president James Detwiler added, “We have seen a significant increase in interest from a very important segment of our customer population, and that is the charter business.” Noting reports that more than a million people have traveled private for the first time, Detwiler said, “They now see the value of chartering a private jet for both work and leisure purposes.”

A year ago executives questioned whether the pandemic would help turn some travelers to business aviation, Martel noted. “A year ago, this was just a theory, but it became true through the year. I am confident that if we do a good job together as a community, we will attract a lot of new

people and they will stay in our business.”

Seeing this opportunity, Textron Aviation last summer launched its “A Different Sky Awaits” campaign to educate on safe travel through private aviation, said Textron Aviation president and CEO Ron Draper. “That campaign was very well received. And since that time, I think we’re all seeing the industry data of new entrants coming into private aviation.”

Burns further noted that Gulfstream has seen first-time buyers through the pandemic. “People started to reassess their situation.”

“The pandemic was challenging last year, but I think it has created for our industry an amazing opportunity looking forward as borders reopen,” Martel said, noting the anticipation of a bit of a surge when that happens.

“The outlook for aviation is strong,” agreed Detwiler.

However, while presenting an optimistic picture, the OEM heads agreed that they face obstacles. Detwiler pointed to pandemic-related quarantines and restrictions, as well as “the continued challenge of not being able



During a virtual EBACE Connect session, the heads of major business aviation companies expressed encouragement about newcomers to the market.

DAVID MCINTOSH

to visit with our customers in person.”

Pilatus CEO Markus Bucher said his company’s biggest challenge has been supply-chain disruption, calling it “the single biggest risk in our business.” Bucher said the company has had to evaluate supply channels moving forward, specifically “whether our sourcing strategy is right.”

Draper echoed concerns about supply chain, saying Textron Aviation is seeing supply constraints and inflation with raw materials.

However, despite the complexities of the pandemic, Daher CEO Didier Kayat praised the efforts of both the FAA and EASA, saying they “have been very helpful and supportive...they have been very efficient” even with the limits in contact.

The industry leaders also mulled issues such as workforce diversity, bringing in a younger generation of workers, and efforts to remain sustainable.

“It’s important to emphasize our industry is more than just pilots, mechanics, technicians. It’s engineers, accountants, specialists, programmers, public relations, and business management specialists,” said Amalfitano. “And we need to find new ways to attract people to our continually evolving industry. The aviation industry encompasses multiple career paths and is an attractive industry with exciting new technologies.” ■

## Bombardier lays out plans to build on Global 7500 EPD

by Kerry Lynch

Bombardier, which last year paved new ground when its Global 7500 became the first business jet to achieve an Environmental Product Declaration (EPD) through the International EPD System, is planning to pursue similar declarations on all of its new aircraft and upgrades moving forward, the company said.

Third-party verified to ISO standards, the EPD discloses detailed environmental information about the Global 7500’s lifecycle, such as CO<sub>2</sub> emissions, noise, water consumption, and other key environmental impact indicators. The International EPD System has built a library of published EPDs for products from more than 30 countries to foster transparency

about environmental lifecycles. But the Global 7500 was the very first from the business jet community.

Bombardier called the EPD an important milestone in its overarching environmental sustainability strategy, saying it has not only provided lessons learned about taking a more sustainable approach throughout the lifecycle of the product but has also helped the company and its suppliers develop more efficient products.

A Bombardier Eco-Design team applied product innovation lifecycle processes throughout the development process to ensure that the ultra-long-range business jet minimizes its impact on the environment from design to end-of-life.



The Global 7500 is paving new ground with its environmental product declaration.

This involved a focus on health, safety, and environmental considerations during design, production, support, and end-of-life.

Operational lifecycles, including an evaluation of noise and fuel burn, were considered, along with recyclability and recovery rates for end-of-life. Bombardier reported that material recycling and energy recovery aggregate to an 85 percent recoverability rate by weight for the Global 7500.

Through its assessment of factors such as CO<sub>2</sub> emissions, recyclability rate, water scarcity, and renewable energy, Bombardier said, it was able to design a Mach 0.925, 7,700-nm, four-zone business jet that emits 15 percent less CO<sub>2</sub> than previous-generation ultra-long-range aircraft.

Bombardier has received a positive response to this effort from the business aviation community and from its customers. “Our Global 7500 customers and operators...appreciate that this EPD allows them to properly evaluate the environmental impact of their aircraft over its lifetime,” the company said. “With a greater focus on the environment and with customers becoming increasingly savvy and informed, our sales teams also received numerous inquiries from potential buyers interested in the environmental aspects of our products, including the Global 7500.”

The EPD provided customers with the ability to do an honest, apples-to-apples comparison of the environmental impact of aircraft products, Bombardier added. ■

# UK prosecution shines light on illegal charter flights

by Kate Sarsfield

A little more than two years have passed since the crash off the French coast of a Piper Malibu that ended the life of Argentinian soccer player Emiliano Sala. The English Premier League star—who was on his way to Wales, where he had just been signed by Cardiff City—was the sole passenger on the U.S.-registered piston-single (N264DB) being flown by pilot David Ibbotson, who was also killed in the crash.

The accident on Jan. 21, 2019, made headlines globally due to Sala's celebrity. The European charter industry noted at the time that the crash bore the hallmarks of an illegal or "gray" charter operation.

Under European regulations, if a flight is operated for hire and reward, it is classified as an air-taxi service and must be approved by the relevant aviation authority to carry paying passengers. The aircraft must also be approved for this role and piloted by a professionally trained crew under an air operator certificate (AOC).

UK investigators confirmed the industry's hunch about the legality of Sala's flight in March 2020. In its final report into the crash, the Air Accidents Investigation Branch (AAIB) concluded that Ibbotson—a private pilot who was unqualified to carry passengers for hire or reward—received a fee to transport Sala. It also found that Ibbotson, whose body has never been recovered, had been paid on numerous occasions to carry passengers, in blatant breach of regulations.

According to the AAIB report, Sala—whose remains were retrieved from the aircraft wreckage on the seabed on Feb. 6, 2019—had been exposed to potentially lethal levels of carbon monoxide, which may have incapacitated Ibbotson.

"The Sala crash really did highlight the dangers of flying with an unregulated operator," said Glenn Hogben, chief executive of the Air Charter Association (ACA). "The business and general aviation community has been fighting this scourge for many years, with little impact, but it took a high-profile, horrifying incident like this one to bring this practice to the public's attention."

Determined to answer calls from legitimate commercial operators, the UK Civil Aviation Authority (CAA) has launched a prosecution against David Henderson, the individual believed to be responsible for arranging Sala's flight. Henderson's trial is scheduled to begin on October 18 in Cardiff, and it is hoped that a successful prosecution will set an example to potential future rule breakers.

"There is no typical sanction for illegal charter," said the CAA, as each case is "treated individually." However, a breach of Article 250, under Schedule 13 of the Air Navigation Order legislation—the charges brought against Henderson—can

incur a fine and imprisonment, it added.

In the aftermath of the crash, the CAA launched a campaign to raise awareness of the "serious risks" of illegal public transport flights. It joined forces with a host of "stakeholders," including soccer's UK governing body, the Football Association, and other sporting organizations "to target specific areas where we think the risk of using illegal charters might arise."

It said: "Agents may genuinely not understand the law and regulatory requirements in relation to the carrying of paying passengers and so we simply want to ensure they do not book travel for their clients with unlicensed operators."



The Piper Malibu PA46-310P that crashed, ending the life of Argentinian soccer player Emiliano Sala.

The CAA also distributed new guidance material to airfields and charter operators highlighting the safety risks for anyone using illegal public transport.

"We are also working closely with the ACA and UK trade body the British Business and General Aviation Association [BBGA] to help us tackle the problem," the CAA added.

The pair are founding members of the Air Charter Safety Alliance. Launched in December 2020, this coalition of global trade associations—including the European Business Aviation Association (EBAA) and its counterparts in Africa, Asia, the Middle East, and the U.S.—has launched an online educational campaign to warn the wider industry and the public of the "dangers of illegal charter," encourage individuals to report gray charter activities, and "hopefully dissuade those seeking to compromise safety for profit."

ACA's Hogben said illegal charter "goes against everything our industry works hard to deliver. It increases risk to passengers, damages the reputation of our industry, and impacts careers and businesses."

The benefits of using established public transport providers are clear, Hogben explained: "An AOC holder takes all of the operational risk of public transport and is responsible if something goes wrong. For private owners who allow their aircraft to be used for illegal public charter, that risk and liability remain with them—and if a

flight is performed illegally, it could invalidate any otherwise applicable insurance coverage, including the passenger's own life insurance."

Passengers on an irregular charter "think they have scored a great deal without realizing that they are being flown by a pilot who is generally not qualified for the type of flight being conducted," said EBAA COO Robert Baltus. "The aircraft is maintained to a different standard and less flight preparation has been conducted than for flights under an AOC. In short, they have no idea of the risk and consequences of being flown to lower standards."

He splits the law flouters into three groups: the clueless, the careless, and the criminal. "The first two parties either don't understand that they operate illegally or are not paying attention to the specificities of their flight," Baltus explained. "This is the group that we [in the industry] try to educate on an ongoing basis."

The criminal group is of more concern, he admitted, and it requires the assistance of aviation authorities to bring prosecutions. "In that area, we are supporting the authorities with data on flights provided by our members and by education if needed. This is an ongoing activity," he said.

EBAA and other industry associations admit that it has been difficult to gauge what impact the Sala crash and the investigators' damning findings have had on illegal charter activity in Europe, due to the Covid-19 pandemic, which has stifled the travel market since early 2020. "There is no clear measure to see if the activity has changed as there is no overall data available and because Covid-19 travel habits have changed," said Baltus.

As Europe slowly emerges from lockdown over the coming months, the pent-up demand for travel is likely to provide rich pickings for unscrupulous operators and for unsuspecting customers looking for a good deal to fly privately.

"Many people will use these services out of ignorance and because they are typically cheaper than hiring an AOC operator to conduct the flight," warned John Hill, chief pilot and head of operations for UK-based charter company Capital Air Services. "Public transport operators are more expensive because of the overheads involved in meeting the required levels of oversight, safety, and security.

That is something we as an industry must promote to the traveling public."

Hill fears the Sala incident has had little impact on unscrupulous operators, noting, "Helicopter owners don't think the incident applies to them, and fixed-wing aircraft operators have already moved on."

He singles out the cost-sharing market for particular criticism. While this practice was established to allow private pilots to build up their hours by sharing the costs of the flight down the middle with travelers heading to the same destination, Hill argues that it is increasingly being used as illegal charter through the back door. "It has become so relaxed to the point where it is nearly impossible to prove a criminal act."

Hill's view is supported by the ACA's Hogben, who said that even during a ramp check at an FBO, passengers on a suspected illegal charter are often instructed by the pilot to say they have not paid for the flight, rendering a criminal prosecution hopeless. "It's very difficult to bring these operators to justice," said Hogben.

He points to only one prosecution in the UK "in recent history" that has resulted in a prison sentence. The guilty party in that case was Robert Murgatroyd, the pilot of a Piper PA28, who was detained in March for three years and six months for carrying out an illegal charter flight in September 2017.

Despite holding only a private pilot license, Murgatroyd charged his three passengers £500 (\$580) each for a bird-watching trip, from Manchester to the Isle of Barra in Scotland. The piston-single was 193 kg (426 pounds) over the aircraft's maximum takeoff weight of 975 kg, and it crashed into a field soon after the flight began. Nobody was seriously injured.

Murgatroyd was convicted on seven charges, including recklessly endangering the safety of an aircraft or persons in an aircraft, conducting a public transport flight without an AOC, and acting as a pilot without holding an appropriate license. Hogben hopes David Henderson's prosecution by the CAA, if successful, will send a strong signal to potential illicit operators.

For its part, the CAA said it takes illegal public transport flying "extremely seriously." It calls the practice "a clear safety risk" to unsuspecting passengers and said it undermines the livelihood of safety-conscious, law-abiding operators. "We will continue to investigate and prosecute individuals engaged in illegal public transport flights and will always push for the strongest possible sentences," the CAA said.

The agency urges anyone "thinking about paying for a flight in a light aircraft" to check that the individual or company conducting the flight has an AOC.

Adam Twidell, founder and chief executive of one of Europe's largest business aircraft brokers, PrivateFly, urges the industry to remain scrupulous. "The most important part we can all play is to always report suspicious activity, no matter how little evidence there appears to be," said Twidell. ■

# With mandate looming, Europe looks to future of SAF

by Curt Epstein

Sustainable aviation fuel (SAF) has been viewed as a vital part of the business aviation industry's decarbonization efforts since 2009 when general aviation groups issued the Business Aviation Commitment on Climate Change (BACCC). Included in that document's aspirational goals was the reduction of CO<sub>2</sub> emissions by 50 percent by 2050 relative to 2005.

More recently, the European Union has committed to climate neutrality in 2050 and intends to increase its 2030 climate ambitions by cutting emissions by at least 55 percent compared with 1990 levels, and included in its scope is aviation.

"We have committed to ambitious emissions reduction targets to decarbonize aviation," said Adina-Ioana Vălean, European commissioner for transport. Speaking at the recent inaugural European Business Aviation SAF Summit, she noted that "for the European Union to hit its goals of cutting emissions by at least 55 percent by 2030 and attaining carbon neutrality by 2050, sustainable fuels must account for an increasing share of aviation's fuel mix over time, to reach more than 60 percent."

That is a broad leap for the industry as SAF usage currently accounts for less than 1 percent of total jet fuel use. The summit examined what needs to be done for the industry to meet those goals.

In 2009, the BACCC identified four pillars of carbon reduction: improved aircraft technology, air traffic control infrastructure and operational improvements, market-based measures such as carbon offset purchases, and alternative fuels.

Thierry Lamant, Dassault Aviation's Falcon training program coordinator and the airframer's lead on SAF, explained that the company is working continuously on its product, lightening and improving airframes in its efforts to increase efficiency and lower carbon emissions. "This is giving us some percentage of improvement, but it's not a big step; each time it's a lot of effort for obtaining a small percentage," he said. Likewise, newer, more efficient engine technology can also result in an improvement of possibly up to 15 percent.

SAF offers the biggest potential for aviation's carbon reduction through its lifecycle benefits. One big misconception about the fuel is these carbon reductions are derived from its actual use in the aircraft. The truth is that what comes out of the tailpipe after the burning of SAF is little different from that emitted when burning fossil fuel.

Instead, rather than removing more carbon from the ground in the form of petrochemicals, the SAF production process simply recycles carbon that is already in the environment. In its unblended neat form, SAF can account for up to 80 percent lifecycle CO<sub>2</sub> reduction over

a like amount of conventional jet-A.

While there is growing talk about the future of electrification and hydrogen-powered aircraft, those technologies are not near the point where they can be considered for long-haul aircraft. "Certainly the products we are producing are for long-range and medium-range flying, and the gas turbine won't be replaced for a very long time," said Frank Moesta, senior v-p for strategy and future programs with Rolls-Royce Deutschland. "We obviously are committed as an industry and as an industry player to introduce SAF."



Events such as 2019's pre-EBACE mass business aircraft sustainable aviation fuel refueling at the UK's Farnborough Airport have served to highlight the safety of the blended renewable fuel.

Indeed, SAF has been growing in recognition over the past several years. The Business Aviation Coalition for Sustainable Aviation Fuel, a group of industry organizations sponsored an education session/flight demonstration at California's Van Nuys Airport in January 2019. A similar event was held at the UK's Farnborough Airport ahead of that year's EBACE, and in January 2020, Jet Aviation sold the first SAF in Switzerland. Since then, following a number of one-off demonstration deliveries at various airports, continuous supplies of the approved drop-in SAF, blended with conventional fossil-based jet-A at a ratio of approximately 30 percent SAF, have begun, mainly in the U.S.

SAF can currently be produced through several approved production pathways utilizing various feedstocks. The ratio of the SAF blends is determined by the ASTM, which approved the fuels as a direct replacement for conventional jet-A, and while the blends can go as high as 50 percent, the industry is already looking at utilizing 100 percent SAF. Rolls-Royce did testing using pure SAF on its Pearl business jet engine, as well as its Trent 1000 testbed. "The products are ready and certified for 50 percent blend, which we can introduce basically today without any problems," said Moesta, "but obviously we are working on

getting the industry to 100 percent [SAF]."

Many in the business aviation industry are interested in the fuel, according to Joao Martins, Jet Aviation's vice president for European regional FBO operations and general manager of the company's Zurich location. "We know there are customers from all of our lines of business asking for SAF, [including] the MRO, the completions, aircraft management, charter, FBO customers," he said.

Yet widespread adoption of SAF still faces hurdles ranging from the most basic of education about the safety and benefits of the fuel to the current price premium over conventional jet fuel to availability. "I think foremost among fellow operators I have spoken to...is that misconception about safety, and that's why it's very important that we stress again that [SAF] is safe to use," said Juergen Wiese, head of BMW's flight department and EBAA

chairman. "That misconception is not only on the operator side...but the airport operator and tank farm operator who have some concerns about the safety and the technical aspects."

Getting those operators on board is crucial to the expansion of SAF capacity. It has been described as a "chicken and egg" question. Will there be more SAF because there are more users, or will there be more users because there is more SAF? One has to come first, and the fuel producers, which require investment to build the facilities that produce renewable fuels, need the demand to come first.

John Cooper, the director-general of Fuels Europe, the trade group that represents 40 fuel companies that operate refineries in Europe, noted that his membership acknowledges the changes that will occur in the fuel industry over the coming years as electrification and hydrogen gradually supplant liquid petroleum fuels. But he singled out aviation and maritime as sectors where it will be difficult to adopt these technologies.

"We have put together an integrated strategy to dramatically scale up the production of low carbon liquid fuels with a target of 150 million tonnes by 2050, and that's enough to supply all remaining liquid fuel needs across all sectors where it's still needed," he said. "We do have to

be honest with everybody that producing this way costs more than making petroleum. It's typically capital intensive and that means investing for the long term, where you need stability in the market for sustainable aviation fuels."

Neste is among those businesses that are ramping up the production of SAF, according to Jonathan Wood, the Finland-based company's v-p for renewable aviation. "In terms of production, we have about 100,000 tonnes' worth of capacity currently available and product being distributed across Europe, in North America, and indeed into Asia," he said.

Wood described a \$1.5 billion investment in infrastructure that will increase that amount more than tenfold by the start of 2023. While Neste's current production relies upon the HEFA production pathway, it is looking ahead to a second phase of technology that can utilize other methods and other pathways, and even to e-fuels, which will use renewable electricity to create liquid fuels from hydrogen and carbon taken from the atmosphere.

In her opening statement at the EBAA SAF Summit, commissioner Vălean said the EU Committee expects to adopt a ReFuelEU Aviation legislative proposal before the beginning of the European summer. While the exact terms were not discussed, Filip Cornelis, the European Commission's director for aviation, explained it will involve an SAF mandate that "we hope to shape in a way that will both boost the supply and uptake of sustainable aviation fuels but also maintain and secure a level playing field for operators working out of European airports." He believes the measure should apply to both domestic and international flights; the latter tend to burn more fuel due to the longer distances involved.

As the geographic distribution of the fuel slowly expands, a process known as book-and-claim will become a major tool. "Certainly book-and-claim is being talked about a lot at the moment," said John Angus Smith, Signature Flight Support's EMEA managing director. "It's enabled by the substitutability of SAF for jet-A, and it is key in our view to accelerate the adoption of SAF by our industry."

The plan, which Signature expects to roll out soon across its 200-plus-location worldwide FBO network, enables an operator to purchase SAF in an area where it's not yet available but still receive the environmental benefits while the actual fuel is dispensed elsewhere. "The best analogy I can give you is depositing money for a family member at a local bank," Smith said. "The credit is then transferred to that family member's account in a different country, and it is withdrawn. He explained that the process would bridge the local availability gap and enable the expansion of the market.

Concluded Jet Aviation's Martins: "We know that SAF is already starting to be present [and] it is going to be the future, but we still need to get there. We need to get traction to start the ball rolling." ■

# EBAA chief sounds off on SAF, bizav issues

by Cathy Buyck

With the in-person EBACE show canceled for a second year due to the Covid-19 pandemic, AIN spoke with Athar Husain Khan, secretary-general of the European Business Aviation Association (EBAA), ahead of the virtual EBACE Connect replacement event to get his take on issues affecting business aviation in the region. Though Covid-19 is still an immediate concern that he addressed, Husain Khan is very focused on what he sees as the business aviation community's next biggest hurdle in Europe and elsewhere—the environment. It is no secret that had EBACE taken place this year, sustainability would have been a key focal point of the Geneva show, with sustainable aviation fuel (SAF) at the top of the list as to how business aircraft operators can most immediately cut carbon emissions.

## The European Union seeks to become carbon-neutral by 2050. How does that impact business aviation in the region?

The entire business aviation value chain in Europe takes sustainability very seriously and the sector has been working to reduce its environmental impact in several ways for years and long before the launch of the European Green Deal. We recently presented our strategic plan for advancing the production, availability, and use of SAF in the region and co-hosted the first-ever European Business Aviation SAF Summit. The SAF Summit saw a ridiculous turnout, with almost 1,100 registrations and we recorded around 650 participants at one point in time live on the webinar. This proves how deeply committed our members, operators, and FBOs alike are to carbon-neutral growth and a reduction in CO<sub>2</sub> emissions. It is now embedded in their DNA.

## During the SAF Summit, green advocacy group Transport & Environment insinuated that business aviation in the past has always been at the forefront of technical innovation but now seems to be surpassed by the airline segment. Do you agree with that?

KLM was the first airline worldwide to operate a passenger flight on 100 percent e-kerosene, but for that to conclude that business aviation has been “surpassed” by commercial aviation on technological innovation is a bit too much and slightly unfair on the business aviation industry. The European business aviation community's vision for further deployment of SAF, which we presented at the SAF Summit in April, clearly illustrates our pledge to SAF and how we can push its uptake and distribution further. We do have a track record on innovation—including winglets, weight and balance, flight deck

avionics—and we continue to build on that. For example, the book-and-claim system for SAF is a business aviation invention. It will actually help the geographic spread of SAF uplift in a very effective way.

## The European Commission's long-awaited ReFuelEU Aviation initiative aims to increase the uptake of SAF. The legislative proposal [Ed. Note: which was not yet released when this interview was conducted] will likely include an SAF blending mandate. Does EBAA support this policy tool, which will increase costs and administrative burdens on the industry?

We welcome the ReFuelEU Aviation initiative because it provides for several elements that can push the topic of SAF further, and many of them are aligned with the policy recommendations contained in our SAF strategic vision. A lot of questions still need to be answered—for instance, what the interconnection will be with other market-based measures such as CORSIA, ICAO's carbon offsetting scheme and reduction scheme for international aviation, and the EU emission trading system. In regards to the blending mandate, it will even out the situation across the EU as all member states will impose the obligation to mix jet-A with SAF, and the percentage of the blend should be the same across the EU as well. It will avoid the patchwork that is in the making now. Also very encouraging is the staggered approach—the proportion of SAF will initially be low and gradually increase. It is expected that the mandate will be placed on the fuel suppliers rather than on the individual aircraft operators and thus the additional admin burden should be minimal, at least that is what we hope and lobby for.

## Business aviation in Europe has withstood the pandemic relatively well, certainly compared to the scheduled airlines. Does this compound the image that business aviation is for the jet-set, for the rich who can afford luxury travel and know their way around travel restrictions?

Quite the opposite. The pandemic has enabled business aviation to highlight its profile as a safe alternative to mass air travel, avoiding busy airports and big aircraft, as an on-demand, pragmatic product that does not fly unnecessarily. In addition, the Covid-19 crisis has put the spotlight on business aviation's humanitarian component—flying medical supplies and people needing medical assistance, whether pandemic-related or not; transporting humanitarian



Athar Husain Khan, EBAA secretary-general

relief to remote areas; and providing high-priority travel for governmental and scientific personnel involved in the Covid-19 response.

## What are the main challenges going forward?

Sustainability and post-Covid recovery rank on top of the list. They are followed by three topics that were on the agenda before the pandemic: correcting the wrong perception of business aviation as a luxury, exclusive product; access to infrastructure; and advocating for regulation that recognizes the specific needs and characteristics of business aviation.

## If you were asked to name one overarching concern, what would it be?

Divergence of safety regulations between the EU and the UK. I would hope that the regulators on both sides would be wise, smart, and proactive enough to understand that convergence should remain.

## How is EBAA weathering the Covid-19 crisis?

This has been a challenging time for everyone. In all frankness and honesty, I miss seeing my colleagues in the office. EBAA is a pretty tight-knit and well-balanced outfit. I have a lot of respect for my team's continued commitment and efforts to represent the members' interests throughout the pandemic. Obviously, it is very disappointing for all of us that we had to cancel the in-person EBACE for a second time. It is the premier event for the European business aviation community, with all stakeholders involved in nearly every aspect of business aviation flocking to Geneva to network, do business, and exchange views. ■



Riviera Executive Aviation opened its new FBO terminal in May at Italy's Riviera Airport. The facility, named Hadid Riviera, is managed by Hadid International Services.

## Hadid International Services-managed FBO opens at Italy's Riviera Airport

The former Riviera Executive Aviation, which is now managed by Hadid International Services and has been rebranded as Hadid Riviera, opened its new FBO in May at Riviera Airport, a private jet airfield on Italy's northwest coast. “The launch of the new FBO was planned for April last year, but with the international Covid crisis—and we are still in a situation where nobody really knows when this will be substantially over—we just postponed it,” airport chairman Clemens Toussaint told AIN.

The announcement in 2018 of the Hadid deal with Riviera Airport marked the Dubai-based flight support specialist's first entry into the international FBO space. Hadid also now operates an FBO at Jinnah International Airport in Karachi, Pakistan.

Meanwhile, a runway expansion project at the airport (formerly known as Albenga Airport) is expected to be completed a year from now, in time for the 2022 holiday season, according to Toussaint. A four-week suspension of operations in winter would be required for work to lengthen the runway to 5,900 feet (1,800 meters), but the exact timing of the work would depend on approvals from the Italian authorities.

Toussaint would prefer to operate under a 50-year lease rather than the current 20-year agreement with Italian civil aviation authority ENAC, as this would improve the economics of runway, MRO, and hangar expansion. He said the airport's business model relies on servicing aircraft that use the field as a year-round base. P.S.S.

# EFVS's advantages coming into focus for bizjet pilots

by Mario Pierobon

Low-visibility procedures have been implemented in Europe for several years since the introduction of enhanced flight vision systems (EFVS) for credit and the one-third runway visual range (RVR) reduction. EFVS approaches are currently implemented across European airspace when landing at CAT I runways, using EFVS to 30-meter (100-foot) decision height.

The European Union Aviation Safety Agency (EASA) is currently working on the implementation of EVS-to-land that uses EFVS to touchdown and rollout. The related "CS AWO EFVS-Landing" certification specifications are set to publish later in 2021.

## Progress So Far

According to Dror Yahav, CEO of Universal Avionics, EFVS implementation has so far been limited because the operators need to perform airport investigations to ensure safety margins. "As EFVS is expected to continue and become more common, EASA and the EU are working to establish more streamlined processes where the airport certification for EFVS will be done by the airport itself, lifting some burden from the operators," said Yahav.

EASA has certified EFVSs on business aircraft based on HUDs and infrared cameras. "Some aircraft also implement combined vision systems [CVS], which are a combination of EFVS and synthetic vision systems [SVS], that provide a depiction of the surrounding terrain based on a terrain database," an EASA spokesperson told *AIN*.

"EFVSs have been certified for an operational credit on the decision height. It is permitted to reduce the decision height/altitude to a value not less than 100 feet on precision and nonprecision approaches. At the published minimum,

the approach can be continued if visual references are seen with the help of the EFVS. At an EFVS minimum of not less than 100 feet, the visual references must be acquired with natural vision to continue the approach," the spokesperson added.

The Single European Sky ATM Research Joint Undertaking (SESAR JU) has carried out extensive testing and demonstrations of the EFVS solution, which was delivered by the program in 2019. "We are delighted to see the equipping of aircraft with this SESAR solution and implementation of EFVS operations starting in Europe," said SESAR JU executive director Florian Guillermet.

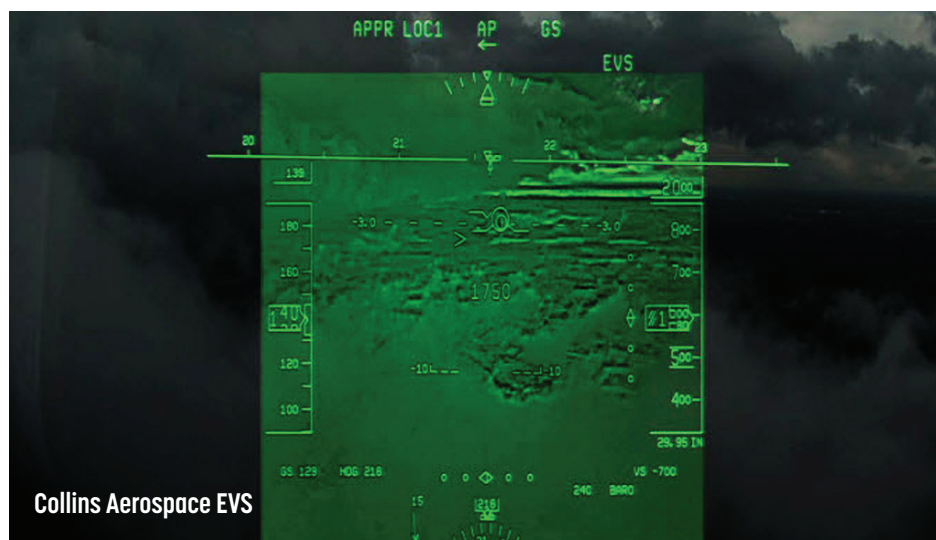
## Enhanced Vision Technology

Enhanced vision systems (EVS) are



Universal ClearVision EFVS

available on most midsize and large business aircraft. "Collins Aerospace EVS is available on several Bombardier and Embraer flight decks, as well as on the Boeing BBJ. It is a light and aerodynamic solution certified for EFVS low-visibility operations when paired with a HUD," said Lorrin Johnson, principal marketing manager for transparent displays and vision systems at Collins Aerospace.



Collins Aerospace EVS



Dassault FalconEye

"With just three sensors within one camera, we have an EFVS approach and landing certified product that has achieved the highest visual advantage attainable today."

Yahav observed that EFVS as part of super-midsize and larger business aircraft is done mostly as a forward-fit option or standard equipment, but in some cases is also available as a retrofit. He aims to expand the market with the company's ClearVision EFVS solution, which is developed and certified based on a wearable HUD called the SkyLens Head-Wearable Display (HWD).

"SkyLens allows the technology to become relevant and affordable to two market segments, in particular new small and medium-size aircraft—where the HWD can fit—and retrofit aircraft, where installation becomes easier and more affordable," he said. "In addition, the SkyLens HWD allows unlimited field of regard, which provides new functionality such as panoramic synthetic vision."

An EVS-equipped aircraft enables more than just lower operating minima, according to Collins's Johnson. "The EVS provides greater situational awareness during night flights, helps prevent the surprise of runway incursions, and allows pilots to see through weather and low-visibility conditions during all phases of flight. This makes improved pilot safety another key reason to fly with EVS," she said.

"SVSs and synthetic vision guidance systems [SVGS] are also available for business aircraft," Johnson added. "Embraer's Praetor was first in the industry to certify SVGS heads down back in November. SVGS allows pilots to receive lower operating minima on a special authorization CAT I runway with a certified SVGS system and a head-down display [no HUD required], changing the 200-foot decision height [DH] to 150 feet DH for CAT I landings. Our third vision system product, Collins Aerospace CVS, overlays EVS and SVS in a single blended

image, providing a truly combined solution. Vision system and HUD options are available for retrofit at the OEMs's discretion on select aircraft."

Dassault has certified an operational CVS known as FalconEye, which is EASA and FAA certified for EFVS 100-foot operations. The system is currently available on the Falcon 8X, 900LX, Falcon 2000 series, and will also be on the Falcon 6X and 10X when certified in 2022 and 2025, respectively.

"This EVS, produced in partnership with Elbit, which comprises six nose-mounted sensors and the HUD, has a field of view of 40 degrees horizontal by 30 degrees vertical, showing the EVS and SVS imagery separately," a Dassault spokesman said. "This EVS camera is multisensory and embeds fusion algorithms. It is designed to see LED lights to overcome the limitation of the first generation of EFVS."

"The use of six different sensors allows it to present the best images from both the near-visible and infrared spectrums. For example, one can detect LED runway lighting before the pilots' naked eyes could. Four sensors are dedicated to light detection during daytime operations. One is dedicated to night conditions and one thermal sensor is used for terrain imaging."

## Increasing Airport Access

Indeed, medium and small airports, with their limited resources to invest in advanced ground infrastructure to support all-weather operations, have significant potential gains to derive from EFVS technology.

"The cockpit solution increases the performance and reliability of landing operations and enables business aviation, regional, and even commercial airspace users to access all airports, but especially secondary ones, no matter what the weather, thereby avoiding cancellations, diversions, and delays," said SESAR JU's Guillermet. "We hope to see more airports declared suitable for EFVS operations so that they can benefit from this safety-enhancing solution." ■



# European industry groups, regulators tackle fatigue

by Mario Pierobon

Regulators and industry groups are increasingly becoming concerned about risks related to fatigue that are inherent to business aviation and have been developing new regulatory requirements and industry best practices to address this issue. The European Union Aviation Safety Agency (EASA) has cited a number of typical fatigue hazards in business aviation, including operations at short notice, long standby at home or in the hotel, frequent change of duty assignments, time zone crossings, and long positioning.

Schedule-related risks and individual factors are the two main sources of fatigue risk in business aviation, said Matthew van Wollen, senior project manager and CFO at Pulsar Informatics. “A robust fatigue risk-management program recognizes these sources and makes safety promotion a shared responsibility between the organization and individual flight crewmembers,” he said.

It is a business aviation operator’s responsibility to create schedules that provide sufficient opportunities for rest between duty periods. “This is not trivial—especially when travel over multiple days and across multiple time zones is involved. Air travel also frequently experiences delay due to weather, airport traffic, passenger requirements, and so on. In addition, the nature of human fatigue and alertness is governed by a nonlinear biological process that is complex and highly sensitive to factors such as naps, daylight exposure, and even workload,” van Wollen said.

According to the European Business Aviation Association (EBAA), the lack of predictability is one of the contributors to fatigue. “It is also important to observe that our crews fly a lot less than airline pilots. Therefore, for our industry, we do not normally speak of fatigue but rather of tiredness,” an EBAA spokesman said.

“Unlike their airline colleagues—given the low number of annual flying hours—cumulative fatigue is rarely a problem for business aviation pilots,” he continued. “Due to the unique operational model crews are more prone to fatigue problems associated with a peak activity or a relatively complex or long mission. The periods of more or less intense activity are generally followed by long periods of lull, which allow the crews to recover. Regarding the mitigating actions, following an appropriate fatigue risk-management scheme and implementing flight-time limitations [FTL] systems would serve as barriers to fatigue-related occurrences.”

Under a fatigue risk-management scheme, the individual crew’s responsibility is to report for work fit for duty. “How can this be accomplished?” asks van Wollen. “By making sleep a priority during time off and being sure to obtain the seven to nine hours of sleep per day recommended by health authorities.”

The reality is that many people do not consistently obtain the optimal amount of sleep, for a variety of personal circumstances including caring for a new baby or elderly family member, working a second



“The problem for our industry is that the fatigue risk-management system is based on historical data.”

job, performing home renovations, or other projects, according to van Wollen.

“Even simple things like staying up late watching Netflix can adversely affect sleep,” he said. “Then there are medical conditions, including not only sleep issues (sleep apnea, insomnia) but also body pain, anxiety, and depression that can interfere with sleep. Because there are so many potential pitfalls in assuring enough sleep, organizations invest in technologies such as the psychomotor vigilance test, an objective assay to verify and validate fitness for duty.”

Today, in European Union (EU) member states, the prescriptive limits of Annex III to Regulation 3922/91 apply to commercial business aviation to a certain extent. “However, the maximum daily flight duty period in emergency medical services by airplanes [AEMS] and in single-pilot operations is regulated by national rules. Also, Annex III to Regulation 3922/91 does not mandate a fatigue risk-management system [FMRS],” said a spokesperson for EASA.

To update and harmonize the legal requirements and promote fatigue risk management, in 2017 EASA published a notice of proposed amendment (NPA) to the air operations regulations on FTLs for air taxis, AEMS, and helicopter emergency medical services. “The NPA used the input from five studies, specifically commissioned by EASA to substantiate its proposals. Three studies specifically deal with hazards and mitigations in those

operations and include a scientific study commissioned by EBAA and the European Cockpit Association,” said EASA.

Based on the NPA and feedback provided by stakeholders, EASA is planning to publish an Opinion of FTL for some business aviation operations (air taxi and AEMS) in the third quarter of 2022. “The Opinion contains requirements for a fully-fledged FRMS (appropriate for large and complex operators), as well as for FRM principles regarding certain duties—e.g., night duties appropriate for small and non-complex operators,” said EASA.

According to van Wollen, the best practice is to have an FRMS in place that is integrated with the scheduling system to ingest schedule changes as they are made in real-time, as well as a flight crewmember data collection system to collect subjective and objective information about fatigue levels from flight crews. “These systems need to be complemented by appropriate workflows, policies, and risk controls—all of which should be documented in an FRMS manual,” he said.

Currently, FRMS implementation is not very common, although business aviation operators do see the benefits of having such a system in place, according to EBAA. “Business revolves around reputation and EBAA’s members acknowledge that the upfront money and time investment in implementing the FRMS and training their personnel outweigh the potential implications of a safety occurrence caused by fatigue,” said EBAA. “The only problem for our industry is that the FRMS is based on historical data. This is a huge issue for our operators that rarely fly the same mission twice.”

The International Standard for Business Aircraft Operations (IS-BAO) was the first standard to mandate—in 2012—a fatigue-management program, which is different from a FRMS. “IS-BAO audits validate that the operator has at least the prescriptive elements (performance-based elements optional) and a systemic approach to fatigue-risk reduction,” said a spokesperson for the International Business Aviation Council (IBAC), which manages IS-BAO.

Wearable electronics and biomathematical models are slowly becoming more common. “However, it is a long winding road until the operator gets a slightly clearer picture of where its roster/planning will likely create hot spots for fatigue impairments and fatigue calls. At least one large operator managed to greatly reduce the number of those calls and repaid for its FRMS by preventing the usual disruption and costs that follow,” said IBAC.

“Considering how intrusive and legally challenging fatigue management can potentially be, building confidence and fine-tuning the system to adjust to human variability can easily take years.”

## EBAA ambassador program to elevate bizav

EBAA has launched a peer-networking program—dubbed EBAA Ambassadors—that brings industry leaders together in closed workshops and forums to address the biggest challenges and opportunities facing the business aviation industry. According to EBAA, these leaders will come together several times each year to reflect on the industry’s most pressing issues.

“As leaders of the industry, they are raising the standard in the ever-changing and evolving world they operate in,” EBAA said. “Ambassadors will be briefed on political and public policy developments that impact the sector and are committed to giving back in the areas of sustainability, diversity, innovation, and responsible business practices.”

“The companies share a common

commitment to create a more sustainable, diverse, innovative, and responsible business aviation industry,” added EBAA COO Robert Baltus. “They are aware of the challenges we face on a daily basis and are committed to accelerating positive changes to overcome them.”

Complementing this initiative, EBAA has also created a virtual platform to share stories about EBAA Ambassadors, celebrate their achievements, and allow space for discourse on making a change for the better. So far, 15 companies have signed up to the program: Air BP, Bombardier, CAT Aviation, Dassault Aviation, DC Aviation, Duncan Aviation, FlyingGroup, Jetcraft, Jet Maintenance Solutions, JSSI, MedAire, NetJets Europe, Primus Aero, UAS International Trip Support, and VistaJet. **C.T.**





Duncan Aviation has developed new capabilities for hydrodipping large components such as table inserts or galley tops. A film-transfer process, hydrodipping costs much less and is more sustainable than traditional treatments for wood and other cabin interior materials.

## Business aircraft cabins going green

by James Wynbrandt

Business aviation’s push for sustainability and carbon neutrality has entered the cabin as the interiors of aircraft from turboprops to executive airliners are going green. And OEMs, completion and refurbishment centers, and interior components providers are all getting onboard. Were EBACE held physically this year, these efforts would doubtless be center stage, as the Continent’s aviation community has embraced the goal of achieving net-zero CO<sub>2</sub> emissions by 2050.

“Supply chains are taking sustainability very seriously—that’s the big turning point,” said Daron Dryer, CEO of Comlux Completion, the VIP cabin-outfitting division of Switzerland’s Comlux Group.

“Today, action on sustainability is really an important competitive criterion,” said F/List director of research and development Domnanich Patrick. “Not only the end customers, but also the OEMs are demanding verifiable sustainability from suppliers and partners.”

Indeed, Gulfstream Aerospace mandates “environmentally conscious business practices” in its suppliers’ code of conduct, complementing the airframer’s extensive internal sustainability efforts, said company interior-design director Tray Crow.

Sustainable materials and processes are found throughout Gulfstream’s cabins, with extensive use of renewable natural fibers like cotton and wool, as well as materials derived from renewable resources such as natural latex and composite veneers. Sustainable materials are also used “in places that don’t always come to mind—those invisible areas behind the walls, under the floors, and inside the furnishings,” Crow said.

Many of the materials are recyclable, as well. Cabinets—mostly aluminum

honeycomb—can be fed directly into a smelter; carpets are recyclable, while synthetics such as nylon and polyester are sought after by carpet mills to use as feedstock to create more carpet; and natural fibers such as silk or wool “can have second lives as jute, rags, or feedstock for paper mills,” he added.

Meanwhile, as aircraft become increasingly sophisticated and integrated platforms, their systems work together to enhance sustainability in concert with other operational efficiencies, and “much

of our focus on increasing sustainability has been through technology,” Crow said. He cited the data concentration network onboard the new Gulfstream G500 and G600, which in addition to providing operational benefits “significantly reduces the amount of wiring required for the cabin, galley, and flight deck systems,” saving weight and materials.

Textron Aviation’s Beechcraft and Cessna aircraft also have increasingly sustainable cabins. Woods are sourced solely by selective cutting in carefully managed forests and leveraging surplus inventory “so that no new trees or other materials are processed or shipped, to help reduce our [environmental] footprint,” a Textron spokeswoman said.

Textron also uses materials from vendors whose products and practices meet rigorous environmental standards, including fabric headliners and window reveals

**“Supply chains are taking sustainability very seriously...”**

—Daron Dryer, CEO of Comlux Completion



Embraer’s Praeterra interior design concept draws inspiration from the Japanese Mokume-gane technique, which uses mixed-metal laminates made from discarded materials.

made from sustainable textiles from Pollock’s “Pure” Collection and wood veneers certified by the Forestry Stewardship Council from Booth Veneers. “These are a few examples of the many concepts we focus on when designing with sustainability in mind,” the spokeswoman said.

Further reducing the aircraft’s overall environmental footprint, Textron captures, treats, and reuses wastewater from its industrial processes, including parts manufacture, chemical processing lines, assembly, and painting.

Brazil’s Embraer Executive Aircraft aims for a highly sustainable luxury interior, a company representative told AIN, which is a goal pursued on multiple fronts. Working rigorously with current and potential suppliers, the Phenom, Legacy, and Praetor business jet manufacturer is expanding its portfolio of materials that meet the company’s sustainability criteria.

Furthering its aims, Embraer’s recently introduced Praeterra design concept features a multidimensional sustainable interior that merges the digital future with sustainable resources, according to the company. The design draws inspiration from “Mokume-gane,” a Japanese technique of making mixed-metal laminate, employing discarded materials—including titanium, copper, and plastic—as ingredients in, for example, cabinetry and tabletop surfaces made from palm tree wood sourced from commercial cultivation, rather than using wild heart of palm fruit.

### Supply Chain has Come a Long Way

Comlux Completion has been committed to sustainability since opening the hangar doors of its purpose-built completion center in 2012, said CEO Dryer, starting with the facility’s designed-in passive and active energy reduction methods, including natural and controllable lighting and environmental systems. What garnered more industry attention was consistent delivery of its luxury cabins at below contract-specified weights, resulting in significantly reduced fuel consumption and the attendant carbon footprint.

“Ten years ago, the cabins were lighter and synthetic, but I wouldn’t call them sustainable,” said Dryer, because few sustainable materials were available then. As he noted, the supply chain has since come a long way.

“Today’s wood-grain veneers are made from reclaimed and repurposed veneers,” he said. “You cannot tell the difference [between] these reclaimed products [and non-sustainable alternatives], and you get more usable material and more supply.”

Customer demands have changed in lockstep. “Clients are now asking specifically in proposals what you are doing [in the interior regarding sustainability].”

Comlux will offer repurposed veneer as an option on the forthcoming ACJ220, whose cabin it will design and outfit. The company has partnered with Airbus Corporate Jets to outfit the first 15 of this newest member of the ACJ family.

Among other Comlux recycling/repurposing initiatives, its design studio donates all carpet and leather samples to local schools and other community institutions. “We’re trying to ensure we support sustainability at an individual and company level,” said Dryer.

At its Basel completion facility, Jet Aviation—which already incorporates robust weight-reduction programs and research—is investigating sustainable materials for use in its high-end completions and refurbishments, with preliminary burn testing on some candidates underway. Concurrently, the executive airliner completion and services specialist is in discussions with potential corporate collaborators on sustainable aviation design, fuel efficiency, and avionics programs, the company told AIN.

Meanwhile, the company said new products and processes—UV light curing for cabinetry surfaces, water-based paints, and plant-based leathers among them—are enhancing cabin sustainability without sacrificing the look, feel, and quality that VIP applications and customers demand.

“We are committed to investing in solutions that provide business aviation owners and operators the choice to contribute to sustainable aviation,” Jet Aviation said. “While the most important thing in VVIP completions is to ensure that we meet customer requirements in design, environment, and functionality of the aircraft, we are continuously innovating techniques that reduce the environmental impact of the finished cabin.

### F/List Sets Net-zero Goal

Austria’s F/List—which pioneered VIP cabin innovations such as heated, ultra-thin stone and wood flooring—is also committed to bringing the Continent’s net-zero goals to its own operations and products. The company’s roots in using natural materials—wood, leather, and stone—for high-end aircraft interiors have made sustainability a foundational principle, said F/List’s Patrick.

“We have two approaches,” he said. “First, we focus on making our processes more sustainable, using less energy and cutting down emissions. Second, we focus on lightweight designs that create fuel-saving products.”

Its sustainable process efforts include reducing energy consumed in production, avoiding the use of solvents and mineral oils, and sourcing responsibly (and locally, where possible). The woods used in its veneers for European and North American customers, for example, are sourced from their respective continents to reduce the energy used in transporting the materials without sacrificing quality, of course. All these sustainable materials must meet stringent safety and flammability standards, in addition to offering the comfort, aesthetic, quality, and wear standards of the world’s most high-end consumers.



F/List aims to make its manufacturing processes more sustainable while developing new designs for interior materials that are lighter and use fewer solvents and mineral oils.

A photovoltaic system installed at its Austrian headquarters facility and efficient heat-recovery systems dramatically decrease the plant’s carbon footprint.

F/List also collaborates with startups that have developed superior sustainable technologies and products. “We focus on modifying these technologies [so the products] meet our highest expectations for decorative materials in aviation,” Patrick said.

One example: in a joint venture, F/List and Hilitech are developing lightweight cabin systems and composite components using carbon monocoque technology initially developed for Formula 1 race car construction. “Reductions of about 30 percent compared with conventional aircraft interior design have been realized,” Patrick said.

Bionic design—those inspired by nature that save weight and material by supporting loads and forces only where needed—is another area of its sustainability research. Other initiatives aim to convert agriculture residuals and industrial leftovers—from banana leaves to the byproducts of its own stone machinery department—into sustainable cabin-interior surface materials.



This credenza top and card table are finished using Duncan Aviation’s hydrodipping process, which replicates surfaces that look like the real materials.

**“We focus on modifying these technologies [so the products] meet our highest expectations for decorative materials in aviation”**

F/List director of research and development  
Domnanich Patrick

If a new generation is driving some of the sustainable-interiors movement, old-school purveyors are doing their share, as well. The UK’s Muirhead Leather, established in 1840, claims to be among the world’s most “environmentally focused leather manufacturers,” with an expertise in creating “the most natural, lowest-carbon, high-performance leather for seat covers,” said sales director Archie Browning.

Today, Muirhead collaborates with airlines, aircraft manufacturers, and aviation design studios to develop interiors

solutions for the future, he said. The newest innovation, Muirhead Active Hygiene Leather, is a sustainable leather impregnated with antimicrobial Polygiene ViralOff, which reduces the need for labor and caustic material to create sanitary interiors.

### Hydrodipping: A Sustainable Refinish

For cabin refurbishments, Duncan Aviation’s hydrodipping process offers a sustainable, low-cost alternative to refinishing wood and other interior elements, and infinitely more options for the finished look. A film-transfer process, hydrodipping allows a detailed 3D image to be transferred onto almost any complex, solid shape, whether an image of fine grain wood, marble, a fanciful scene, or anything in between.

Used primarily in the automotive arena, the process involves dipping the selected component in a vat of water containing the film, and carefully joining the two. “We got the idea to try adapting it for table inserts or galley countertops,” Duncan sales representative Angie Coleman said.

Duncan spent about two years experimenting and developing hydrodipping processes and techniques that met all EPA requirements, replicating surfaces such as carbon fiber tabletops indistinguishable from real materials, and achieving “fantastic” results, Coleman said. The Lincoln, Nebraska company introduced the refinishing option in late 2019, creating faux marble lavatory countertops and sinks for a Gulfstream G150 and Bombardier Challenger 300.

Most of Duncan’s customers choose hydrodipping for its cost advantages—some 20 to 25 percent below re-veneers. But, Coleman said, “For somebody who wants to be environmentally friendly, you’re keeping the existing veneer, not cutting into more trees, and getting the same elegant look.” However, she stressed that that re-veneered wood remains “a beautiful, natural product.”

But re-veneering might not make economic sense for light and midsize aircraft, or Part 135 aircraft that get heavy charter use. Repairing damaged veneer is costly and the grain might be impossible to match. Conversely, damaged hydrodipped surfaces can simply be replaced with an identical film.

Hydrodipping options have advanced beyond sinks and tabletops. After a customer asked if a cabinet could get the film coat, the Duncan finish team procured a cow watering tank and developed a mechanical arm that could dunk an entire galley or interior cabinet. Since then, the company had a custom dip tank and dipping equipment made to handle these larger pieces. The first hydrodipped cabinet for a customer debuted on a Cessna Citation XLS in January.

Now, Coleman added, an owner of a large-cabin Gulfstream wants a cabinet hydrodipped, which would demand a larger tank. “We’re working on it right now,” she said of the needed equipment. ■

# Travel restriction relaxation to aid recovery in Europe

by Cathy Buyck

Europe's business aviation activity so far is lagging behind the recovery pace witnessed in other regions, specifically compared to North America, but the gap is likely to narrow in the second half of this year, analysts predict.

"What we typically see is that Europe is a couple of months behind North America in terms of overall market recovery," said Travis Kuhn, v-p of market intelligence at Argus International. North America recorded gains exceeding 2019 levels in both March and April—business aviation logged 266,585 flights in the U.S., Canada, and the Caribbean in March, 33 more than in March 2019, and completed 262,277 flights in April, 359 more than in April 2019, according to Argus TraqPak data.

"In Europe, I expect August to be the first month that breaks through the 2019 numbers," meaning business aviation movements, he said. "August 2020 was a strong month in Europe. It marked the first growth spot in terms of year-on-year growth since the pandemic began and activity actually exceeded activity levels of August 2019. I expect August 2021 to be equally strong." Recovery to pre-pandemic business aviation flight activity in Europe could even be as early as July, Kuhn added.

The positive trajectory assumes no new spikes in Covid-19 cases and the lifting of travel restrictions as vaccination programs expand across the region. "There is a move in a positive direction on that," according to Kuhn.

Several European countries have announced inoculated travelers would be welcome to visit quarantine-free—such as Italy from mid-May—and the

EU is expected to roll out this month an EU-wide Covid-19 certificate attesting that a person has been vaccinated against coronavirus, received a recent negative test result, or recovered from the disease. The system—which will be valid in the bloc's 27 member states and open for Iceland, Liechtenstein, Norway, and Switzerland—aims to reinstate free movement inside the region and revive the beleaguered tourism industry. The UK has also allowed some international travel starting May 17.

"There is a great deal of pent-up demand and if that pent-up demand is released, then there will be a surge of business aviation activity," said Richard Koe, managing director of Hamburg, Germany-based market intelligence provider WingX Advance. "It's not a matter of if. It is a matter of when," he added, pointing out that business aviation in Europe is heavily leisure-oriented in summer. In fact, up to 60 to 70 percent of European business aviation traffic is leisure-related in summer.

## Strong Comeback

"So it is quite critical that travel restrictions get lifted sooner rather than later," Koe stressed. The comeback of business aviation flying will be "pretty strong" in the second half of the year, he contended. Koe predicts a 30 to 50 percent increase of activity year-over-year but a shortfall of 15 to 20 percent versus 2019 levels. "That is a lot less good than in other parts of the world. We think that in North America there is a good chance that in the next six months pre-pandemic activity will be pretty much completely recovered."



The recovery path to pre-Covid levels will be uneven across the region, observed Koe. He predicts UK activity will be "at least" 35 percent less in the second half of the year compared to where it was in the same period in 2019 owing to Brexit and the government's reluctance to ease international travel bans despite high vaccination levels. "The UK will be right at the back of the pack, which is somewhat ironic and kind of undermines the argument that vaccine programs will lead to [air travel] recovery."

An Argus TraqPak forecast calls for a 3.3 percent increase in business jet and turboprop flights in Europe in August compared to the same period in 2019. Growth is expected to slow down in September due to the seasonality of activity in the region, resulting in a 4 percent decline from September 2019 but still a 6.1 percent year-over-year gain. For October, November, and December, Argus's outlook calls for 0.6 percent, 2.4 percent, and 0.4 percent gains over the same respective months in 2019.

Kuhn believes that flight activity in the second half of the year in Europe will come in about 3.1 percent down versus the second half in 2019. Meanwhile, he foresees North American business aviation flying to climb 2.5 percent in the second half versus the last six months of 2019.

"The top end, the large-cabin international operations are still heavily

suppressed," explained Kuhn. In the first four months of the year, large-cabin activity was down 32.3 percent from the same period in 2019, while flights operated with turboprops and light jets were down only 19 percent and 18.6 percent, respectively.

"We are observing a similar pattern in Europe as we have seen in the U.S.—a lot more short-haul domestic and regional travel and a lack of long-haul flying international flying," he said. "While the large-cabin segment will probably improve throughout the summer, I still expect a double-digit decline in activity in the next few months compared to 2019."

The EU in March last year closed its external borders as a measure to contain the further spread of the virus within the bloc, halting nearly all intercontinental traffic. Brussels in early May this year recommended easing restrictions on non-essential travelers from outside the EU and allowing entry into the bloc for foreign citizens and non-residents who are fully vaccinated or coming from countries with a so-called "good epidemiological situation."

At press time, member states had not yet endorsed the proposal, and travel into the EU was allowed from only eight countries—Australia, Israel, New Zealand, Rwanda, Singapore, South Korea, Thailand, and China (subject to confirmation of reciprocity).

Long-range, large-cabin business jets are definitely still less active than before the pandemic, Koe confirmed. "Interestingly, that segment is seeing a lot of demand in the global aircraft transaction market from very wealthy people who have not been in the market before the pandemic," he noted.

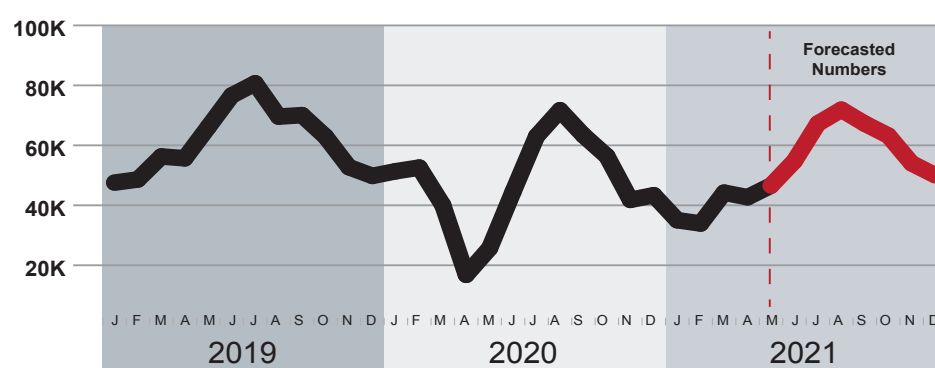
Flying in a controlled environment, away from crowded airports and large commercial aircraft, has become more of a theme, according to Koe. "A private jet is perfectly curated, all the complications are effectively managed by expert brokers, who even if restrictions are in place have a way of handling that."

## April 2019 vs April 2021 flights

Type of Aircraft	APRIL 2019	APRIL 2021	
Turboprop	15,412	12,480	-19.0%
Small Cabin	13,280	10,804	-18.6%
Mid-Size	12,049	9,292	-22.9%
Large Cabin	14,939	10,120	-32.3%
Total	55,680	42,696	-23.3%

SOURCE: ALL CHARTS ARGUS INTERNATIONAL TRAQPAK

## BUSINESS AVIATION FLIGHT ACTIVITY IN EUROPE



## 2021 versus 2020 number of flights

Country	2021 Flights January-April	2020 Flights Entire Year
France	22,544	84,172
Germany	20,200	71,594
UK	12,955	63,944
Spain	10,159	40,760
Switzerland	10,063	35,059
Italy	8,980	34,338

# Data for safety offers collaborative FDM for business aviation in Europe

by Mario Pierobon

Since flight data monitoring (FDM) programs are currently mandated in Europe only for aircraft with an mtow above 27,000 kg (59,525 pounds) and operated commercially, there is a limited number of business aircraft operators that are required to have FDM. However, due to the importance of safety in the business aviation sector, several operators already have an FDM program in place. In more recent times, with safety management systems (SMS) becoming more mature, additional sources of safety data have grown, and with this richness, the potential to generate useful insights from the data has also grown.

Much like in commercial aviation, collaboration is critical to safety in business aviation, and government and industry are working together in this field. “An example of this collaboration is the FAA’s Commercial Aviation Safety Team (CAST), which comprises representatives from airlines, manufacturers, labor, and government that analyze data from accidents and safety incidents to improve commercial aviation safety,” said Gunter Ertel, senior program manager of system safety at Boeing.

Currently, however, there is no organized data sharing specifically for business aviation, both globally and regionally in Europe. “We see that there are some initiatives where individual operators share a limited amount of data between themselves, but this remains on a ‘best practice sharing base’ only,” said a spokesperson for the European Business Aviation Association (EBAA). “In Europe, the recently launched Data for Safety (D4S) is coming to the end of the proof-of-concept phase in 2021 and is planned to start including new operators in 2022.”

D4S is a data collection and analysis program with the goal to ensure the highest common level of safety and environmental protection for the European aviation system. “The program aims to collect and gather all data that may support the management of safety risks at the European level. This includes safety reports (or occurrences), flight data (i.e., data generated by the aircraft via the flight data recorders), surveillance data (air traffic data), weather data—but those are only a few from a much longer list. However, this does not specifically target business aviation,” said EBAA.

“When and how smaller business aviation operators will be able to join D4S is still under evaluation, however, we support EASA in the effort to bring forth a system that further increases safety and operations in the European aviation sector,” it added.

Sources for safety data sharing range from airplane-recorded flight

parameters to ADS-B Out, weather data, and ground-based radar surveillance to many different forms of voluntary reporting information all within the confines of appropriate governance and data protection, according to Ertel. “Different data sources and information provide different benefits. Generally speaking, airplane recorded data is often used in the context of safety performance indicators [SPI],” he said.

“An SPI could be thought of as a precursor element to an undesired outcome (i.e., an airplane accident or incident). Reporting information can give specific insight into certain types of incidents and often adds a human element to the

story.” Sharing safety data can be difficult because the bulk of the relevant data is often proprietary to a particular stakeholder, be it an air operator, original equipment manufacturer, or maintenance provider. “A fundamental trust between the industry and government to adhere to the voluntary, non-punitive, ‘just culture’ concept makes data sharing possible,” Ertel said. “The main role of the regulator in this context is, in part, to facilitate the collaboration by bringing stakeholders together.”

Indeed, government and industry working together with the same goal of improving aviation safety have provided a fertile ground for the initiatives and

data sharing programs that exist today. “Critical mass is absolutely necessary to make valid assumptions about the data analyzed. There is more work to do and there are several regional efforts to establish safety data-sharing programs, such as D4S in Europe and APshare in the Asia Pacific,” Ertel said.

As a way to sustain the path towards safety data sharing, EBAA invites operators to join FDM programs and to make FDM a part of normal daily operations, even though FDM is not mandated for a significant part of the business aviation fleet. “Safety is, and always will be, priority number one in business aviation. Safety efforts should include the installation of quick access recording equipment on board the aircraft on top of the normal ‘black’ box commonly known to most people. This additional recording equipment is needed to participate in an FDM program as the data they produce are more widely accessible,” concluded EBAA. ■



Aircraft landing and taking off from London City Airport are now remotely managed from an air traffic management facility 72 miles away.

## Remote ATC services begin at London City Airport

by Charles Alcock

London City Airport in April became the first significant international airport where traffic is fully managed from a remote digital air traffic control tower. Landings and takeoffs are now overseen from the air traffic control center operated by air navigation service provider NATS at Swanwick on the south coast of England, which is 72 miles from the airport that lies in the heart of the UK capital’s financial district.

NATS controllers receive live video and audio feeds from the airport, with 16 high-definition cameras and sensors mounted on a 164-foot-high digital control tower providing a 360-degree view of the airfield. These feeds are relayed via secure fiber networks to the Swanwick

facility, where they are displayed on 14 high-definition screens.

This technology was developed by Saab Digital Air Traffic Solutions, which has previously demonstrated its use at the far smaller Ornskoldsvik and Sundsvall airports in Sweden. Video images can be overlaid with digital data about real-time operations to provide controllers with a so-called “enhanced reality” perspective.

The combined visual display can include information such as call signs, altitude, and speed for aircraft approaching and departing London City, as well as weather readings and any tracked moving objects. The on-site cameras have a pan-tilt-zoom feature that allows controllers

to magnify images up to 30 times for closer inspection.

London City’s digital control tower was installed in 2019 and the remote control process has been extensively tested since then. The original air traffic control tower will now be redeveloped as part of the modernization program at the airport, which received more than five million passengers in 2019.

“This is the UK’s first major digital control tower and represents a significant technological and operational achievement, especially against the backdrop of Covid-19,” commented NATS operations director Juliet Kennedy. “Digital tower technology tears up a blueprint that’s remained unchanged for 100 years, allowing us to safely manage aircraft from almost anywhere while providing our controllers with valuable new tools that would be impossible in a traditional control tower.”

On April 29, new legislation came into effect in the UK to modernize the country’s airspace and tighten control on the illegal use of unmanned aircraft. The Air Traffic Management and Unmanned Aircraft Act will support efforts by the Department for Transport to make improvements to the way airspace is controlled. The government has yet to publish a detailed plan and timeline for the improvements, which it says will reduce carbon emissions from air transport.

There have been several programs in the U.S. aimed at exploring the potential for remote tower air traffic control at airports, including Leesburg Executive in Virginia and Northern Colorado Regional in Loveland. In 2017, libertarian think tank the Reason Foundation published a study urging the federal government to take this approach to reduce costs associated with the FAA’s provision of air traffic management services. ■



# International FBOs shine in AIN's annual survey

by Curt Epstein

Though the past year was one unlike any other the business aviation industry has faced due to the Covid pandemic and its chilling effect on global aviation, there remained at least one thing that went on as normal, uninterrupted: the **AIN** FBO Survey. For more than three decades, **AIN** has conducted its annual survey, in which we ask our readers to rate the FBOs they frequent worldwide.

Readers are given the opportunity to evaluate FBOs they visited during the previous year in five categories: line service; passenger amenities; pilot amenities; facilities; and customer service representatives (CSRs). For each of these categories, the participant is asked to assign a number from 1 to 5, with 1 being the lowest. **AIN's** online survey database now offers respondents a comprehensive list of 4,500 FBOs worldwide, and here we present this year's top finishers in Europe, Middle East, and Asia.

## EUROPE

### 4.66 Farnborough Airport (EGLF), UK

Of course, the 60 percent dip in 2020 aircraft movements compared with the 32,000 recorded in 2019 was a shock to the system, but overall the UK's Farnborough Airport has shown resilience

throughout the ongoing Covid-19 crisis and continued its more than decade long reign as the most highly-ranked FBO outside of the Americas in the **AIN** survey.

While FBOs outside North America tend to lag in terms of scores, Farnborough's overall rating is high enough that the FBO, which was ranked second-highest in the world by readers this year in the facilities category (4.85), would place among the top 10 percent of North American service providers.

Its immaculate three-story, 52,000-sq-ft business aviation terminal features VIP customer lounges that can accommodate

up to 60 people for high-volume flights, conference rooms, crew lounge, and snooze rooms, work area, passenger and crew shower facilities, laundry service, and gymnasium. Drive-through customs and immigration clearance is available, along with an on-airport hotel (*The Aviator*).

CEO Simon Geere, who succeeded Brandon O'Reilly in July 2020 following the September 2019 purchase of the property by Macquarie Infrastructure and Real Assets, now feels able to anticipate a resurgence in activity as travel restrictions start to lift.

Geere told **AIN** that he anticipates a "sharp recovery" with business aircraft operators better placed to respond to demand for flights than airlines that face ongoing struggles to manage yield and profitability from their less flexible scheduled services. While acknowledging that business aviation has suffered with "expensive assets parked on the ground,"

he said it has been encouraging to see new customers gravitating toward private charter services in the months between the UK's three national lockdowns when travel was permitted.

Evidence of this glass-half-full perspective can be seen in plans to add a third hangar to add to the pair of three-bay units already on-site that offer 240,000 sq ft of climate-controlled shelter. The company will seek approval for this construction later this year, as part of a process in which it works closely with local authorities to manage growth within the currently agreed confines of 50,000 annual movements.

Farnborough is also proud of its standing as the first purpose-built business aviation airport to be certified as carbon-neutral.

"Our main focus now is on further improving the customer experience and we have an incredible canvas to build on," he commented. In addition to initiatives such as new electric ground power units, Farnborough aims to make sustainable aviation fuel (SAF) available to operators within 12 to 18 months.

### 4.61 Universal Aviation, London Stansted Airport (EGSS), UK

Universal Aviation, the ground handling arm of Texas-based Universal Weather and Aviation, operates FBOs and general aviation terminals around the world, from Beijing to Barcelona and Singapore to Toluca, but its facility at London Stansted Airport continually earns its highest accolades, according to **AIN** readers. Home to the company's European operations center, and its flight planning and trip support



Universal Aviation, London Stansted Airport, UK

Jet Aviation, Schiphol Airport, Amsterdam, Netherlands



services, the two-story, 11,000-sq-ft facility offers a wide variety of amenities and services, including VIP arrival and departure lounges, conference rooms, crew lounge, and crew business center, shower facilities, dedicated in-house security screening, customs and immigration areas, and catering preparation kitchens.

“Our facility is often likened to a boutique hotel,” said Sean Raftery, Universal’s senior director of international business for Northern Europe and Africa. “That is probably as much about the team and the attention given to our customers as it is about the fixtures and fittings,” he said. Indeed, the location which has a staff of 60 and is normally open from 7 a.m. until 10 p.m., received its highest score (4.79) this year in the CSR category.

The facility, which has obtained Stage 2 registration in the International Business Aviation Council’s IS-BAH program, has been in operation since 1984. “Our in-depth local knowledge and our long-established relationships with the regulatory and government authorities help take the pressure off the customer,” Raftery told *AIN*. “Passengers arriving at London Stansted can be on the road within minutes of landing, and are able to concentrate on their purpose for coming to the UK, and not be distracted by complications.”

With 40,000 sq ft of private ramp, the facility has the ground equipment to handle the largest passenger aircraft. While the UK has been severely impacted by the Covid pandemic, Raftery noted the demand to fly remains. “Customers need borders to be open, but also hotels and restaurants, and while lockdown is necessary, it has of course made travel difficult.” He added that the company has worked ceaselessly with its clients to help them navigate the ever-changing regulations and requirements.

#### 4.48 Jet Aviation, Schiphol Airport (EHAM), Amsterdam, Netherlands

In operation for more than three decades as the KLM Jet Center and from 2018 when it was acquired by Jet Aviation along with its sister location in Rotterdam, the FBO at Amsterdam Schiphol Airport has long been an outstanding performer among our readers. Located just off the airport’s Runway 04/22, which is primarily used for general and business aviation,

Jet Aviation’s nearly 5,000-sq-ft facility occupies approximately 60 percent of the airport’s general aviation terminal and includes two passenger lounges, two crew lounges with a pool table, beverage bar, computer workstations, international television channels, and on-site immigration and customs clearance.

Open daily from 6 a.m. until 11 p.m. with a staff of 22, it offers dedicated refueling and deicing services on the ramp. “This set-up allows us to perform quick turnarounds and fuel stops for all types of customers,” explained Edwin Niemöller, the company’s senior director of FBO operations for the Netherlands. As a result, the facility tallied its highest category total this year in line service (4.62). While the location does not possess hangar space of its own, it can, depending on availability, accommodate aircraft all the way up to the size of an

ACJ or BBJ.

Over the past year, like other FBOs in the world, the location worked to establish protections and social distancing during the pandemic. “We had to rapidly adjust to the challenges of Covid and do everything in our power to ensure the health and safety of everybody visiting our facilities and using our services,” Niemöller told *AIN*. “Despite the uncertainties and ongoing challenges posed by Covid, I’m very proud of how our teams are supporting customers and flight operations in this environment.”

The FBO earned its IS-BAH Stage 1 registration in 2020 and, according to Niemöller, is currently preparing for its Stage 2 certification audit in October.

## ASIA-PACIFIC

#### 4.50 ExecuJet Australia, Sydney Kingsford Smith Airport (YSSY), Sydney, Australia

Earning its spot among the top-rated international service providers in *AIN*’s FBO Survey for the second straight year is ExecuJet’s location at Australia’s Sydney Kingsford Smith Airport. Over the past year, the facility which serves the country’s largest city, underwent a refreshment, including a complete interior repaint of its 3,230 sq ft of passenger and crew lounges, as well as its trio of conference rooms and catering preparation kitchen.

The FBO also includes on-site customs, immigration and quarantine services,

valet parking, and crew concierge. Other improvements were made to the ramp, with new lines drawn to extend the parking area and the maximum wingspan of the apron increased to the latest ultra-long-range business jets such as the Bombardier Global 7500 and Gulfstream G700.

“This is an important step in future-proofing our service offering, as new aircraft types are added to the industry, and means that the ExecuJet ramp is now the only private, direct-access bay on the airfield that can cater for aircraft this size,” said Darren McGoldrick, the company’s v-p for Asia-Pacific. The FBO has access to two hangars, one occupied by its collocated MRO facility, as well as the largest hangar on the field, which it manages. The latter can accommodate four large-cabin business jets, with room to spare for a midsize jet.

In operation for 35 years, and part of the global ExecuJet chain since 2017, the IS-BAH Stage 2-registered location received its highest scores this year in the customer-facing line service (4.72) and CSR (4.69) categories. “The relaxed and comfortable nature of traditional Australian customer service seeps into every conversation with the ramp and customer service agents, where clients are welcomed and the team’s combined 170 years of experience bolsters confidence in decisions and planning,” McGoldrick told *AIN*.

The Sydney location—like all of the company’s FBOs—participates in the FlySkills Hygiene Certification Program, with Socotec-approved Covid control processes.

#### 4.46 MJets FBO, Don Mueang International Airport (VTBD), Bangkok, Thailand

MJets FBO, which serves Thailand’s capital city’s private traffic aviation at Don Mueang International Airport, has been in operation for more than a decade now. Its new facility has impressed *AIN* readers since its debut in 2016, resulting in it being the highest-rated FBO in Asia.

The 26,000-sq-ft, two-story terminal celebrates its fifth anniversary this year and is open 24/7. It features on-site customs, immigration and quarantine clearance with visa availability on arrival, crew suite with three sofa beds and shower facilities, 3,400-sq-ft executive lounge that can accommodate up to 75 guests, private passenger lounge, conference rooms, and concierge. These attributes enabled the FBO to receive its highest scores (4.62) in the passenger amenities and facilities categories.

Those amenities are certainly there for those who want them, but the facility is known for its quick-turn capabilities. “Normally, a passenger will spend less than seven minutes in the terminal for formality and screening process before boarding the aircraft for an international trip,” said company chairman Jaiyavat Navaraj. “For domestic trips, it takes even much less time.”

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Customers can even arrange security services through the FBO ahead of arrival.

The location, which was the first in Southeast Asia to earn accreditation under IBAC's voluntary International Standard for Business Aviation Handling (IS-BAH), has now reached Stage 2 in the program and is currently in the process to obtain Stage 3.

A full-service FBO with a staff of 176, the location offers aircraft charter and management services, operates its own Part 145 repair station with AOG service, and has more than 86,000 sq ft of hangar space, which is currently home to 14 jets and turboprops.

#### 4.27 Jet Aviation, Sydney Kingsford Smith Airport (YSSY), Sydney, Australia

Private aircraft operators heading to Australia's largest city have their choice of service providers at Sydney Kingsford Smith Airport, with two FBOs there earning recognition among FBOs outside of the Americas in this year's FBO survey.

Jet Aviation's facility, which was last remodeled in 2017, consists of a nearly 31,000-sq-ft terminal with on-site customs, immigration and quarantine clearance, passenger lounge with complimentary refreshments and snacks, crew lounge, shower facilities, and vehicle access to its 26,000-sq-ft private apron. The company also has hangar space available to accommodate several jets, up to the size of a Dassault Falcon 7X, and two large-cabin-jet parking bays directly outside the terminal. Established in 2002, the IS-BAH Stage 1 registered location is normally operational from 6 a.m. until 10 p.m., with after-hours callout available.

The FBO earned its highest score (4.41) in the CSR category. "We strive to get to know and understand our customers so we can anticipate their needs," said general manager Andy Gahan. "We also always try to provide a warm, personalized welcome, whether it's washing a customer's vehicle as a surprise when they are away, starting their vehicle just prior to the aircraft arriving to cool it down, collecting favored catering, or anything else we can think of that we know they'll appreciate."

Like many in the industry, Gahan noted that the location saw a significant drop in international traffic over the past year, the result of border restrictions brought on by the Covid pandemic. While business aircraft movements on the domestic side were down as well, the facility has seen an uptick in local aeromedical operations, sports charters, and military flights. The location instituted a business continuity plan that included PPE requirements for employees and customers, increased facility and vehicle cleaning measures, reduced face-to-face interaction between staff and customers, and online training for employees on signs and symptoms of exposure.

### MIDDLE EAST

#### 4.25 ExecuJet Middle East, Dubai International Airport (OMDB), Dubai, UAE

One of the busiest airports in the world in terms of international flights, Dubai International has several FBOs to choose from, including ExecuJet Middle East. In operation for 15 years, the location offers a 12,300-sq-ft terminal with eight passenger lounges, a transit lounge, prayer room, duty-free shop, showers, business center, and in-house customs and immigration clearance, all of which combined to earn the facility its highest score (4.42) this year in the passenger amenities category. According to regional FBO manager Dumani Ndebele, clients can walk off the airplane and pass through the facility—immigration and customs cleared—within minutes.

Flight crews have their own dedicated lounge with ensuite washrooms and massage chairs. The company has a complete renovation of the facility scheduled for this August, which will update the crew lounge with an entertainment center and add club and majlis lounges.

Home to a dozen private jets and turboprops, ExecuJet also manages 55,000 sq ft of hangar space at OMBD capable of sheltering aircraft up to a Boeing 737-800, which can be used for transient aircraft storage or the company's maintenance activities.

In operation 24/7, the IS-BAH Stage 2 registered FBO shares 42 employees between



this location and its smaller facility at Al Maktoum International Airport/Dubai World Central. A new terminal and hangar complex currently under construction will open there in 2022.

Ndebele explained that Dubai has remained largely accessible during the pandemic, resulting in record flight movements. Following the lockdown period, it became a regional hub for connections between commercial airlines and private jets, which saw many private aircraft operators reposition their aircraft there. Ndebele noted that traffic has increased month-on-month, with March showing a 40 percent increase over 2019 numbers, with much of the traffic originating from Russia and CIS countries.

#### 4.18 Jet Aviation, Dubai International Airport (OMDB), Dubai, UAE

Global FBO operator Jet Aviation has an extensive FBO network throughout the Middle East including locations at both Dubai International Airport and, since 2017, Al Maktoum International Airport/Dubai World Central. The former earned recognition in this year's AIN FBO Survey.

The FBO, a member of the Air Elite Network, and staffed 24/7 was founded as a joint venture with the Al Mulla Business Group in 2005. It occupies a stand-alone 10,700-sq-ft terminal, and tallied its highest score for passenger amenities (4.30), offering executive lounges with a refreshment bar, a conference room, a prayer

room, duty-free shop, on-site customs and immigration clearance, and door-to-door VIP transfers for customers between commercial airlines and their private jets. For crews, there is a lounge with a snooze room and flight planning area. Aircraft cleaning, both inside and out, is available along with fueling coordination.

The IS-BAH Stage 2-registered facility's 54,000-sq-ft hangar, which can shelter a pair of bizliners, is currently home to nine based aircraft and the company's Part 145 repair station, which can provide everything from line to heavy base maintenance to scheduled checks to AOG service. The FBO's ramp can accommodate aircraft up to a Boeing 747, and the company plans to install a 400-sq-ft stand-alone staff canteen just outside the hangar.

According to Phillippe Gerard, Jet Aviation's director of FBO operations in Dubai, the 60 staff members there are experts at building and establishing long-term meaningful relationships with its clientele. "Our customers know and trust us to ensure their safety and well-being as they travel throughout the region and around the globe," he told AIN. "They are comfortable when they visit us and they feel safe in our care with every take-off and landing." In light of the Covid pandemic, the company has installed a temperature scanner at the facility's entrance as well as an in-house nurse to manage the PCR testing for passengers. ■





# Finding freedoms post-Brexit

by Kate Sarsfield

Britain's exit from the European Union (EU) brought to an abrupt end for the UK business aviation sector years of operating on a level playing field with its EU-based counterparts. When the 11-month transition period concluded on December 31, unfettered access to the markets of some 27 member states was halted for the UK's unscheduled operators, and a whole new relationship with the bloc began under stricter and often burdensome terms.

"It came as a complete shock to us on January 1," said Alex Durand, chief executive of UK charter company SaxonAir. "We had already had a poor year in terms of movements and revenue due to the Covid-19 pandemic, so the end of the transition period was like falling off a metaphorical cliff. It's been a slow-moving car crash."

Durand, who is also vice-chair of UK industry trade body the British Business and General Aviation Association (BBGA), said during January and February the company recorded a 90 percent downturn in business year-on-year. "Europe-wide travel restrictions and border closures were already impacting demand across our fleet of helicopters and light jets, but we were also faced with the added challenge of having to secure approval from each [27] EU member to perform a commercial flight," he noted.

Durand described this experience as "incredibly frustrating." Overnight, he said, UK unscheduled operators "went from having unfettered access to EU airspace to holding third-party operator status with new rules and restrictions to navigate."

SaxonAir's poor performance in the early part of 2021 is reflected in the depressed state of the UK business aircraft charter market as a whole during the period. German data research company WingX Advance recorded a 64 percent fall in departures of UK-registered charter aircraft to EU member states in January and February 2021, to 175 movements. This compares with 482 departures during the same period in 2020, and 658 in the first two months of 2019.

Furthermore, the fall in traffic this year hit UK charter revenues by more than €1 million (\$1.19 million) a month. It also resulted in an estimated €6 million deficit in landing, handling, and parking fees across the UK's top three business aviation airports: Biggin Hill, Luton, and Farnborough.

"The most crushing aspect of our new situation on January 1 was to see our competitors take businesses from under our noses, as there was no agreement in

place between the UK and EU post-transition to allow non-scheduled carriers to operate without securing costly and time-consuming permits on a flight-by-flight basis," admitted David Lacy, head of commercial for business and specialist aviation services provider RVL Group.

In contrast, the UK government allowed EU operators post-transition to continue exercising third and fourth Freedom rights—allowing flights to and from the UK—under a three-month block permit agreement. Such freedoms were not reciprocated by many EU countries, Lacy said. "We got to the stage where we didn't bother bidding for jobs, and some brokers didn't consider UK operators for EU-bound contracts," he added.

These frustrations reverberated across the UK charter market and fed back to the Department for Transport (DfT) and Civil Aviation Authority (CAA). The pair began talks on January 1 with each of the 27 EU member states to replicate the flexibility of the UK's block permit system, with renewal conditional on each EU country offering reciprocal third and fourth-freedom services to UK operators.



Marc Bailey,  
BBGA chief  
executive

Negotiations are ongoing with member states to secure fifth and sixth Freedom permit processes—allowing operators to fly to or from a third member state and to carry traffic via the UK. Seventh and eighth freedoms, which permit operators to make flights to and from a third state and traffic between two points in a member state, are also being sought.

"A return to full Open Skies between our nations would be an ideal end-goal for all concerned, but we have to take it one step at a time," said BBGA chief executive Marc Bailey.

He described the UK's block permit agreement as a "good-will gesture" from the government, and placing a time limit of three months has allowed the CAA and DfT to gather "vital evidence" from industry on the conduct towards UK operators of other aviation authorities and gain vital leverage over them going forward. It has been a mixed response.

"Some small EU states struggled to issue permits as they simply haven't had the manpower to do so and have had to set up a dedicated department from scratch," Bailey explained. But other larger established authorities such as Austria, Germany, France, and Spain simply lacked the willpower, he said.

The dearth of reciprocal freedoms persuaded the CAA to play tough and not to renew UK block permits from



UK-based SaxonAir saw charter activity drop dramatically earlier this year following the end of the Brexit transition period on Dec. 31, 2020.

April 1 for unscheduled operators within those offending countries. This stance paid off, Bailey said. Many authorities were "persuaded" to adopt a more benevolent approach to UK providers following pressure from their domestic operators.

He cited Portugal, home to fractional ownership provider NetJets Europe, as an example. The country was "slow off the mark," so NetJets and its legal team put pressure on the aviation authority "and brought them to the table," said Bailey.

Austria is another case in point. With the UK deciding not to renew the block-permit agreement from April 1 for the country's 20 unscheduled operators, intense lobbying of the government followed, resulting in a reciprocal agreement being offered to UK companies before the March 31 deadline.

"We were faced with having to apply for a permit every time we wanted to fly to the UK—one of our largest and most important markets—which would have been time-consuming and costly," said Bernhard Fagner, founder and chief executive of GlobeAir, Austria's largest business aircraft operator.

By April 20, the CAA had secured reciprocal arrangements with 24 member states and said negotiations were continuing with Bulgaria, Latvia, and Lithuania. "At the moment these agreements are renewed every three months, however we are hoping to formalize them into more permanent arrangements," said the CAA.

Fagner welcomed this strategy and suggested long-lasting agreements "will provide much-wanted stability for the industry going forward."

SaxonAir's Durand proposed that future arrangements should offer more flexibility for UK and EU charter providers, especially as Covid travel restrictions are starting to ease across Europe and demand for business aircraft is expected to soar. "Flexibility is a key dynamic of this industry and critical to a competitive landscape," he said.

Applying for seventh and eighth Freedom permits today, Durand argued, can be risky and time-consuming for UK operators as they must secure a "no-objection" from local EU carriers. "Before Brexit, we

could just accept the job without thinking about it," he said.

Time-critical cargo operations are particularly difficult under these circumstances, noted David Lacy from RVL. "We have one hand tied behind our back due to the length of time it can take to secure agreements from all EU countries concerned," he said.

Since January 1 the East Midlands airport-based company has undertaken only one seventh-freedom flight. This compares with around one flight a week in 2020. "This was a side of our business that we wanted to grow, but Brexit has prevented us from doing so," said Lacy. RVL operates a fleet of 14 aircraft including six Reims-Cessna F406s, four Beechcraft King Airs, two Cessna 404s, and a pair of Saab 340Bs (used for cargo transport).

He described the current arrangement between the UK and the EU as a "sticking plaster." "Had negotiations between the UK and the EU 27 been permitted during the transition period, we could be in a much stronger position today," Lacy said.

The plight of RVL and other UK operators is acknowledged by the European Business Aviation Association (EBAA). "Most European countries understand that it is not in the interest of anyone to apply procedures that would ultimately prevent operators to fly to and from the UK," said chief operations officer Robert Baltus.

Based on feedback from EBAA members, Baltus suggested that "the promotion of an Open Skies agreement between the UK and the EU could be a solution going forward."

However, he stressed that a return to "pre-Brexit open access" only works if there is a level playing field between the two in areas such as tax, flight-time limitation rules, and safety regulations. "This is a long-term process where the UK needs to commit to EU rules like they did before. From that perspective this is a thorny issue that is playing out at the highest political level," said Baltus.

Meanwhile, as laid down in the EU-UK Trade and Cooperation Agreement, "it is in the hands of the 27 Member states to define what agreement they want with the UK going forward," he added. ■

# European operators mixed about Brexit impact

by Cathy Buyck

Usually, Athar Husain Khan is very diplomatic, measuring and weighing his words carefully when describing a challenging situation. But when asked whether Brexit was as disruptive as some had predicted, the European Business Aviation Association (EBAA) secretary-general was unequivocal and atypically blunt.

“Yes, it was pretty disruptive even though it did not hit the headlines every day,” he told *AIN*. “I think as EBAA we were ahead of the curve and we were able to sensitize the membership that the UK’s complete exit from the European Union and EASA was coming, and we alerted them with information sessions on where we thought the risks were, for instance with the registration of aircraft or licenses of pilots.”

But, he admitted, some issues were just not foreseeable. One of them was the difference in the way the UK and a number of EU countries dealt with granting third- and fourth-freedom rights and all-cargo fifth-freedom rights. “There was a divergence, which frankly was detrimental for our entire ecosystem. Operators were facing an administrative and legal nightmare,” Husain Khan noted.

The UK put a so-called “block permit” scheme in place, allowing EU airlines to operate any number of ad-hoc passenger

and cargo flights between the UK and the EU state where that operator is licensed. The mechanism was designed to eliminate the need to apply for single permits per flight and would see the automatic renewal of the block permit after three months—starting April 1—conditional on the respective EU country giving the same deal to UK operators.

However, not all EU countries were responding with the expected reciprocal deal. “This was not always out of ill-will,” an EBAA spokesperson noted. “Often the national aviation authorities did not have the legal framework in place to be able to offer something equivalent.”

The issue risked escalating in April but appears to have calmed down. About half of the EU member states—including Denmark, France, Germany, Greece, Ireland, Italy, Malta, Portugal, Slovakia, Spain, and Sweden—have either introduced a block-permit process covering third/fourth-freedom operations for UK airlines or are negotiating such an agreement with the UK Department for Transport. Some bilateral deals, such as UK-Malta, also include the exchange of fifth freedom on nonscheduled flights and cargo flights.

Most EU operators faced certain complexities or delays due to the renewal or refusal of new block permits, though

the situation was quickly resolved on the German level, asserted Siegfried Axtmann, chairman and founder of Nuremberg, Germany-headquartered FAI Aviation Group. The company, which offers fixed-wing air ambulance, private jet charter, and aircraft management service, was not affected, he said, stressing that “our medevac business continued as before Brexit.”

Overall, he sees no advantage or disadvantage arising from Brexit for FAI. “We never flew a lot within the UK, so the loss of UK cabotage rights does not represent a handicap for us. Likewise, I do not see more intra-EU flying coming our way because UK operators lost the right to operate within the EU,” Axtmann noted.

UK-registered airlines that performed a lot of intra-EU flying pre-Brexit anticipated the upcoming restrictions and decided to secure an EU air operator certificate (AOC) ahead of the end of the transition period, which falls on Jan. 1, 2021. Independent charter company Air Charter Scotland, for instance, decided last year to put two of the 10 business aircraft in its fleet on the Maltese register to be able to continue flying between the 27 EU states.

The Glasgow-based company now has a Cessna Citation CJ3+ based in Malta and a Bombardier Challenger 350 at Nice in southern France. It also employs three flight crew residing in the EU to support the aircraft, which was formerly based in the UK.

The UK-EU divorce challenged the status quo of open skies, from one day to the next, “but in the practical application of

that the Covid-19 related travel restrictions have almost suppressed some of the bigger impact of Brexit,” contended James Foster, COO of Vertis Aviation, a Swiss-based charter broker with offices in Ireland, Switzerland, and the UK. “There is less traffic anyway, particularly in the leisure market, which means that we have not felt the impact as much as we would have done in a normal year.

“That is not to say that there have been no logistical or paperwork issues owing to Brexit. It is adding an additional complication to delivering what are the benefits of business aviation, which is able to react quickly, efficiently,” he added, pointing to the challenges to find an operator with the right permission and aircraft registration to fly from and to the relevant destinations. “Twelve months ago, we would not have to consider this.”

While the pandemic is masking the full impact of Brexit, it also helped prepare for Brexit, Foster alleged. “In spring last year, we had to deal with short-notice travel Covid-19-related restrictions; flights between Italy and the UK or between France and the UK were suddenly not possible. It was sort of a rehearsal for short-notice travel restrictions due to Brexit.”

Axtmann’s main concern is not Brexit but the traffic recovery from Covid-19. “Our core charter jet business is long and ultra-long-distance flights. I cannot confirm that I see a recovery to 2019 levels in the second half of this year as long as North America, most of South America, and Africa maintain their travel bans,” he concluded. ■

## Bombardier’s Biggin Hill site adds mx apprenticeships

by Jerry Siebenmark

Bombardier’s London Biggin Hill service center is about two months into its first 36-month aircraft maintenance apprenticeship program that aims to create a pipeline of future maintenance techs and support the area’s economy, the Canadian airframer announced May 13. Through a combination of virtual classroom and on-site training, the 16 apprentices in the first class expect to earn EASA Part 66 modules (B license) certification and Level 4 City & Guilds Diploma in Aerospace and Aviation.

A collaboration between the service center and training and apprenticeships provider Seetec, the program is supported by KLM UK Engineering and the Department for Education. Graduates will have an opportunity to earn full-time positions at the service center upon completion of the program.

“Indispensable apprenticeship programs provide qualified students with

an important pathway to an aerospace career—a powerful gateway to exciting, new opportunities,” said Bombardier executive v-p of services and support and corporate strategy Jean-Christophe Gallagher. “Our London Biggin Hill facility offers these students the best on-the-job training possible in a technologically advanced workplace environment—with the possibility for full-time employment at the facility upon graduation.”

Department for Education skills and apprenticeships minister Gillian Keegan noted apprenticeships like the one at the London Biggin Hill service center help to rebuild the economy by enhancing the workforce, boosting skills, and developing talent for the future. “It is great to see Bombardier’s continued investment in apprenticeships and its commitment to giving people the chance to train and launch fantastic careers,” Keegan said. “Bombardier’s innovative new



Bombardier maintenance apprentice Joshua Cadwallader with UK Department for Education skills and apprenticeships minister Gillian Keegan.

program presents a brilliant opportunity for first-class training and superb future job prospects.”

Bombardier added that the program will help to provide technicians for an expansion of the London Biggin Hill site now underway, with completion expected next year. The project involves

the construction of a new and larger facility encompassing nearly 250,000 sq ft and simultaneously accommodating up to 25 aircraft, including Bombardier’s flagship Global 7500. The new service center will replace the existing facilities Bombardier has occupied since opening the Biggin Hill operation in 2017. ■

# ACJ TwoTwenty Xtra Large business jet moves forward

by James Wynbrandt

Market reaction to the ACJ TwoTwenty (220)—the newest member of Airbus Corporate Jets’ executive airliner fleet introduced last fall—has been “very positive,” according to company president Benoit Defforge. However, the continued global pandemic lockdown has slowed sales activity. Notching orders is “taking a bit longer than we expected,” he said, citing second-wave lockdowns and prospects’ continued caution. “Our customers have made a lot of money these last months, but the situation is so unstable.”

The absence again this year of EBACE, a prime stage for Airbus Corporate Jets, won’t help, either. Defforge said the orders for six aircraft announced at the program’s launch are still in hand for the TwoTwenty, which is based on the

A220-100 single-aisle airliner.

Airbus Corporate Jets calls the TwoTwenty an “Xtra Large Bizjet,” a new category of business aircraft and “an alternative to the traditional large-cabin business jet and the bizliner,” in Defforge’s words. It offers three times the interior space, yet the same hangar footprint and a lower price than the largest business jets, meaning it will cost less than \$72 million. Bizliner operators opting for the A220 variant, meanwhile, can save significantly on purchase and operating costs, he added.

The company launched the Two-Twenty in partnership with Swiss-based bizliner services specialist Comlux Group, the world’s largest owner and operator of executive-configured airliners. Comlux Completion in Indianapolis will outfit the cabins of the first



Comlux Completion will outfit the interiors of the first 15 ACJ TwoTwentys, and the first to be inducted will arrive at the company’s Indianapolis facility in early 2022.

15 TwoTwentys, offering customers a selection of predefined configuration options that will provide “a unique interior within a minimized time frame,” Comlux Completion CEO Daron Dryer told *AIN*. The Comlux Group has ordered the first two ACJ220s for its own account, to be available for charter and sale through Comlux Aviation, its Malta-based operations division.

The interiors will feature a “very open design meant to provide spaciousness” and “use as much sustainable material—textiles and carpets using natural fibers without chemical dyes—as possible,” Dryer said. The open design will reduce cabin weight, lowering fuel burn, and together with the use of sustainable materials in the cabin will lessen the aircraft’s lifetime carbon footprint. Outfitting options will include veneers and other components created with sustainable processes without compromising comfort, look, or feel, he added.

The first green ACJ220 is scheduled for induction in early 2022, with service entry in early 2023. Engineering of standard and optional cabin and interiors components is in development, and Airbus Corporate Jets is concurrently developing a low-utilization maintenance plan for the platform.

With a comfortable 6,000-foot maximum cabin altitude and 5,650-nm range, the ACJ220 will be capable of linking London and Los Angeles, Moscow and Jakarta, Tokyo and Dubai, or Beijing and Melbourne. Though falling short of the Bombardier Global 7500’s and Gulfstream G700’s legs, ACJ analyzed 16,000 flights of private aircraft with a range greater than the ACJ220’s and found “only 2 percent were more than 6,000 nm,” Defforge said, adding that many passengers would likely prefer a much larger cabin and a fuel stop for such ultra-long journeys.

Airbus Corporate Jets also believes the ACJ220 is well-positioned for sales in the U.S., business aviation’s global capital: The airframe is made in Alabama, the engines are built in Connecticut, and the completions are performed in Indiana. The A220’s bones are also North American. Developed by Bombardier as a next-generation short-haul airliner (the C-Series) and incorporating contemporary technologies throughout the airframe, the program was acquired by Airbus in 2018.

ACJ doesn’t disclose projected orders, but with vaccines promising a return of normalcy to global business aviation operations, Defforge said his company is optimistic that stalled TwoTwenty sales will take off this year. Summed up Stan Shparberg, v-p commercial at Airbus, “We expect a good number of opportunities will come our way.”

# Dassault’s 6X service entry prep includes support plan

by Jerry Siebenmark

As Dassault Aviation continues its Falcon 6X flight-test campaign, the French airframer is also preparing to support the business jet’s 2022 entry into service—preparations that began long before the type’s March 10 first flight.

Key among those preparations is ensuring the reliability of the 6X’s systems and components, according to Jean Kayanakis, senior v-p of Dassault’s worldwide Falcon customer service and service center network. To do that, Kayanakis said, Dassault’s teams and partners are going through intensive equipment testing and screening, including a process the company calls highly accelerated life testing (HALT). Under HALT,

components are exposed to extreme conditions such as vibration, temperature, and humidity, or “shake and bake” testing, Kayanakis explained. “If they don’t fail through all of this, they’re a lot less likely to fail in the aircraft.”

Product support staff also are involved in the Falcon 6X test program. The company has assigned seven experienced engineers and technicians to the flight-test aircraft. Their duties vary and include providing line service on the ramp, acquiring and analyzing data, and validating the FalconScan onboard diagnostic system and maintenance documents.

Technicians from Dassault Falcon Service and TAG Maintenance Services

(TMS) are also part of that team. Dassault acquired TMS as part of a roll-up of 19 MRO facilities—including Luxaviation’s ExecuJet MRO centers and Ruag maintenance and FBO operations at Geneva and Lugano airports—nearly two years ago.

Additional staff at Dassault’s Falcon Command Center (FCC) in Mérignac, France, are conducting evaluations of raw data from the test aircraft’s FalconScan advanced diagnostic system downloads. Last November, Dassault moved FCC and product support to Mérignac to bring those operations closer to its engineering, production, flight test, and service center there.

Kayanakis noted that in early April the company began running failure simulations with FalconScan on the test bench to simulate as many fault configurations as possible. “FalconScan monitors 100,000 parameters, so you can easily imagine that this system can track a lot of fault scenarios,” he said.

A second 6X flight-test vehicle took to the skies on May 5 and the third—which will be outfitted with a fully finished interior—is expected to join the fleet in the third quarter. The third 6X will test cabin systems and amenities, galley equipment, flight entertainment systems, and options such as Ka-band Internet connectivity.

“We’ve poured everything we’ve learned about reliability and maintainability into the 6X,” Kayanakis said. “But if service-entry problems crop up, you know we’ll do whatever it takes to keep operators flying.”



With a second Falcon 6X in flight testing, Dassault Aviation is also busy making preparations to support the aircraft once it enters service in 2022

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# Asia Flight Services learns to be flexible

by Chen Chuanren

Even during its inception in 2012, Asia Flight Services (AFS) had to deal with changes. Initially set up to support the launch of new routes for the German leisure carrier Condor to Myanmar and Cambodia, the airline suspended services after a few months due to a change in strategy and AFS became a full-fledged aviation services company to support nonscheduled aviation services with a focus on business aviation.

It expanded to most of Indochina and saw its business quickly expand to cargo, scheduled passenger, military,

and government flights, and support for high-level events such as the ASEAN and APEC summits.

However, during the onset of the pandemic in early 2020, AFS shifted away from business, leisure, and government trips toward repatriation and evacuation flights, as well as cargo flights for personal protection equipment delivery. By around April and May 2020, traffic halved to pre-pandemic levels. At that stage, numerous governments were chartering airliners to repatriate citizens that were stranded in Southeast

Asia due to lack of flight options or closed airports.

“We supported many such missions both in terms of handling and by liaising with the respective embassies for all clearances,” said AFS business development manager Aljoscha Subasinghe. “But not all repatriation flights were organized in this manner, though. Quite a few passengers decided to organize their own flights, using business jet operators, to maintain flexibility and distancing.”

Vietnam operations started in 2014 and are one of AFS’s brightest-growing markets alongside the government’s investment in the aviation sector and strong economic data. Although Vietnam managed to be one of the success stories in the world in terms of controlling the virus, measures for visitors are extensive and strict and the processing time is relatively long.

“For this reason, hardly any leisure traffic is taking place at the moment, but business and repatriation flights are still operating once the required documents are in place,” he added.

As one of the founding markets for Asia Flight Services, the unexpected coup in Myanmar by the military on February 1 gave the company another issue to ponder. Known as Myanmar Aviation Centre locally, it is one of the group’s larger local teams and it supports both commercial airlines and nonscheduled clients. The company now has to deal with fuel shortages and strict entry restrictions for crew, although Subasinghe said operating flights to Myanmar recently “is not easy, but not impossible either.”

Subasinghe said during the lull period of the pandemic, the company overhauled



Aljoscha Subasinghe, business development manager, AFS

**“While aviation continues to be affected by the pandemic, AFS has its eyes on expansion.”**

its internal processes to root out inefficiencies and improve customer satisfaction, and in March achieved IS-BAH accreditation for its services in Cambodia, Laos, Myanmar, Thailand, and Vietnam, while Bangladesh and Papua New Guinea stations are participating in the NATA Safety 1st Ground Safety Program.

Moving into 2021, the company was able to maximize its decentralized “boots on the ground” concept of operation and provide timely updates, adapt quickly to new situations, and provide services “as usual.” While the aviation industry continues to be affected by the pandemic, AFS still has its eyes on expansion.

“Our strategy has always been to look for areas where clients are not satisfied with the service they are receiving and finding a way to remedy this gap in the market. Most of our expansion has been client-driven in this regard and we have done well with this approach,” Subasinghe said. “We will keep focusing on improving our core benefits of direct communication, seamless service, and even better regional coverage.” ■

## Covid creates conditions for brokers to prosper

by Peter Shaw-Smith

While one leading OEM was reticent in speaking to AIN about recent sales of new business jets in Africa, Jetcraft’s preowned aircraft brokerage has performed well overall in the year since the pandemic broke out.

Danie Joubert, Jetcraft’s v-p of sales for Africa, said most OEMs were represented on the continent, with Bombardier and Dassault’s Falcon series the most prevalent business jet types there. “In addition, Embraer remains popular, while interest in Gulfstream is more likely to be seen in western Africa than in South Africa,” he said.

“Before Covid-19, interest in preowned private jets sales was focused on particular areas, but now this has spread across the continent. Right now, we’re seeing serious widespread activity, with interaction between competent buyers in Angola, Nigeria, South Africa, Ghana, Uganda, Congo-Brazzaville, Kenya, and Namibia, among others.”

After a lull, Joubert saw an improvement in activity towards the fourth quarter last year in the region. “At Jetcraft, in the last 12 months we’ve seen roughly double the number of first-time buyers of preowned aircraft than in previous years, which is a tremendously positive indicator of the future growth of our industry,” he said.

Covid-19 also triggered a fresh wave of interest from new market entrants. The downturn in airline activity and the demise of many airlines, or route reductions, led to a major increase in interest in aircraft acquisitions.

“In particular, we’ve seen inquiries from those who had previously been happy to rely on the airlines for business travel but now want to explore the flexibility, control, and security that flying privately



Kani Saritas, Jet HQ’s Dubai-based sub-Saharan Africa specialist

provides,” he said. “As things are steadily opening up in Africa, we’re seeing a resulting increase in activity and transactions coming together in 2021.”

While it now has an office in Egypt, Kansas City, Missouri-based Jet HQ has been expanding its sub-Saharan footprint via its UAE office. Dubai, UAE-based Kani Saritas specializes in north and west Africa and South Africa and recently completed a transaction in Côte d’Ivoire, assisting the country’s air force in finding and purchasing a Gulfstream G450 based earlier in Latvia. “As a whole, the region has seen growth in midsize and super-midsize jet sectors,” the company said.

The eastern part of sub-Saharan Africa is still untapped, according to Dawit Lemma, CEO of Addis Ababa, Ethiopia-based Krimson Aviation. “Eastern Africa and the eastern seaboard of Africa are lacking in jets,” he said. “I want to clearly distinguish between turboprops and jets.

“We don’t have that many corporate jets flying up and down the country. The turboprop market is phenomenal, while the helicopter market is also strong, with Kenya, of course, leading the way. Given the strategic location, especially with the Red Sea corridor and the China One Belt, One Road initiative, and the ports on the Red Sea, long term we’re going to see an uptick in business aviation.” ■

## DC Aviation Al-Futtaim sees double-digit rise in business aviation activity

Crediting the UAE for its handling of the Covid-19 pandemic, DC Aviation Al-Futtaim (DCAF) in Dubai reported a 25 percent increase in private and business jet activity in the first quarter, which also fueled gains in its other services such as charter, ground handling, and MRO.

“The increase in flight movement is the result of the increased confidence in the UAE government’s vaccination program, tourism-related initiatives, and other economic stimulus measures taken to boost consumer and business sentiment,” said DCAF managing director Holger Ostheimer. “We have seen this increased number even into Ramadan, which is generally a quiet period, and we expect this trend to

continue for the remainder of the year.”

Increases in VVIP guests from the Commonwealth of Independent States, Europe, India, and Pakistan, as well as visitors from Israel—following the signing of the Abraham Accords agreement to open diplomatic, trade, and economic relations between the two countries—helped to drive business higher during the period.

A joint venture between German business aviation operator DC Aviation and UAE conglomerate Al-Futtaim, DCAF operates from Al Maktoum International Airport in Dubai South with a 1,300-sq-m (13,993-sq-ft) VVIP lounge and two hangars measuring 5,700 sq m (61,354 sq ft) and 7,500 sq m. ■

J.S.

# Asia-Pacific optimistic with Post-Covid bizav outlook

by Anthony Lam

Despite hopes of an uptick, most believe that international charter flights remain challenging. But business has been much stronger for domestic flights in China, and business aviation leaders see encouraging signs for the rest of Asia once the pandemic eases.

When the pandemic began, the industry experienced an influx of hype on air charter inquiries and activity. “People thought business aircraft charter would likely increase because of Covid-19, but unfortunately that’s just not true,” said Denzil White, Hong Kong-based Metrojet managing director of aircraft management and charter. “When you examine it and look at the details, we are an industry governed by Covid. It is not over, and we are now seeing an uptick in mutations. Whether it’s owner or charter flying, we’re still governed by the same restrictions, and it’s definitely tough to fly,” said White.

The consensus is that it is taking too long to reach herd immunity to provide a boost for the industry in Asia. While domestic business aircraft travel in China has recovered by 95 percent, international charter activity is still sitting at less than 20 percent. “This is where Hong Kong is really suffering, as all of our flights are international. At the same time, factors like the mandatory 21-day quarantine have pushed pricing up significantly, and customers don’t appreciate the increased costs associated with crew quarantine,” said White. Charter requests in the Asia region thus far have largely been for repatriation, medical, crisis, and cargo purposes.



**Denzil White,**  
Metrojet  
managing  
director  
of aircraft  
management  
and charter

Despite the challenges, White remains optimistic. “The positive side is that there’s a new market segment being appreciated, where health and safety are critical going forward. Those who previously weren’t willing to allocate funds to business jets are now considering or are willing to fly on them. When Covid-19 subsides, we expect there to be an increase in charter and fractional ownership,” said White.

Even though many have become familiar with virtual meetings over the last year, White believes that business aviation, like many other businesses, relies on relationships. The return of cross-border business aviation charter activity would

likely focus on building or rekindling those relationships.

Hong Kong and Beijing-based Sino Jet group president Jenny Lau agreed. “Even though international flights have pretty much been banned since October 2020, domestic charter flights within China have really picked up, and we’ve experienced a lot more activity than previous years for both business and leisure charter users. Some of these domestic clients were previously first-time clients who happened to have experienced charter flying for the first time via their first international charter booking with us for repatriation,” she said.



**Jenny Lau,**  
Sino Jet group  
president

In some cases, demand for domestic China charter has been so high that there have been shortages. According to Lau, the major cities in China remain the most popular charter destinations. There has also been a noted increase in charters to the city of Sanya in Hainan as well as to the Changbai Mountains in northeast China.

“More clients are getting used to charter, and some of them have been converted to owners, too,” said Lau. In terms of desired aircraft size, Lau’s clients continue to prefer ultra-long-range aircraft such as the Gulfstream G650 and Bombardier Global 7500, and there has been a notable uptick in preowned business jet purchases.

Lau believes that business jet charter and ownership are going to be “very hot” after Covid. “Prospective owners and charter users are more wary of the health and safety concerns in their travels now, and they want to go with the safer route.” According to Lau, another reason is that many clients did much better financially with their positions in the stock market during the pandemic and hence have greater spending power.

According to Vicky Tsui, v-p of sales and marketing and customer service for Shenzhen-based Amber Aviation, “The domestic charter market has been recovering rapidly since July 2020, due to the stabilization of the pandemic in China.” There was a “long boom” in charter activity particularly from October to this past February, and Amber Aviation’s charter activities in 2020 increased by 80 percent compared to 2019.



**Vicky Tsui,**  
v-p sales and  
marketing  
and customer  
service, Amber  
Aviation

Tsui is confident that business jet charter will flourish when the pandemic is over. “The Covid-19 pandemic has played a pivotal role in popularizing business jet travel. As the wider public begins to identify both the safety benefits and cost viability of business aviation, business jets are being justified as a practical choice and less of a luxury expense.”

Jet Aviation Asia region senior director Carlos Gomez has had a similar experience and an optimistic outlook. “In addition to the fear of the pandemic, the difficulties with the multiple restrictions imposed on passengers and crew made it a real challenge to plan and execute charter and owner flights. As if that was not enough, the different quarantine requirements for the crews translated into additional costs to the operators, increasing the costs of the trips,” said Gomez.

Gomez confirmed that Jet Aviation also experienced additional requests for quotes and the arrival of first-time

customers who are looking for increased security and social distancing. In most cases, however, those inquiries were tentative requests and rarely transformed into actual bookings. “Moving forward, we see the demand for requests for the summer as vaccination campaigns are expected to help ease travel restrictions. Clients seem to anticipate there will be some kind of relaxation, and so they are beginning to make preparations in hopes there are real options to travel very soon,” he said.



**Ian Moore,**  
VistaJet chief  
commercial  
officer

VistaJet chief commercial officer Ian Moore was similarly bullish on the Asia region’s charter outlook. “In the second quarter, we have seen steady growth in traffic month by month. And with the likely improvement and easing of restrictions expected by the summer and with more people being vaccinated, we are optimistic that demand in Asia will continue to grow and there will be a strong recovery in the second half of the year for the industry,” Moore said. ■

## ■ L’Voyage expands with new shareholder

AIN caught up with Hong Kong-based charter broker L’Voyage’s new shareholder and CEO, Jolie Howard, to discuss the recent announcement of a strategic expansion. Howard has been in the business and general aviation industry in Asia for more than 20 years, spending the last five as CEO of TAG Aviation Asia before joining L’Voyage.

According to Howard, L’Voyage is well positioned to serve the expected influx of new customers in the post-Covid market. “We are investing in new technologies—including proprietary software solutions that would augment our services—so that we can lead in providing safe, transparent, legal, and sound charter services,” he said.

Howard noted that a growing number of prospective customers are considering or already using business jets due to their safety and health advantages over airlines, especially during a pandemic. “At the moment, our charters are mainly essential, one-way travels,” he said. “On occasion, however, we are seeing a demand with immigration flights to Europe, as well as requirements such as the need for passengers and pets to travel together. We expect to see an increase of charter requests for personal, leisure flights, as well as for essential business trips as borders begin to open up in the coming months.”

L’Voyage has been focusing on building its team and enhancing its product offerings, he noted. “We are launching our membership programs where members are able to enjoy many more benefits from discounted charter flights and exclusive access to luxury hotels, villas, private islands, and cruises, as well as tailored arrangements and other concierge services,” said Howard.

The company is also partnering with suppliers to support its clients’ travel needs. “In the long term, in addition to expanding our customer base and market share, we aim to continue to significantly improve clients’ booking and interfacing experience by investing more in technology,” he added.

L’Voyage founder Diana Chou shared her vision for this expansion, saying, “This strategic union and expansion augment the company’s strength and growth in scaling the business to the next evolution. As partners, Jolie and I have seen and built the industry firsthand through our mutual long-term confidence in the market.

“Jolie’s corporate expertise and experience complement and enhance the fundamentally bespoke and boutique elements of L’Voyage. With every crisis comes opportunity, and L’Voyage is poised to lead and transform the industry in the post-Covid environment,” she concluded. **A.L.**



# New aircraft programs aim for improving market

by Matt Thurber

A slowdown in new business aircraft development programs finally ended with the May 6 unveiling of Dassault's entry into the ultra-long-range, wide-cabin business jet market, the Falcon 10X. Of course, there are other ongoing programs, including the Falcon 6X, Gulfstream G700, and Cessna Denali, but it seems that many of the optimal niches are filled and it might be some time before we see further new programs launched.

## Falcon 10X

The newest business jet program is the just-launched Falcon 10X, Dassault's 7,500-nm competitor to the Bombardier Global 7500 and Gulfstream G700. A twinjet powered by Rolls-Royce's Pearl 10X turbofan, the 10X will feature a huge cabin with a volume of 2,780 cu ft, the largest cross-section of a purpose-built business jet, with an interior width at 9 feet 1 inch and height of 6 feet 8 inches.

With a mtow of 115,000 pounds, the 10X will carry 51,700 pounds of fuel and have a payload of 6,500 pounds. According to Dassault's preliminary performance figures, the 10X will be able to achieve its 7,500-nm range at Mach 0.85. Maximum operating speed will be Mach 0.925, but the 10X will still be able to take off at maximum weight with a balanced field length of less than 6,000 feet and perform steep approaches. Landing distance is projected to be less than 2,500 feet.

Dassault is leveraging its experience at manufacturing composite wings for the Rafale fighter jet, and the 10X's highly-swept wing will be made of carbon-fiber composite materials. Like all Falcons, the 10X will have leading-edge slats, flaps, spoilers, and ailerons. The empennage is also a big change for the 10X, switching from the cruciform and downward-canted horizontal stabilizers on earlier models to a T-tail configuration.

Also new for the 10X is an addition to the digital flight control system (DFCS)—the single power-lever Smart Throttle that was tested extensively during a 7X flight-test campaign last year. Dassault's plan to incorporate the Smart Throttle

to the DFCS will enable the addition of Recovery Mode.

With full control of all aspects of fly-by-wire flight control as well as the engines, the DFCS will be able to return the 10X to stable flight after an upset, when the pilot pushes the Recovery button on the instrument panel. Incorporation of the Recovery Mode may also lead to the addition of an Automatic Ground Collision Avoidance System (AGCAS). The single power lever, Recovery Mode, and AGCAS are standard on the Rafale.

The 10X's DFCS has additional features, including a soft go-around and "comfort" climb and descent, designed to make passengers more comfortable during maneuvering. The Smart Throttle also helps facilitate improvements for reduced-thrust takeoffs and noise abatement.

Multiple touchscreen displays simplify the pilot interface, including a graphical flight management system and simplified checklists with auto-sensing of many switch positions. Much of this is designed

to address both the possibility of reduced crew operations, which could be one pilot flying while the other rests. In fact, the flight deck will be fitted with fully reclining seats for what is termed extended minimum crew operations.

Dual FalconEye head-up displays (HUD) will be double as primary instruments, opening up the panel displays for other uses. Dassault expects to have EVS-to-land capability with FalconEye, allowing landings to touchdown and rollout in poor visibility with no natural vision outside the aircraft.

The Pearl 10X represents the first time a Falcon will be powered by a Rolls-Royce engine. For the new jet, the Pearl 10X will produce more than 18,000 pounds of thrust while delivering 5 percent lower specific fuel consumption compared to earlier-generation engines.

The engine features a bladed-disk (blisk) fan design and a 10-stage compressor with six stages of blisks. An ultra-low-emissions combustor cuts noise and emissions, and a two-stage high-pressure turbine has a shroudless blade design. Testing will include running on 100 percent sustainable aviation fuel (SAF).

Spirit AeroSystems will build the nacelle system, and it and the 10X engine will be flight tested on Rolls-Royce's Boeing 747-400 flying testbed. Rolls-Royce will maintain a digital twin of the engine to track its performance, including capture of more than 9,000 parameters.

With so much cabin volume, Dassault designers are working on various configurations with up to four lounges, including a full bathroom with shower, private cinema, and VIP master suite with a queen-size bed and its own bathroom.

A dining table with four individual seats will allow passengers to exit their seats without disturbing seatmates. Passenger seats will have an available full-recline option like first-class seating on airliners.

The 10X will have a 3,000-foot cabin altitude at 41,000 feet and air filtered by ozone and VOC filters. Larger windows are fitted, with 38 in the 10X's long fuselage.

Priced at \$75 million in 2021 dollars, the 10X is expected to be certified and enter service in 2025.

## Falcon 6X

On March 10, Dassault's next jet to enter service, the Falcon 6X, took off for the first time from France's Bordeaux-Mérignac Airport, launching the new jet's flight test program. As of late April, the first 6X had logged more than 50 hours and flown to its Mach 0.90 maximum operating speed.

On April 30, the second flight-test 6X made its first flight, and a third is expected to begin flying in the third quarter. The latter will be equipped with a full interior, and testing will cover cabin systems, galley equipment, inflight entertainment systems, and Ka-band satcom. The fourth 6X will be the first production version and it will fly around the world on a demonstration tour.



The twin-engine 6X is powered by Pratt & Whitney's PW812D ("D" for Dassault), with each engine delivering 13,500 pounds of thrust. The PW812D features a 44-inch single-piece fan, a 4.5:1 to 5:1 bypass ratio, and the low-emissions Talon X combustor.

Until the 10X enters service in 2025, the 6X will be Dassault's largest Falcon, with a cabin height of 6 feet 5 inches and a width of 8 feet 5 inches, and also will have the largest cross-section dimensions of any purpose-built business jet. With three lounge areas, the 6X's aisle is five inches wider than earlier Falcons. Baggage is accommodated in a 155-cu-ft compartment inside the pressure vessel, plus there is another unpressurized compartment of 76 cu ft.

Dassault's performance specifications for the 6X call for 5,500-nm range at a long-range cruise speed of Mach 0.80 while carrying eight passengers and three crew. At Mach 0.85 that drops to 5,100 nm. Maximum operating speed is Mach 0.90 and the maximum altitude is 51,000 feet.

A new feature in the 6X design facilitates short-field performance—the fly-by-wire flight control system's use of electrically driven flaps and flaperons. This allows the flaperons to act as both flaps (increasing lift) and ailerons (roll control)—a first for a business jet. With the control surfaces working in tandem, lift-over-drag augmentation improves steep approach visibility, control, and comfort and enables a low approach speed of 109 ktas at typical landing weights. Takeoff distance at sea level and mtow is 5,480 feet.

The 6X flight deck features the latest version of the Honeywell Epic-based EASy III avionics, with four 14.1-inch displays, Honeywell's IntuVue RDR-4000 radar, and the FalconEye head-up display with combined vision system (overlaid synthetic vision and enhanced vision system imagery). FalconEye is standard in the 6X and was developed with Elbit Systems.

To enhance 6X maintenance, the jet is the first Falcon fitted with the FalconScan advanced diagnostic system. FalconScan "monitors and reports on 100,000 maintenance parameters," according to Dassault.

Falcon 6X certification and entry into service are planned in 2022.

## Gulfstream G700

Gulfstream has made extensive progress on its flagship G700 program, with six aircraft now in the test fleet as the company closes in on certification. Entry into service is expected in 2022. First flight of the G700 took place on Feb. 14, 2020, and that aircraft has flown to 54,000 feet and Mach 0.999.

The largest Gulfstream jet ever, the G700 will offer up to five living areas, a range of 7,500 nm, and maximum operating speed of Mach 0.925. Flight testing has demonstrated a balanced field length of 6,250 feet at maximum takeoff weight and a typical landing distance of about 2,500 feet.

Equipped with a full production interior, the sixth test G700 is fitted with Gulfstream's new "ultra galley," which has more than 10 feet of counter space, dedicated crew rest space, six-seat conference and dining area, and stateroom with a full-length wardrobe. Further, the twin-jet features the OEM's ultra-high-definition circadian lighting system, 100 percent fresh cabin air, low cabin altitude, and "whisper quiet" noise levels.

The galley is large enough to accommodate a refrigerator, microwave, and conventional oven. A dining area in the fourth zone can be configured in a club-six layout with a quick-deploy table that spans the entire cross-section.

Gulfstream showed a cabin mockup with a master bedroom with a full-size bed and dresser, in addition to an en suite lavatory with a toilet and vanity opposite from a floor-to-ceiling storage closet. In a first for a Gulfstream, the aft lav includes windows. Aft lavatory options not shown on the mockup include a larger vanity with opposite toilet, as well as a shower. A rear door in the aft lavatory allows in-flight entry to the 195-cu-ft baggage compartment, which can hold up to 2,500 pounds.

The G700 is powered by a pair of Rolls-Royce Pearl 700 engines. Delivering 18,250 pounds of thrust, the Pearl 700 has 8 percent more takeoff thrust, a 12 percent better thrust-to-weight ratio (8 percent more thrust and 4 percent less weight), 3.5 percent less fuel burn, and 5 percent greater efficiency compared to the Rolls-Royce BR725 engine on the current-production



G650. The new engine will meet or exceed Stage 5 noise standards and have nitrous oxide emissions that are projected to be 35 percent below the CAEP/6 standard.

According to Rolls-Royce, the Pearl 700 features a 10-stage, high-pressure axial compressor; improved gearbox breather exhaust; new Safran-Aircelle nacelle; 24-blade, 51.8-inch blisk fan; bypass ratio in the 5:1 range; high-pressure compression ratio of 24:1 (compared to 16:1 on the BR725); six blisk compressor stages; low-emission combustor; two-stage shroudless high-pressure turbine; and an enhanced four-stage low-pressure turbine.

A new feature for a Gulfstream jet is the G700's predictive landing performance system, designed to shield against runway overrun and to warn pilots to go around when necessary. A new dual head-up display will include enhanced flight vision system with EVS-to-land (no natural vision) down to touchdown and rollout.

Like its siblings, the fly-by-wire G500 and G600, the G700 is equipped with BAE active inceptor sidesticks, which are electronically interconnected and simulate mechanical linkage to prevent simultaneous pilot input.

Avionics are Gulfstream's touchscreen Symmetry flight deck, which is based on Honeywell's Primus Epic avionics. The full three-axis digital fly-by-wire system offers flight-envelope protection, stability augmentation, increased redundancy, and reduced maintenance.

Many of the visible switches found in earlier designs have been eliminated. Instead, inputs are made through 10 touchscreens like those in the G500/600. In addition, cursor control devices are integrated into the center console, giving each pilot control of three of the four main display screens and allowing data to be shifted between them in the event of a failure.

Gulfstream has also redesigned the pilot seats for better comfort—an important feature on an airplane with an endurance exceeding 14 hours.

## Cessna Denali

For many years, there was little competition in the single-engine turboprop market. While Piper has stepped up the performance of its Meridian/M500 with the more powerful and longer-range M600, there were no competitors for the TBM 900 series and Pilatus PC-12

until the Epic E1000, which was certified in November 2019. Textron Aviation finally added its Cessna brand to the fray with the Denali single-engine turboprop, announced in July 2016, though its development has been delayed.

First flight of the Denali was originally planned for 2018 or 2019, and now this is due to happen in the second half of this year. Interestingly, a top former Textron Aviation official involved in the Denali launch told **AIN** that the reason for selecting the name Denali is because Denali is the highest mountain in North America at 20,310 feet, about three times higher than Switzerland's Mount Pilatus and signifying Cessna's desire to unseat the PC-12 as king of the single-engine utility turboprops. Of course, the Denali doesn't offer three times the performance, but it will be competitive.

The Denali is powered by GE Aviation's Catalyst turboprop engine, which has been ground-tested on GE's testbed Beechcraft King Air 350. The Fadec-equipped 1,300-shp engine has a single-lever power and propeller control and features an all-titanium, 3D-aero compressor design for lightweight and efficient power generation; cooled turbine blades enabling higher thrust and fuel efficiency; and integrated electronic propulsion control to enable the single-lever power control.

With a four-passenger range of 1,600 nm, the Denali will fly at a maximum cruise speed of 285 knots and be capable of carrying a full-fuel payload of 1,100 pounds and up to 11 occupants. The turboprop features a flat-floor cabin, a 53-inch-by-59-inch rear cargo door, a digital pressurization system that maintains a 6,130-foot cabin to 31,000 feet, and an optional externally serviceable belted lavatory with pocket door enclosure in the aft of the cabin.

The cabin design also incorporates large passenger windows, a refreshment cabinet, and an in-flight-accessible baggage compartment. In addition, the interior is designed to be easily and quickly converted between passenger and cargo configurations.

Pilots will fly the Denali using Garmin's G3000 touchscreen-controlled integrated avionics suite, which will include voice command with automatic speech recognition, weather radar, autopilot, advanced terrain awareness warning system, and ADS-B Out/In capabilities. ■





DAVID MCINTOSH

**In the Middle East the royal family and government delegations have, in the past, traveled in sizeable aircraft, giving rise to the phenomenon dubbed “royal barge bizliners.”**

## ‘Royal barge’ bizliner sizes tested by pandemic effects

by Peter Shaw-Smith

With extremely large cabin sizes a traditional feature of the Middle East business jet market, **AIN** sought to canvass opinion on whether there has been a regional downsizing of aircraft types due to the Covid-19 pandemic. Traditional royal family and government delegations have tended in the past to travel in sizeable aircraft, giving rise to the phenomenon dubbed “royal barge bizliners.”

While the pandemic has placed more emphasis on “travel” than the “travel in style” to which top-notch delegations subscribe, there does seem to be evidence that it will take more than a pandemic to unseat VIP-configured airliners in favor of long-range traditional business jets.



**Simon Davies**  
sales director  
for the UK,  
Middle East,  
Africa, Turkey,  
India, and  
Eastern  
Canada, Global  
Jet Capital

Simon Davies—sales director for the UK, Middle East, Africa, Turkey, India, and Eastern Canada at Global Jet Capital—said the majority of business aircraft in the region are what might be referred to as traditional business aircraft.

“While many large bizliners are in the Middle East, most of those acquisitions were related to government or ruling

family needs, and these aircraft are not acquired annually,” he said. “It is challenging to state whether there has been any meaningful shift by these entities to smaller aircraft types.

“We observed some interest by some of these entities to add more traditional business aircraft to their fleet. However, this was not always at the expense of the larger aircraft type already in their fleet. Given the size of the traveling entourages for government or ruling family members, there will always be a requirement for bizliners in the region.”

Jeffrey Emmenis, a partner at Vertis Aviation in Switzerland, chose to reference the debate by looking at the market in Africa as well as the Middle East. “There has been a seismic shift,” he said. “We founded the business around the Boeing BBJs and Airbus ACJs.

“We are seeing more customers in the Middle East and Africa using those aircraft, but on official head-of-state business trips and government and diplomatic missions, because the airline industry is absolutely obliterated within Africa. It was never well connected anyway, but driven by Ethiopia and Kenya Airways, and now effectively, South African Airways. We’ve now seen a shift with those guys, where they would prefer smaller budgets and traditional business aircraft over executive airliners.”

“Recent times have seen fewer VVIPs in the region flying, in general,” said Mohamed Husary, the co-owner, founder, and executive president of UAS International Trip Support. “Our clients have exacting

standards when it comes to comfort, and I don’t see them compromising.”

Hamish Harding, chairman of Action Aviation in Dubai, believes the biggest business aircraft categories are making way for smarter ones. “We are indeed seeing that,” he said. “We do see some of the bizliners being sold now in the region and less demand for the really big aircraft. Obviously, Saudi was the heart of all that. The whole region seems to be less interested in the very big business jets. There is more demand for the Gulfstreams of this world, or the Globals, Challengers, and Legacys.”



**Hamish Harding,**  
chairman,  
Action Aviation

In the charter market, the argument can be more a question of long-range, super-large, large, or super-midsize business jets.

Sameer Hdairis, accountable manager for Arab Wings in Amman, Jordan, said he had not seen aircraft size being affected by Covid. “I have not seen any downsizing. We have definitely noticed an increase in charter flight demand due to the problems the airlines are experiencing. I have seen, let’s say, newcomers who used to travel business class, or first class, who have started seeing the need to acquire aircraft or to use aircraft charter.

“I have noticed certain businessmen buying preowned aircraft because of the lack of commercial flights to meet their needs. Arab Wings has added two aircraft

in the past year. I think there will be more demand for preowned aircraft.”

Hdairis had seen aircraft valuation metrics diverge. “There are two outcomes concerning this. On the one hand, for owners of the most expensive aircraft, if their business or industry was negatively affected, they sold their aircraft, and prices fell significantly,” he said. “On the other hand, I noticed that Challenger 604s, Legacy 600s and 650s maintained their value and in some cases these increased because of demand.”

Mark Hardman, CEO of RightJet in Dubai, noted that the selection of aircraft charter type was more price-conscious under Covid. “The market is presently super price-driven. It depends on the profile of the client as to whether they’re looking at a small, medium, or large jet, or a bizliner,” he said.

“We are seeing travel for leisure and business, but...with the exception of certain routes such as Dubai, Seychelles, Turkey, and the Maldives, pleasure travel is not a pleasure at the moment. Most people are traveling for a compelling reason.”

When it comes to royals and government delegations, Hardman questions whether they are traveling at full capacity at the moment. While he thinks not, some activity is being seen.

“How price-sensitive is the charter market? There’s quite a lot of new market entrants, who were used to traveling business or first,” he said. “If you’re traveling with a group of people [and considering a business jet], you’ll probably not be too surprised at the price of chartering a jet. However, if it is just one passenger then the price is considerably more than first class.”

People on the commercial side were used to shopping around. “We’ve seen quite a lot of this, where many brokers have been contacted and where there are parties working on the same trip,” he said. “This is fine, but it is not very efficient and usually does not lead to better pricing. I believe the market, within certain sectors, is buoyant, but still very much price-driven.”

Asked if bizliners had been edged out on size and price considerations in the last 12 months, Paras Dhamecha, managing director of Empire Aviation Group (EAG) in Dubai, said: “No, the larger aircraft have not necessarily disappeared. The smallest aircraft in our fleet is the Hawker 900XP and our charter fleet goes from the Legacy to the Global, and the G650.”

From time to time, EAG still gets requests for the larger bizliners but many countries are currently closed. “Is anything going to change when things open up? I don’t really think so,” he said.

“People are still going to jump in those airplanes and go where they need to go. We have seen no issue, in terms of people looking at price when they know what they want to do with these airplanes, which serve a very regular clientele that spends a lot of money flying around the world.” ■



# Charter helps Middle East weather Covid storm

by Peter Shaw-Smith

Aside from scheduled cargo, business jet activity has been the only sector in Middle East aviation to prosper during the pandemic, as the dearth of recent airline activity has forced more people to look into air charter or even business aircraft ownership. But the practical realities of day-to-day restrictions have made aircraft operators' lives difficult.

Factors complicating missions have included border closures, differing immigration rules that often change daily, lockdowns that limit access to suppliers and amenities, health screenings and long quarantine periods restricting crew entry and crew rest, reduced airport opening hours, and manpower shortages. "We're extremely positive about the rest of 2021," said Mohammed Husary, UAS co-founder and executive president. "Recovery is happening, albeit slowly, but we must all consider that the past 12 months have been the most challenging times aviation has ever experienced."



**Mohammed Husary, UAS co-founder and executive president**

"The UAE is open without any limitations or restrictions, making it exceptional among the majority of global states," he added. "With Expo 2020 Dubai kicking off in October and running for six months, we're expecting a big increase in air charters to the UAE."

Paras Dhamecha, managing director of Dubai-based Empire Aviation Group (EAG), agreed that last year was difficult. He said the second quarter last year, in particular, was extremely testing, with airports and nations completely shutting down.

"There were two big challenges," Dhamecha said. "One was having airplanes on the ground, but secondly, as an asset-management business, making sure that airplanes were kept up the entire time, with [difficulties] of moving people around and completing maintenance."

Charter business picked up in July, with repatriation flights from within the



Dubai-based Empire Aviation Group has seen demand for charter continue despite Covid and, with the exception of March, every month has been strong since July of last year.

region to Europe—a surprise, as summer in the region is normally relatively slow. Demand for EAG charter has continued and, with the exception of March, every month has been strong since July of last year.

"The drop in demand in March 2021 perhaps reflected a new wave of Covid-19, with the UK and other European countries closing down," Dhamecha said. "Apart from March, we've seen good uptake in our charter business since the beginning of the year."



**Paras Dhamecha, managing director, Empire Aviation Group**

He cites research by GlobeAir, which calculates the number of passenger touchpoints when flying on a private jet at just 20 versus 700 by airline. This is because private aircraft passengers move through a smaller, less-trafficked terminal and fly with a handful of people who are known to them.

EAG has also seen renewed interest from customers, as well as new clientele, on the aircraft acquisition side. Several deals are in progress. "If you look at the market, the inventory of good-quality aircraft seems to be drying up fairly quickly," he said. "This shows that many people see business jets as a 'safe-haven,' a safe means of flying."

## Brokers Stay Busy, Too

Just as with charter, aircraft brokers have been busy in the region. "The brokerage world has worked extremely well recently," said Hamish Harding, chairman of Action Aviation in Dubai. "The business jet market is effectively booming at the moment. We couldn't really have a more active market."

"Overall, in 2020, it went extremely well," Harding added. "The beginning of the year was going well for us anyway. In January 2020, we closed a brand new G650ER for around \$60 million in a preowned sale, one of the highest-value G650 preowned deals last year. We had a couple of other deals

and then suddenly Covid hit. Obviously, it went quiet for a few months from March 2020 with the sudden worldwide shock of Covid. Nobody quite knew what was going on and everybody shelved decisions."

The firm saw one or two deals fall through and deposits were also lost, as people could not complete. Business picked up again in the second half, particularly the fourth quarter. "There was a massive sales effort around the world and people trying to buy aircraft for U.S. depreciation," he said. "We sold a couple of large jets around December 30 last year. Just make sure it closes before the end of the year and let me do one business flight."

Action Aviation aims to sell 20 to 25 aircraft a year. Though it had a very active 2020, this year seems to be even busier. "I had actually thought [sales] might fall off a cliff," Harding said. "I wasn't quite sure what the change of U.S. president might mean. I thought maybe there'll be a clamp-down on businesses, and 100 percent depreciation of preowned aircraft might go."

"It seems the momentum has built, if anything, and now we're hitting a problem where there's a real shortage of inventory. [W]e have sold most of the aircraft we were representing: for example, we have sold four G450s in the last few months. We are desperately looking right now for fresh stock, particularly G450, G550, and G650, Global 6000, Legacy 600/650, and Challengers. These sorts of aircraft are in constant demand. We cannot get enough of them. We have multiple buyers right now and not enough good stock."

New-market entrants are moving in. "Right now, we've got so many first-time buyers who finally decided they want to have an aircraft," Harding said. "They could have had an aircraft anytime in the past, but they've chosen now because Covid just made traveling so unpleasant any other way."

Jordan's Arab Wings said that the past 12 months had been tough. A six-month, countrywide airport closure last year—from mid-March until mid-September—meant it operated only three or four flights, impacting financials significantly. Everything was grounded, said accountable manager Sameer Hdairis.

"We were ready to operate and had some requests, but in some cases we had to outsource flights through special exemptions to bring humanitarian officials in from Europe or elsewhere," he said.

During these six months there was no or little income, except for management fees. It reduced salaries, as overheads, rent, fee payments, and certification approvals remained in place. "I wouldn't say it was back to normal [in September] but business gradually picked up," Hdairis said. "We had to adopt Covid-19 protocols on aircraft sterilizations, with crew...wearing the necessary clothing and masks. The offices also occasionally had to be disinfected."

Arab Wings manages 11 aircraft, of which nine are on charter. "We have seen a slight increase in the first quarter of 2021, compared with the fourth quarter of 2020," Hdairis said. "There is a gradual increase in demand for charter flights."

RightJet CEO Mark Hardman said the return of flights from Doha would boost the ability to use operators from across the region, including Qatar Executive, enhancing customer choice. The market has also seen significant increases in FBO activity at Dubai International and Al Maktoum International airports. The firm has advised on infrastructure development projects in the UAE and Europe.

Simon Davies, v-p sales for the UK, Middle East, and India at Global Jet Capital, said that while the pandemic affected the business aircraft market in the Middle East significantly in 2020, his company remained active in the market.

"We saw fewer opportunities during the middle of the year while noticing an increase in charter sales during the same period," he said. "However, we observed an increase in activity in the last quarter of 2020, which has continued into 2021. We cannot predict what will happen in 2021, but we expect to see continued growth in activity levels."

The key driver for the international markets outside the U.S. in 2021 will be the reopening of national borders from travel restrictions. Another critical market growth factor will be the availability of aircraft.

"We expect to see a more vibrant market in 2021 than in 2020," said Davies. "The larger-sized aircraft in the traditional aircraft models have seen a dramatic reduction in available preowned aircraft for sale as a percentage of their installed base. Simultaneously, OEM backlogs have remained relatively constant for this aircraft market segment, which means fewer total potential transactions can be completed." ■



VLADIMIR KARNOZOV

A Russian Mi-171A2 and Mi-38.

## Ruggedness and reliability keep Russian helos flying

by Vladimir Karnozov

Albeit having a small share in the global market for business aircraft, the Russian aerospace industry maintains one important stronghold with VIP-configured Mi-8/17 series helicopters. Operational since 1965, the platform continues in production with more than 13,000 copies built so far, including hundreds for use by corporations and government officials.

Exported to more than a hundred countries, the helicopters logged some 100 million flight hours and won worldwide acclaim for ruggedness, reliability, and predictability, the three merits that certain customers place above all else. A Hip (NATO code name for the Mi-8/17) can be much noisier and shakier than most modern designs, but its outstanding flight record and classic appearance prevail when a customer does not want to take any chances.

During the past decade, the annual production rate floated between 100 and 200 units. No official statistics are available for how many helicopters come with a high-comfort interior. Most customers for those aircraft prefer to stay unidentified. But analyzing reports of Russian outfitters on the installation of VIP interiors into green aircraft and conversions of used ones shows that, on average, there are about six VIP/VVIP Mi-8/17 helicopters entering service each year.

“Installation of VIP interiors into the Mi-8/17 family remains our core activity, with three helicopters done in 2020 and four orders won for 2021,” said Dmitry Onyanov, general manager at the Tulpar Aero Group. High-speed airborne connectivity is now a standard customer requirement, he added. The Covid-19 outbreak prompted a desire for cleaner air inside the aircraft through the installation of so-called “improved thermal filters.” The work costs about €100,000 for a Mi-8-sized helicopter and can be done during a shop visit for maintenance.

Another novelty is an improved ventilation system that manages a complete replenishment of air inside the aircraft within two to three minutes. A new trend involves the installation of Nuage-like seats—fashioned after the reclining seats designed by Bombardier for its Global business jet family—into the Russian-built helicopters.

Tulpar is considering similar designs for a wider range of applications. “We are working hard on the creation of a similar seat for other jets and choppers,” Onyanov said. Tulpar is also developing improved honeycomb panels for lighter weight and better noise insulation. The company buys them abroad but plans to introduce local analogs made completely of Russian materials.

Another outfitter doing VIP interiors for the Mi-8/17 is AirTaxi-Service, which has developed a quick conversion (passenger/cargo/medical/corporate) cabin with a high comfort variant for up to 13 people. Initially an aircraft operator and MRO provider, the company moved into the aircraft interiors business in 1999.

Together with the Mil design house, AirTaxi-Service outfitted a Mi-38 with VIP interior, for which it received praise from Russian president Vladimir Putin, who showed the helicopter to Turkish leader Recep Tayyip Erdoğan at MAKS 2019. Developed as a growth replacement for the Hip, the Mi-38 produces less noise and flies faster, while offering payload capability of 5.5 tonnes and cabin space of 29.5 cubic meters against the Mi-8’s 4 tonnes and 23 to 27 cubic meters, respectively.

There is no Mi-38 yet in the Russian government air arm yet since it buys only products that have already proved safe and reliable in operation. It operates more than a dozen Mi-8AMT-1s and Mi-8MTV-1Ss, which replaced older Mi-8PS VVIP helicopters.

The latter’s leather seats, satellite phone, and air-conditioning inspired Indira Gandhi, and in 1971 her cabinet approved the purchase of six broadly similar Mi-8MPs. Bearing Indian Air Force markings, they served with the VVIP Communication Squadron based at Palam, near New Delhi, until their replacement came in the form of six Mi-17-V5s whose VVIP outfitting was done at the Base Repair Depot at Chandigarh.

Three Mi-8s—registration EW-25049, EW-001DA, and EW-002DA—operate for Belarus president Alexander Lukashenko, while two Mi-172VIPs fly for Venezuela’s Nicolas Maduro. Ugandan president Yoweri Kaguta Museveni uses a Mi-17-1 bought in 2016 and equipped with 12 passenger seats, a cloakroom, snack bar, and a lavatory.

Other recently delivered VIP-configured Mi-17s went to Sudan, Turkmenistan, Egypt, and Bangladesh. In addition to Mi-171A2 UP-MI701 and UP-MI702, Kazakhstan’s Berkut air company, which serves the government, has taken delivery of a UP-MI707. The Mi-8/17 helicopters also serve national leaders of Ukraine, Sri Lanka, the Czech Republic, Bulgaria, and Slovakia, among others.

VIP-configured Mi-8/17 helicopters are also found in the fleets of large corporations such as Russia’s Gazprom, Rosneft, and other fossil fuel giants. Recent deliveries include a Mi-8MTV-1 to ZEST leasing company in St. Petersburg for operations with Russair. It is configured for four main passengers and eight members of their entourage.

Similar helicopters are easily available for charter across Russia at rates of between 140,000 and 215,000 Roubles (\$1,845 and \$2,833) an hour depending on condition. The pandemic caused a number of operators to place their VIP-configured Mi-8/17 for sale and others to buy them.

At the turn of the century, new VIP-configured Mi-17s sold for \$4 million, compared with today’s price tag of \$23 million for an outfitted Mi-171A2 new from the factory, \$16 million for a Mi-8AMT-1-VIP of 2014 vintage, and \$6.2 million for a 2006-vintage Mi-8AMT-VIP. The market for such equipment remains alive, keeping Russian industry and outfitters afloat. ■

## Vnukovo-3 FBO sees more growth

Vnukovo-3/Vipport, Russia’s largest FBO, is ready to strengthen its position in the domestic market this year thanks to the ongoing recovery of the country’s business aviation sector from the pandemic’s consequences, according to recent statements by representatives of the FBO and independent analysts. According to data provided by WingX Advance in April, Vnukovo-3 is the leading airport in Europe in terms of the number of business aviation flights year-to-date.

At present, Vnukovo-3 continues to show a positive momentum, as the demand for business aviation flights in Russia steadily grows. However, a further expansion of Vnukovo-3, according to its representatives, will probably be suspended until 2022.

Anna Kislova, head of the development and quality-control department of Vnukovo-3/Vipport, told **AIN** that while the business aviation sector in Russia is gradually improving, the company will be unlikely to invest in major projects this year. “Currently,” said Kislova, “the infrastructure of our complex remains unchanged, and there are no plans for new investment projects this year. The most difficult period we had was in April 2020, after which the situation began to improve rapidly, allowing the company to reach pre-pandemic results.”

Kislova added that Vipport this year has particularly high hopes for the RUBAE Expo, which will be held September 8-10 in the traditional format, the first Russian business aviation event to be conducted in-person since the beginning of the pandemic.

About 90 percent of Russian business aviation traffic is in the Moscow region. In addition to Vnukovo-3, Terminal A of Sheremetyevo Airport remains a center of business aviation. According to local analysts, Covid-19 has not had a catastrophic effect on business aviation in Russia, as local authorities did not impose restrictions on business flights even during the pandemic’s peak.

On the contrary, the cancellation of the majority of regular flights and closure of Russia’s borders with many foreign states from the end of March to August last year led to the growth of business aviation flights to and outside the country. In June last year, the number of flights almost doubled, with a peak in September.

One reason for the rapid development of business aviation in Russia is the lack of traditional bureaucracy associated with the issuance of permissions for such flights, which are usually provided by the Russian Federal Air Transport Agency. **E.G.**

# China Business Aviation Safety Day 2021

## 商务航空安全交流会 中国·成都



## AsBAA, ACP host inaugural and in-person China Business Aviation Safety Day 2021

by Anthony Lam

Civil Aviation Administration of China (CAAC) deputy administrator Hu Zhenjiang emphasized the agency's commitment to aviation safety during a keynote presentation at the China Business Aviation Safety Day 2021 in early April in Chengdu. The event, which was jointly held by AsBAA and the U.S.-China Aviation Cooperation Program (ACP), hosted more than 150 business aircraft pilots, OEMs, MROs, FBOs, and EMS, airport, and government representatives in the year's first in-person event for the Asian business aviation industry.

In a historical first, NTSB, FAA, and CAAC officials delivered virtual keynote presentations followed by expert presentation sessions covering a range of safety topics relevant to business and general aviation in mainland China. All sessions

were augmented with live English/Chinese dual language interpretation for all attendees.

Besides Hu, government keynotes featured NTSB chairman Robert Sumwalt; Robert Ruiz, director of the FAA's office of general aviation safety assurance; and Xiong Jie, the director general of the CAAC's aviation safety office.

Sumwalt, who spoke virtually from Washington D.C., presented business aviation accident case studies and discussed the importance of following standard operating procedures (SOPs) and "being a professional," the latter of which he described as "doing the right things even when no one is watching."

Meanwhile, Hu emphasized the CAAC's commitment to aviation safety as part of the administration's five-year

plans, and especially amid the Covid-19 pandemic. He encouraged budding Chinese GA and business aviation operators to "proactively adopt" safety management systems (SMS) and promised for the "parallel development" of both commercial and general aviation in China. Further, Hu echoed Sumwalt's remarks on the importance of professionalism—not only among pilots, but among the "ecosystem of aircrew, operator, and airport management."

The event's presentations discussed the necessity of cultivating a safety culture, implementing effective SMS, strengthening investigations to ensure general aviation safety, safety innovations, data-driven SMS best practices, human factors, maintenance, ground handling, and others. In addition to the presentations

were panel discussions on relevant topics moderated by Victoria Wilk, director of safety and regulatory affairs for Boeing in China; Rocky Zhang, Asia Business Aviation Association (AsBAA) vice chairman, chair of the AsBAA Mainland China committee, and vice president of government affairs for Textron China; and Chris Wu, president of Sino Jet Beijing.

US-China ACP executive director Geoffrey Jackson, along with Zhang and AsBAA board member and ExecuJet Haite Aviation Services China general manager Paul Desgrosseilliers, delivered opening and closing remarks for the event. Hosted by the Haite group in its physical conference and dining venues, attendees enjoyed a long-overdue opportunity to physically network over a luncheon, an afternoon tea break, and an evening cocktail to facilitate the exchange of awareness and ideas in aviation safety. China Business Aviation Safety Day 2021 was sponsored by Haite, Gulfstream, Boeing, Bell, and China Aviation Rescue & Emergency.

"AsBAA is pleased to have co-hosted and co-organized the historic China Business Aviation Safety Day 2021 with the U.S.-China Aviation Cooperation Program," said AsBAA chairman Wu Zhendong. "For years, AsBAA has led the industry with in-depth, knowledge-based safety training for the Asian business aviation industry on a per-country basis."

"Since 2020, AsBAA's first dedicated safety committee has been taking the association's safety initiatives to the next level, where we are constantly working closer with the relevant government authorities and industry stakeholders in identifying country-specific safety issues, highlighting regional safety concerns, and drawing lessons from experience to make Asian business aviation safer."

Following the critical reception of AsBAA's Virtual Safety Summit 2020, which saw the first participation of an Asian business aviation safety event by the NTSB and Civil Aviation Authority Singapore (CAAS), it has also hosted the Malaysia Virtual Safety Forum 2021 and the China Business Aviation Safety Day 2021 with the participation of the NTSB, FAA, and the respective Asian countries' civil aviation authorities. In its mission to improve aviation safety for business aviation in the region, AsBAA aims to host its next physical and/or virtual aviation safety events in the Philippines, Singapore, and elsewhere in Asia-Pacific later this year.

The Aviation Cooperation Program is a public-private partnership that works with aviation stakeholders in countries outside of the U.S. to design programs that promote technical, policy, and commercial cooperation in civil aviation. The program is industry-led and government-supported with cooperation from the U.S. Trade and Development Agency, FAA, U.S. Department of Transportation, Transportation Security Administration, and Department of Commerce. ■



NTSB chairman Robert Sumwalt spoke virtually at the China Business Aviation Safety Day 2021, which was held in-person in Chengdu, China, on April 8. The event was jointly hosted by the Asian Business Aviation Association and U.S.-China Aviation Cooperation Program.

# Will business aviation be part of the advanced air mobility revolution?

all stories by Charles Alcock

Seemingly oblivious to the disruption inflicted on aviation by the Covid pandemic, developers of new electric vertical takeoff and landing (eVTOL) aircraft are pressing ahead with plans for what they say will be a revolution in how people and things move around. Most of the early commercial operations are expected to involve short flights in

and around cities, under the urban air mobility (UAM) business model.

However, some companies are looking to expand the envelope for new electric-powered aircraft that could eventually operate autonomously without a pilot on board. In some cases, this may involve fixed-wing aircraft offering greater range by operating from runways.

Europe is at the forefront of the development of so-called advanced air mobility, with several eVTOL start-ups based in the continent and a wealth of expertise to provide supporting infrastructure and technology. There is also pioneering work happening across the Asia-Pacific region in countries such as China, Singapore, and New Zealand.

What is perhaps surprising is that so far there appears to have been little direct connection with the established business aviation sector, in part because most of the startup companies seem to want to retain control of commercial operations. But this could change in the next few years as the advanced air mobility revolution goes mainstream.

## EASA PREPARES TO PUBLISH MEANS OF COMPLIANCE DETAILS FOR EUROPE EVTOL TYPE CERTIFICATION

EASA intends to publish phase two of the means of compliance (MoC) requirements for its Special Condition-VTOL (SC-VTOL) type certification rules by the end of June. Confirming the European safety agency's next steps in finalizing the SC-VTOL regulations during a presentation to the Vertical Flight Society's Forum 77 event on May 13, David Solar, head of EASA's general aviation and VTOL department, said that phase three of the MoC document will be made public in November.

During his presentation, however, Solar also reported that EASA's operational rules will not likely be confirmed in time for the first urban air mobility services using eVTOL aircraft. European manufacturers, such as Volocopter and Lilium, have been targeting the start of commercial flights in 2023 or 2024. He indicated that EASA will probably allow some local exemptions so early operations can get underway.

The further MoC details will be eagerly awaited by eVTOL aircraft developers seeking to certify their products under the new SC-VTOL rules. These are based on the CS-23 Amendment 5 rules for light fixed-wing aircraft. EASA recently released the phase-one MoC requirements, which cover factors such as minimum acceptable handling qualities, the structural design and strength envelopes, load limits, and emergency landing capability.

The planned requirements for the eVTOL category cover aircraft of the same size and capacity as the existing CS-27 rules for small rotorcraft, with nine or fewer passenger seats and a maximum takeoff weight of 3,175 kg (7,000 pounds) or less. It is anticipated that under the Special Condition, there will be requirements for "enhanced" and "basic" categories of operation, depending on the purpose of flights and the operating environment.

The enhanced category will apply for the protection of third parties in commercial flights over congested areas, as envisioned by the so-called on-demand taxi urban air mobility business model. This will cover factors such as requirements for continued safe flight and landing, including the possibility of having to divert from the planned destination.

The basic category will likely apply for private operations and in less congested airspace. Aircraft operating in this mode will have to be able to make a controlled emergency landing through means similar to a controlled glide for a fixed-wing aircraft or autorotation for a helicopter.

The phase-two MoC requirements will cover aspects of eVTOL aircraft such as structures, hydro-mechanical systems, flight and human factors, electrical systems, avionics, fire protection, and cabin safety. The phase-three MoC document will be presented at the next EASA Rotorcraft and VTOL Symposium, which is to be held as part of the European Rotors trade show in Cologne, Germany, from November 16 to 18.

According to Solar, industry-standards group Eurocae is expected to publish around 15 new standards related to eVTOL type certification during 2021. He said that EASA will step up efforts to support training needs for eVTOL aircraft operators and recently qualified the first virtual reality training device developed by VRM Switzerland for helicopter pilots. In April, the agency published the final version of the SC-VTOL rules covering electric and hybrid-electric propulsion systems that will power the new class of aircraft.

While EASA's work on the certification of eVTOL aircraft appears to be closely aligned with the approach taken in the U.S. by the FAA, Solar indicated that other international safety agencies might not



The VoloCity aircraft being developed by Germany's Volocopter is expected to be one of the first eVTOL designs to earn type certification under EASA's SC-VTOL requirements.

be on the same track. FAA is basing its approach to eVTOL certification on its Part 23 Amendment 23 rules.

"One big question mark is China, because we have very low visibility [of the Civil Aviation Administration of China's approach to certifying eVTOL aircraft] and they may have some very local agreements we are not aware of," Solar told the Forum 77 audience. This comment would appear to be a reference to Chinese eVTOL aircraft manufacturer EHang, which has enjoyed a high degree of cooperation from CAAC, allowing it to conduct extensive trial operations with its EH216 aircraft ahead of certification, which may come as soon as late 2021 or 2022.

According to Lowell Foster, director of global innovation and engineering with the General Aviation Manufacturers Association, industry and regulators are generally making good progress in establishing the certification path for eVTOL aircraft, while cautioning that more work lies ahead. "We're about midway through the process and still have some huge challenges," he told the Forum 77 audience, "It took the airline industry around 100 years to get the level of safety and efficiency that they have today and we're doing it all in a very short time."

Foster maintained that complete requirements for operations and training will need to be worked out once the first eVTOL models are certified and ready to

start operating. "This work will have to be done concurrently; otherwise the initial operations could be severely limited," he said.

GAMA's Electric and eVTOL Certification Progress committee is bringing together member companies to focus on challenges around certification, operations, training, infrastructure, and airspace challenges. Lowell said the committee is encouraged by the willingness of FAA and EASA to take a performance-based approach to aircraft certification and that around two-thirds of MoCs for existing aircraft will be applicable for eVTOL designs with no changes.

However, he expressed concern that the approach taken to type certification may still be too rooted in requirements for aircraft powered by fossil fuels, rather than the new modes of electric propulsion. "I'm concerned that we may miss an electric-specific safety issue this way," he warned.

Foster also advocated for a strong emphasis on human-factors issues, such as the need to closely scrutinize the design of flight displays used by pilots. He indicated that lessons learned from two fatal accidents involving Boeing's 737 Max airliner could have a bearing on how eVTOL aircraft are treated. "In the fallout from the Max [accident investigations], the human-factors folks have an even bigger magnifying glass now," he concluded. ■

These stories are from [FutureFlight.aero](http://FutureFlight.aero), a news and information resource developed by AIN to provide objective, independent coverage and analysis of cutting-edge aviation technology, including electric aircraft developments and advanced air mobility.

# VERTIPOINT PLANS SUPPORT SINGAPORE'S CASE TO BE WORLD'S FIRST EVTOL AIR TAXI MARKET

Singapore seems increasingly likely to see the world's first eVTOL air taxi operations, with services set to begin there no later than 2023, and perhaps sooner. China's EHang is being no less bullish about when it expects to begin commercial services with its two-seat EH216 vehicle and says they could start next year in various Chinese cities.

However, 2024 is now viewed as the more likely launch date for U.S. rivals Joby and Archer in locations such as Los Angeles and Miami. And early adoption in Europe is also viewed as being around three years away.

Ground infrastructure specialist Skyports is working closely with eVTOL developer Volocopter and local authorities in Singapore to establish the first permanent vertiport in the Southeast Asian city-state. In October 2019, the two companies set up a proof-of-concept vertiport, branded VoloPort, in Singapore's Marina Bay area as the base for flight demos of Volocopter's 2X prototype aircraft.

The partners have been working with the Economic Development Board of Singapore and the Civil Aviation Authority of Singapore on plans to launch services. "We are now working in greater detail with the regulatory authorities and it will certainly happen by 2023, or even sooner," Skyports managing director Duncan Walker told FutureFlight. "Singapore is a beachhead for other Asian [air taxi network] rollouts."

On the assumption that operations will begin on a small scale, the company's plan calls for the initial construction of one vertiport in Singapore. This may support flights to existing suitable landing sites across the island nation as well as to nearby locations, such as Johor in Malaysia and Batam in Indonesia. Progressively, as demand for air taxi services grows, Skyports expects to build a network of vertiports across Singapore, which has a population of 5.7 million.

Singapore is a major global shipping port and Walker said this has the potential to support a strong market for eVTOL aircraft or drones to make deliveries between ships and the shore, carrying urgent items such as cargo manifests, as well as medicines and cash to pay crew. Skyports is already established as a drone delivery operator, providing support to both the National Health Service and the Royal Mail in the UK, where it is headquartered. It has just announced a partnership with Kenya Airways that is expected to result in the launch of drone flights later this year for deliveries, logistics support, and

infrastructure inspection across the East African country.

Skyports is also setting its sights on another early-adopter market on the other side of the world. Both Germany's Lillium and California-based Archer have already announced plans to start service in Florida, and the UK-based vertiport developer also wants a piece of the action, especially in the densely populated Atlantic coast corridor of South Florida, extending from Miami northwards to West Palm Beach.

"We expect to see a very different build-up of vertiports there and different types of [larger and longer-range] vehicles, providing services between cities," Walker said. "This [higher volume of traffic] will reduce the price point. My gut feeling is that the U.S. and Asian markets will slightly precede Europe [in adopting eVTOL aircraft], but Europe will be fast followers."

In April, Japanese trading group Kanematsu Corporation signed a memorandum of understanding with Skyports to do joint development work on infrastructure to support eVTOL aircraft services in Japan. The partners are already working together on drone delivery plans in the country, where last year Japan Airlines and Volocopter launched a partnership to provide passenger and cargo flights.

While Walker has high hopes for the market to scale up significantly, he doesn't see the potential for service providers to retain sole control and use of supporting ground infrastructure. Just as with public airports today, he sees multiple operators sharing vertiports, although there may be some "flagship locations" in places where individual companies have a strong presence.

The Skyports business model treats vertiports as miniature versions of airports, with aircraft operators charged landing fees, and also for recharging and storing their vehicles overnight. As part of the offering, the facilities will include a terminal building where passengers can be accommodated.

So far, most prospective eVTOL air taxi operators have not revealed much about how the ground infrastructure to support these will be provided. One exception is Germany's Lillium, which has announced a partnership with Spanish infrastructure and airports management group Ferrovial to develop vertiports across Florida, making no mention of whether it will allow rival service providers to use these. "Ultimately, operators will likely have to accept shared use," Walker predicted.

With this in mind, Skyports is designing vertiports to be able to support any



Skyports is working with local government agencies and its partner Volocopter to develop vertiports to support eVTOL air taxi services in Singapore.

type of eVTOL aircraft with critical services such as recharging for their electric batteries. Walker told AIN that his company is seeking to avoid what he called "the A380 problem," referring to Airbus's high-capacity, two-deck airliner, which encountered operational challenges at some airports because it was too large to be accommodated efficiently in existing ramp space.

Singapore and Florida apart, Skyports is also involved in two important research and development programs aimed at laying the groundwork for the expansion of the advanced air mobility market in Europe.

In January, it was among 30 companies and organizations selected by local agencies in Paris to conduct a series of experiments, mainly based around an eVTOL aircraft test area set up at the Pointoise-Cormeilles-en-Vexin airport. Volocopter is providing its two-city VoloCity aircraft, and UK-based Vertical Aerospace and EHang are also participating. Another key partner is French airport group ADP, which is a shareholder in Skyports.

Meanwhile, in the UK, Skyports is providing infrastructure expertise for a project to explore the feasibility of launching eVTOL air taxi services in the

city of Bristol. This project, which has secured £2.5 million in funding from the UK government's FutureFlight challenge program, is being led by civil engineering group Atkins and also involves Vertical Aerospace, which is based in Bristol.

However, it faces competition in its home country from Urban Air Port, which earlier this year was selected to partner with Hyundai to develop an eVTOL operations hub called Air-One in the city of Coventry. The company claims that its vertiports will be 60 percent smaller than traditional heliports and that it will be able to install them in just a few days to support operational flexibility. Design drawings show an elevated pod structure with a landing pad on top of a terminal building for passengers and support services.

While there seem to be innumerable companies vying to be leaders in the advanced air mobility sector, the competitive landscape for ground infrastructure would appear to be less cluttered. However, with early eVTOL air taxi services supposedly now less than three years away from launch, it seems highly likely that other contenders will show their hands, some potentially proposing alternative business models to the Skyports model. ■

## LILIUM PARTNERS WITH AIRPORTS TO BUILD REGIONAL AIR MOBILITY NETWORK IN BAVARIA

Munich and Nuremberg airports are set to become the first hubs for Lillium's plans to operate its Lillium Jet eVTOL aircraft in a regional air mobility network across the southern German state of Bavaria. The Munich-based company recently announced agreements in principle with both airports that mirror plans already announced for Germany's North

Rhine-Westphalia region and for Florida, with passenger services due to launch in 2024. From these hubs, Lillium intends to provide flights for up to six passengers in each aircraft to multiple cities across the region. The all-electric Lillium Jet will have a range of up to around 155 miles and cruise at speeds of up to 175 mph.

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## WISK PREPARES FOR NEXT PHASE OF CORA FLIGHT TRIALS IN NEW ZEALAND

Wisk Aero says it is on track to begin what it calls a “transport trial” of its Cora all-electric, autonomous eVTOL aircraft in New Zealand during the second half of 2021. The two-seater is set to participate in demonstration flights in South Canterbury as part of the government’s Airspace Integration Trial Programme, but these will not be made with passengers on board.

To support the work, California-based Wisk has enlisted the help of Boeing subsidiary Insitu Pacific, which is a specialist in unmanned aerial systems. Wisk is a joint venture between Boeing and Kitty Hawk.

The overall purpose of the flight trials is to safely evaluate, test, and demonstrate the integration of unmanned aircraft into existing airspace. The program is based on a memorandum of understanding signed with the New Zealand government

in February 2020, with both parties now engaged in detailed planning for the next phases of the trials.

To date, Wisk has made around 1,500 test flights with the Cora, backed by Boeing’s expertise in integrating piloted and autonomous technology. Earlier phases of the program focused on understanding and collecting the data to support the safe integration of autonomous aircraft into the airspace.

A spokesman told **AIN** that the company will now undertake a program of flight testing, as well as simulation work and data analysis involving multiple government agencies and New Zealand’s air navigation services provider Airways Corporation. “The goal of this is to provide robust, platform-agnostic data that can be used by governments, air navigation service providers, and civil aviation authorities globally to advance standards,” he explained.



Wisk is preparing for the next phase of flight trials with its autonomous all-electric Cora eVTOL aircraft in New Zealand.

Wisk has not published a timeline for the anticipated type certification of the Cora. The company is also working with the FAA with a goal of eventually receiving U.S. approval for autonomous flight operations.

Meanwhile, Wisk is suing a rival eVTOL aircraft developer called Archer for alleged theft of trade secrets and patent infringement. It is seeking

an injunction in the U.S. federal court for the Northern District of California to stop Archer using what it says is its intellectual property to develop a five-seat aircraft that it intends to use for commercial services from 2024. Archer, which recruited 20 former members of Wisk’s engineering team, says that it will defend itself vigorously in the case. ■

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Nuremberg and Munich are just over 100 miles apart, in the north and south of central Bavaria, respectively, and with a drive time between the two of at least two hours. The services could potentially connect other cities, including Würzburg, Bayreuth, Augsburg, and Ingolstadt.

Early drawings show plans to establish dedicated vertiports on the landside of each airport. Lilium, which is headquartered near Munich, also plans to develop vertiports at locations such as Lake Nona, near Orlando International Airport in Florida, and the German airports of Cologne-Bonn and Dusseldorf.

Through its Air Mobility Initiative Bavaria, which is part of the wider High-Tech Agenda Plus program, the state is

investing €100 million (\$120 million) in research and development for urban air mobility services. The management teams of Nuremberg and Munich airports both view the planned eVTOL flights as complementing existing connections between ground transportation and established airline services.

In late March, Lilium announced plans for an \$830 million initial public offering through a merger with a special purpose acquisition company lead by General Motors North America president Barry Engle. The deal with Qell Acquisition Corp makes Lilium the best-funded eVTOL aircraft developer in Europe, giving it the funds to complete type certification and start production on what it says will eventually be a large scale. ■



Nuremberg Airport is one of two hubs around which Lilium intends to create a regional air mobility network serving the German state of Bavaria.



EHang’s all-electric, fully autonomous EH216 eVTOL aircraft is being developed for short flights carrying passengers and for a variety of applications including logistics and fire-fighting.

## EHANG CONFIRMS PLANS FOR VT30 LONGER-RANGE, LIFT-PLUS-CRUISE EVTOL AIRCRAFT

China’s EHang is pressing ahead with development of a larger, longer-range eVTOL aircraft than its two-seat EH216 model. In April, it said it would soon start flight testing of a new passenger-carrying model called the VT30.

The VT30 will combine multiple rotors and a fixed wing to offer a range of around 186 miles and be part of a VT family of autonomous aircraft to be marketed alongside the EH216, which can only

operate up to around 22 miles on a full battery charge. The new types will also include a smaller model called the VT10.

EHang also announced plans to introduce a new piloted version of the fully autonomous EH216. It said that it aims to secure an experimental certificate to start flying the EH216M in China before the end of May.

Meanwhile, the Civil Aviation Administration of China (CAAC) has established a dedicated team to handle the type certification of the EH216. The agency confirmed that its Central South Bureau gave the team clearance to proceed during an April 14 meeting in Guangzhou attended by aviation safety inspectors, certification engineers, and experts from various Chinese aviation bodies and universities.

EHang has previously indicated that the EH216 might complete certification in

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China before the end of 2021. In December 2020, the company submitted its type certification application for the autonomous vehicle to the CAAC and the agency formally accepted it in January.

Announcing 2020 financial results in April, EHang reported that it sold a further 70 examples of the uncertified EH216 vehicles, representing a 15 percent increase over 2019. Revenues totaled RMB 180 million (\$27.6 million), with a gross adjusted profit of RMB 108.6 million.

Revenues come from a mix of aerial media solutions, which mainly involve light shows using its drones, and air mobility solutions. The latter income source was not clearly defined in the annual report, and it is unclear whether it includes payments already made for sales of EH216s to several partners in China and other countries. The company also has not explained whether these partners are distributors or operators for the aircraft.

According to EHang's chief strategy officer Edward Xu, the company plans to transition its business model from aircraft sales to an operating approach under which it would generate revenues from providing a full array of urban air mobility services. He said that production rates for the EH216 will significantly increase this year with the opening of its new manufacturing facility.

The company said it will launch a "100 Air Mobility Routes Initiative" in China to support this business model. It expects to roll this out over the next 24 months, with initial services focused around Guangdong, Hong Kong, and Macao. ■

## VOLOCOPTER FILES FLIGHT PLAN FOR UAM TAKEOFF

German eVTOL aircraft developer Volocopter recently spelled out how it plans to exploit the global market for urban air mobility (UAM) that it expects to be worth €241 billion (\$284 billion) by 2035. In a 2.0 white paper entitled *The Roadmap to Scalable Urban Air Mobility*, the German eVTOL aircraft developer explains the steps it will take to launch commercial operations in the next two or three years.

More than half of the projected market potential for 2035 will be in passenger services, valued at €141 billion (\$171 billion), according to Volocopter, which has updated the estimates it gave in its June 2019 1.0 white paper, *Pioneering the Urban Air Taxi Revolution*. The company expects the remaining €100 billion portion of the market value to be generated by cargo and other logistics operations that it intends to address with its VoloDrone vehicle.

In March, Volocopter announced that it raised a further €200 million through a Series D funding round supported by a group of venture capitalists. The startup has now raised a total of €322 million, which is less than some leading rivals that have opted for initial public offerings through mergers with special purpose acquisition companies.

The new white paper outlines what Volocopter considers to be the main elements of the so-called ecosystem to support the envisaged rapid scaling up of UAM services. The company maintains



Singapore is likely to see Volocopter's first commercial air taxi operations in 2023.

that early-stage services will be able to get underway using existing ground and air traffic management infrastructure, but it now seeks to explain the "interfaces and interdependencies" that will need to be established in the longer term to grow services. These include regulators, customers, cities, operators, air navigation service providers, staff, digital operations platforms, and maintenance services.

The company is working with UK-based Skyports to identify and secure locations for its VoloPort vertiport facilities. At the same time, it is focusing on plans to provide "first and last mile" ground connections for passengers and has already established a partnership with ride-hailing app Grab, which provides connections to services in 339 cities across Southeast Asia.

In Europe, Volocopter's partners also include Fraport, which runs Germany's Frankfurt Airport, and Lufthansa Industry Solutions. The latter company is helping to build the VoloIQ digital platform that

will harness artificial intelligence to connect the complex operational web of services and support functions.

According to Volocopter, most of the early demand for UAM services can be met by the initial 22-mile range of its VoloCity aircraft, which will have a pilot on board and just a single passenger seat. The white paper maintains that the core urban areas of major cities span less than 20 miles and that its vehicle will prove competitive with car services operating above gridlocked streets at speeds of around 56 mph. As battery technology improves, the VoloCity's range is expected to increase to 40 miles.

EASA is the primary focus of Volocopter's efforts to complete type certification for the VoloCity aircraft. It recently applied for concurrent U.S. validation by the FAA and also expects to get this from the Singapore authorities within three to six months of the initial approval from EASA under the new Special Condition VTOL rules. ■

## ROLLS-ROYCE TO PROVIDE PROPULSION FOR VERTICAL'S IMPROVED VA-X4 EVTOL

Rolls-Royce is developing the electric propulsion system for Vertical Aerospace's VA-X4 eVTOL aircraft. The aero engines group recently confirmed that its Rolls-Royce Electrical division will design the system, which will incorporate 100 kW-class lift and push propulsion units, as well as power distribution and monitoring systems to support operations.

UK-based Vertical Aerospace has renamed what was announced last year as the VA-1X as the VA-X4 to reference its ability to carry four passengers. The company now projects increased range and speed of 120 miles and 200 mph—an improvement on the earlier projections of 100 miles and 150 mph. The all-electric design features four sets of coaxial rotors on booms protruding from the rear of the fixed-wing and four sets of five-bladed tilting propellers on the front of the wing.

Around 150 engineers from Rolls-Royce

facilities across Hungary, Germany, the U.S., and the UK will support the Vertical Aerospace team, which is based at Bristol in southwest England. In 2019, Rolls-Royce acquired the Germany-based Siemens eAircraft business, and this has formed the bedrock for its ambitions in the advanced air mobility sector.

The company's development timeline calls for it to roll out the first full-scale prototype in July, and to then begin ground testing in late August, followed by initial tethered flights in September. Initially, the prototype will use an interim propulsion system that will be replaced by the Rolls-Royce system for the version of the aircraft used for the certification process, which Vertical Aerospace aims to complete in 2024. Untethered flights are expected to start in 2022, first in vertical mode, then in forward flight only, and, finally, in transition between these two modes.



Vertical Aerospace has redesignated its new all-electric eVTOL aircraft as the VA-X4 to reference its capacity to carry four passengers.

In February, Vertical Aerospace selected composites specialist Solvay to develop the main aerostructures for the fuselage and wing of the VA-X4. Belgium-based Solvay is developing a mix of thermoplastic composites, specialty polymers, structural adhesives, and functional films for the aircraft.

Other key contributors to the program include Honeywell, which is providing flight controls, and TE Connectivity, which is supplying electrical cables and connectors.

The selection of Rolls-Royce as a key partner is based in part on the strong ties

between the aero engines group and the Vertical Aerospace management team. In May 2020, Rolls-Royce chief engineer Tim Williams moved to Vertical to head up its engineering group. Twelve months earlier, Michael Cervenka also moved from Rolls-Royce to become the startup's CEO.

Recently, Rolls-Royce announced a partnership with Tecnam to develop an all-electric fixed-wing aircraft called the P-Volt. With a pair of electric motors, this is intended to be a short- and medium-range passenger aircraft. ■

These stories are from [FutureFlight.aero](https://www.futureflight.aero), a news and information resource developed by AIN to provide objective, independent coverage and analysis of cutting-edge aviation technology, including electric aircraft developments and advanced air mobility.



The EcoPulse hybrid-electric aircraft is a project by aircraft manufacturers Daher and Airbus and engine manufacturer Safran, which is providing the electric motors. Preliminary design review is done and first flight could take place in 2022.

# Electric business aircraft development ‘creeping up’

by Jerry Siebenmark

As the push for sustainability within business aviation grows, so too do efforts by startup and established firms to offer all-electric fixed-wing aircraft. Though not anywhere near as voluminous as the seemingly hundreds of proposed eVTOL offerings and designs, a smaller group of companies are proposing more traditional business aircraft with electric powerplants.

They include Pipistrel in Slovenia, which last year certified in Europe an electrically powered light trainer; Ampaire in California, which in 2019 first flew a Cessna 337 Skymaster converted to hybrid-electric propulsion that it calls the Electric EEL; and MagniX and AeroTec, which last May completed the first flight of a Cessna 208B Grand Caravan with an all-electric propulsion system.

In addition, two other proposed electric airplanes—one hybrid, the other all-electric—are on the drawing board that could mark the emergence of battery-powered business aircraft: the Daher-Airbus-Safran EcoPulse and Bye Aerospace eFlyer 800. While these two models and others that are sure to follow don’t represent an immediate threat to the turboprop-powered product lineup from traditional business aircraft OEMs, these electric aircraft pioneers bear watching by them. “If you’re them, I think you have to keep an eye out on it,” Teal Group v-p of analysis Richard Aboulafia told *AIN*.

In reality, it may be several years before all-electric aircraft become a viable option for operators and serious competition to business aircraft OEMs, independent business aviation analyst Brian Foley explained to *AIN*. Business jet-size electric aircraft “are probably a little further down the path,” he said.

Nevertheless, with flight shaming on the rise and the desire by corporate clients to demonstrate their commitment to leaving a smaller carbon footprint to shareholders and the public alike, it’s

clear to analysts like Foley that the push to move away from fossil-fuel-powered aircraft is here to stay. “It’s creeping up,” Foley said, and “eventually it will touch the corporate aircraft sector.”

In 2019, Daher, Safran, and Airbus announced an effort to develop the EcoPulse, a distributed propulsion hybrid aircraft demonstrator backed by the French government that is based on a TBM airframe with six electric thrusters, three each mounted on the leading edge and tip of the TBM’s wing. The project has completed its preliminary design review and is entering the assembly and integration phase at Daher this year.

Meanwhile, Safran has finalized the technical configuration of the EcoPulse’s electric thrusters that will be fitted with 50-kW Engineus electric motors, as well as integrated electronics and patented air cooling. DUC Hélices will supply the propellers. For Safran, the next step will be to deliver an electric thruster to Airbus for wind tunnel and endurance testing as a precursor to qualification for EcoPulse’s first flight, which is scheduled for 2022.

“With this demonstrator, Daher intends to develop the key architectural principles

for future hybrid aircraft,” said Daher chief technology officer Pascal Laguerre. “The project reaffirms our commitment, as a general aviation manufacturer with our Kodiak and TBM product lines, to more efficient and eco-responsible aviation.”

Recently, Bye Aerospace, which is working toward FAA Part 23 type certification for its two-seat eFlyer 2 model, unveiled plans for the eFlyer 800, an all-electric aircraft with seating for seven passengers and two pilots on flights of up to 500 nm at 320 ktas. Powered by a pair of Safran’s Engineus electric motors, the eFlyer would compete with existing turboprops such as the Beechcraft King Air 260 and Daher TBM 910.

“The time is right, the technology readiness is right at hand, the FAA regulatory process is becoming much better understood, and the program’s progressing through to the normal category FAR Part 23 amendment 64 certification,” Bye Aerospace CEO and founder George Bye told *AIN*. “All of that is the building blocks for the eFlyer 2 and the eFlyer 4, and then the 4 to the eFlyer 800.”

Even with less than a third of the range of the King Air 260 and TBM 910, Bye believes the eFlyer 800 will more than effectively compete with those and other business turboprops. He argues that the range of the eFlyer 800 is consistent with the distance a turboprop flies on a typical mission and at a lower cost.

“The 500-nautical-mile number is a key number for this category of aircraft,” Bye

said. “Ninety percent of the turboprop missions, 90 percent, take place in 440 nautical miles or less. I mean, if you can accomplish 90 percent of your missions for one-fifth of the operating costs on a brand new, high-tech, no CO<sub>2</sub>, no-noise aircraft, bravo. Bravo.”

## Left Behind?

Foley believes the path to electric business aircraft the size of light, midsize, and super-midsize jets is a ways away simply because an electrically powered aircraft the size of a Cessna Citation Longitude or Bombardier Challenger 350 would require enough batteries with “nothing short of a Mack truck in weight.”

“But fast-forwarding to when that day arrives, where there’s some kind of change in business jet propulsion, it could likely begin with some kind of hybrid setup first where you might have the traditional turbine jet-A powered engine for doing the heavy lifting, like the takeoffs and getting up to altitude, and then you could potentially switch over to some form of electric and cruise at least,” Foley added.

Neither Foley nor Aboulafia thinks the current lack of participation in electrically powered business aircraft by the major business aviation OEMs means they will ultimately be left behind in coming to market with such an aircraft. Aboulafia believes that once the demand for such aircraft is there, OEMs could simply acquire the intellectual property necessary to fielding such an aircraft, given that there are a lot of players in the electric powerplant space, albeit for largely eVTOL designs.

Foley noted that new propulsion and battery technology will follow the same path in business aviation that it always has. “Generally, in aviation, the technology that’s available to one manufacturer is available for the next, too. So maybe we’re waiting for the battery suppliers and the electric powerplant suppliers to come to them with some solutions. There will be a first adopter but the second will be right behind.”

Not all business aviation OEMs are sitting on the sidelines, however. The parent company of Textron Aviation announced in late March the launch of an eAviation division headed by former Textron Aviation senior v-p of global sales and flight operations Rob Scholl. According to Scholl, the division will bring together the work being done across Textron’s fixed-wing and vertical-lift businesses around emerging electric technologies.

Scholl told *AIN*, “eAviation is looking at all options when it comes to the development of electric, fixed-wing as well as VTOL aircraft for urban air mobility. Electric propulsion is just one such technology and we will continue to evaluate its potential role with our future aircraft development plans. The role of eAviation is to drive collaboration on a variety of new technologies and capabilities across the Textron enterprise. We continue to evaluate new aircraft technologies to determine how to best serve our customers and operators.” ■



Bye Aerospace’s proposed eFlyer 800 could be the most serious electric-powered challenger to traditional business turboprops, including the King Air 260 and TBM 910.

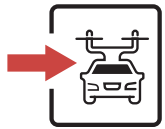




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