The international guide to business airports, FBOs and ground support partners

Business Airport October 2018

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FATGUE

Don't put people's lives at risk by flying while tired

In this issue

VTOL

Could these aircraft eliminate the ground transfer market?

Trip support

All you need to know about traveling to Super Bowl 2019

Airport access

How is the industry tackling capacity constraints in Europe?

Location focus: Northwestern USA | Preview: NBAA-BACE City guide: Helsinki | Interview: MEBAA



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British Virgin Islands, The Jet Centre maintains a special network of dedicated handling agents and fuel providers that extends to 24 airports throughout the Caribbean region.

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In this issue...

On the web

• David Kang, Avplan trip support account manager at Avfuel, looks at how new automated technologies are no replacement for human assistance

• Desiree Perez, CEO and founder of the Aviation Leadership Academy, discusses recruitment in the business aviation industry and what else can be done to lure potential talent For exclusive interviews and industry opinions, visit www.BusinessAirport International.com

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MEDIA & EVENTS Published by UKi Media & Events, a division of UKIP Media & Events I td

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Search for Business Airport Interna

Printed by William Gibbons & Sons Ltd, 26 Planetary Road, Willenhal West Midlands, WV13 3XT, UK

Business Airport International is published guarterly. Annual subscription price is £85/ US\$110. Airfreight and mailing in the USA by agent Air Business Ltd, c/o Worldwide Shipping USA Inc, 155-11 146th Street, Jamaica, New York 11434. Periodical postage paid at Jamaica, New York 11434 US postmaster: send address changes to Business Airport International. c/o Air Business Ltd, c/o Worldwide Shipping USA Inc, 155-11 146th Street, Jamaica, New York 11434. Subscription records are maintained at: UKi Media & Events, Abinger House, Church St. Dorking, Surrey, RH4 1DF LIK Air Business is acting as our mailing agent. USPS Permit Number: 4930

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Print publication: ISSN 2042-7212 Online publication: ISSN 2397-6454



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Welcome

atique is a feeling that I am very familiar with. I have two children below the age of four and maintain a full-time job. I am lucky that my role is flexible and most of the time work is kept between 9:00am and 5:30pm. However, during particularly busy periods, such as magazine deadline weeks, I often find myself working before the sun rises and continuing until it sets. Couple this with getting up two or three times a night to tend to one or other of the kids, and the fatigue really sets in.

I notice during particularly tiring times that I experience more headaches, my responses are slower and sometimes decision making can be difficult. I can cope with these symptoms as I know they are only temporary. My children will grow up (and sleep more!) and my role will in turn become easier as I will be less tired. But not every working professional can see light at the end of their fatigue tunnel - and for some this can be a very dangerous prospect.

In a 2017 study by University College London, Prof. Mika Kivimäki found that employees working long hours were 40% more likely to develop heart conditions than those working standard hours. This is not good news given that working long hours has become so common in many countries around the world. And even when people are not working, they are often still 'switched on' and checking emails constantly, thanks to mobile devices.

In the business aviation sector, fatigued employees, especially pilots, can put people's lives in danger. This is why the NBAA has invested a lot of time and money in ensuring that the industry is doing all it can to prevent fatigue setting in. On its website it hosts a number of rest guidelines and fatigue guidebooks to try to raise awareness of the issue in the industry.

According to Tim Wollmuth, who authored a 2017 study in association with the University of North Dakota and the NBAA on fatigue and how it affects business aviation personnel, since 2000 there were almost double the number of pilots who said that fatigue was a serious concern. This went hand-in-hand with an increase in longer working days: "In general terms, the number of duty days that are exceeding 12 hours is up 150% compared with 2000, while the number of days per month that exceed eight hours is up two-thirds," says Wollmuth in Tired and Tested on page 32.

The full results of the fatigue study will be revealed during a conference session at this year's NBAA-BACE event in Orlando, Florida, on October 16-18. The aim of the session is to further raise awareness of the serious implications of flying while fatigued. The overall message is that no job or trip is more important than life itself.

Helen Norman, editor

"The overall message is that no job or trip is more important than life itself"

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SHELTAIR STARTS CONSTRUCTION ON 20-ACRE HANGAR AND FBO COMPLEX AT FORT LAUDERDALE EXECUTIVE AIRPORT

Fort Lauderdale Executive Airport

Location: Florida, USA Opening hours: 24/7 Runway length: 6,000ft (560m) Facilities: Fixed-base operations provided by Banyan Air Service, Sano Jet Center, W Aviation and World Jet



heltair Aviation is to build, lease and manage a new 20-acre hangar complex at Fort Lauderdale Executive Airport FXE), with FBO services supplied by Banyan Air Service.

The US\$30m complex will include eight hangars totaling 157,000ft² (14,600m²), each with a 28ft-high (8.5m) door. There will also be 31,000ft² (2,900m²) of office and shop space available for customer use.

The complex will additionally be home to Banyan Air Service's FBO terminal, which will be operational 24/7 and provide fueling, customer services and ground handling. The company will lease 20,000ft² (1,850m²) of hangar space to boost its client offering.

Todd Anderson, senior vice president for real estate and development at Sheltair, said, "Sheltair is developing the complex to accommodate the larger-cabin business jets and expanding fleets of our existing customers, and those that are moving into the thriving South Florida aviation market. The eight hangars will each accommodate up to a G650 jet. "The site is on the north side of the airport and provides a level of exclusivity when accessing the facility, and privacy with dedicated ramp and apron space for those operators who will be based in the new complex."

Sheltair is providing unique leasing opportunities for exclusive, private hangar and office space with early-bird incentive packages available for fuel and other amenities. The complex is expected to be completed and operational from winter 2019.

Don Campion, president at Banyan Air Service, added, "Working with Sheltair on this project was an easy decision. On occasion we may be proud competitors, but at Fort Lauderdale Executive Airport we've aligned our interest with one another for almost 40 years.

"Once again we will expand our operations and Sheltair will grow its footprint through this exciting expansion of the north side of Executive Airport. This cooperative effort enhances the airport and, most importantly, better serves our customers." \bigcirc

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Left: The new complex will be home to eight new hangars Right: A new FBO terminal will be utilized by Banyan Air Service

> "The site provides a level of exclusivity and privacy when accessing the facility"

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Todd Anderson, senior vice president for real estate and development at Sheltair

FBO features

RANK

Banyan Air Service's 24-hour, full-service FBO will span 9,500ft² (880m²), with more than 1,000,000ft² (93,000m²) of hangar and office space. Banyan will provide business aviation services including ground services, aircraft sales, heavy maintenance and interior modifications, turbine engine service, structural repairs, avionics installations and services, aircraft part sales, Jet Runway Café and Banyan Pilot Shop.





ir Service Hawaii has unveiled its construction plans for a large aircraft hangar and FBO terminal at Kona International Airport (PHKO) in Hawaii, after gaining planning permission for the project. The company has selected design and

construction firm Nicholson to create the 6,900ft² (640m²) FBO terminal and 38,000ft² (3,500m²) hangar, with completion expected in autumn 2019.

Shaen Tarter, president of the FBO, said, "Air Service Hawaii is one of a few truly independent FBO networks in an increasingly consolidated industry. In addition to representing a choice of FBOs to its clients, Air Service Hawaii enjoys the ability to tailor its service offerings to what clients want and expect. Our new facility design reflects this approach.

"Air Service Hawaii has existed at PHKO for more than 25 years. It is our second-busiest location, and we believe that our new FBO terminal and hangar will enhance our company's capabilities, even on a statewide basis.

"The west side of the Big Island is very popular with wealthy visitors from all over the world. Our new facility is designed with their needs in mind, and to "Our new facility design reflects our approach of tailoring service offerings to what clients want and expect"

> Above: The new FBO and hangar will help cater to the growing demand for business aviation services on the island

The new facility will feature a 5,000ft² (460m²) lounge with wi-fi access, restrooms and showers, on-site catering service and cold storage for hold items, and concierge services for crew and passengers.

There will be a separate 1,900ft² (180m²) secure terminal area, rental cars available on-site, and the hangar will have a 28ft-high (9m) door to accommodate Global 8000, Gulfstream 650 and other large cabin aircraft.

enhance our ability to service them at an even higher level."

Commenting on the project, Winton Nicholson, owner and general contractor at Nicholson, added, "We are proud to be a part of the vision that Air Service Hawaii has been planning, and we are excited to work with a company that strives to provide excellence through Aloha."

Established in 1948, Air Service Hawaii is the only locally owned and managed FBO in the Hawaiian Islands to provide aviation services for business, commercial and personal aircraft throughout the US state. \bigcirc



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STRASBOURG AIRPORT OPENS CALL FOR BUSINESS AVIATION PROJECT PARTNERS

Above: A rendering of how a VIP lounge could look at the airport

rance's Strasbourg Airport is looking for project partners for its €20m (US\$23m) business aviation development plans. The airport plans to create a brand-new business aviation area with hangars, an FBO and a VIP lounge.

The airport is to invest in the extension of the Bravo apron – which is dedicated to business aviation – and to integrate new aircraft positions that will cover an area of 8,400m² (90,400ft²). It will also create a new taxiway named Romeo, to provide code E aircraft with access to this apron, and ensure the implementation of EASA standards for the entire zone.

Furthermore, Strasbourg will budget for the creation of a new access road to the zone, the demolition of old military buildings still situated on the access road, and for servicing required for the construction of landside buildings next to the business aviation apron.

In its call for project partners, Strasbourg hopes to find at least one other company to work with. It aims to collaborate on the construction and/ or operation of the buildings, the management and development of an FBO, VIP lounge and hangars, Right: Strasbourg hopes to become the home base of more business jets

"We plan to double the revenue figures generated by business aviation in the city"



Why travel to Strasbourg?

In 2017, there were around 12,000 general and business aviation movements at Strasbourg Airport, including those of more than 2,200 non-Strasbourg-based business jets.

Strasbourg is the home of 21 European institutions and hosts 20 sessions and international summits every year, making it a famous congress city with strong business tourism potential. The Alsace region welcomes 15 million visitors a year, with popular attractions including vineyards, castles and Christmas markets.



trasbourd

and the installation of mechanical activity, to meet the demands of aircraft based on and around the airport. The project will also involve the development of transportation solutions, with Strasbourg as a home base for business aircraft, meeting the demands of location institutions and operations.

Thomas Dubus, CEO at Strasbourg Airport, said, "For a long time, we did not have an incentive to attract business aviation, which was generating low income and was less established than commercial aviation. For the past two years, however, the airport has been frequented by members of the European Parliament, providing a basis for our new ambitions.

"With this call for partners, we are starting work on doubling the surface of the apron and launching the construction of two new hangars, a new FBO and a VIP lounge in cooperation with the French state, to welcome heads of state on official visits to Strasbourg. With such an infrastructure, we plan to double the revenue figures generated by business aviation in the city."

Responses to the call for partners must be received at the airport by October 15, 2018. \bigcirc

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FROST & SULLIVAN'S NEW REPORT REVEALS THE POTENTIAL FOR A REGIONAL BUSINESS AVIATION HUB IN MALAYSIA

Subang's Sultan Abdul Aziz Shah Airport has around **3,200** business jet movements per year jet movements in Subang could reach **9,299** by 2030

Annual business

Business aviation contributes **M\$96m** (US\$22m) to Malaysia's

GDP, representing 0.008%. This could grow to M\$342m (US\$83m) by 2030

Only **30%** of the Malaysiabased fleet is registered to the Malaysian registry rost & Sullivan has released its *Opportunity* to Develop a Regional Business Aviation Hub in Malaysia report, detailing the country's untapped potential. The report explores the economic progress of Malaysia and the growing number of high-net-worth individuals in the country, which has boosted the demand for business aviation. It also found that Sultan Abdul Aziz Shah Airport in Subang, Malaysia, is the most popular choice to be the latest business aviation hub in Asia-Pacific.

Here, Business Airport International outlines some of the key findings of the report. \bigcirc

Sultan Abdul Aziz Shah Airport's flight movement numbers are ahead of Bangkok's Don Mueang Airport and Manila's Ninoy Aquino Airport

As many as **124** jets could be owned by people in Malaysia by 2030

51 jets were owned by Malaysians in 2017

E-HEST

Painting and modifications, flight simulation and training, and parts distribution are among Malaysia's missing business aviation services

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Will Holroyd, sales and marketing director atHarrods Aviation

"When Harrods Aviation joined Air Elite, it was with a certain degree of caution. We could see the value in being part of a global offering, but were very keen to retain our independence and to protect the good name we had spent years developing.

"Before entering into a network agreement, you need to be absolutely sure of the aim of the network, who the other members are or will be, and how the network will be presented. The desires of the network have to match your individual business goals.

"The network approach has opened many doors for us around the world. If a customer in China inquires about good FBO services in London, 'our' local agent – be that a World Fuel Services employee or a fellow network member like Deer Jet – can talk about the services we provide. We have also been able to use the resources of other network members to assist with introductions to flight departments around the world who visit London, but who we would otherwise have had difficulty reaching. This collaborative approach has made a significant difference to our sales growth.

"By being members of the Air Elite network at both London Luton and London Stansted, we have access to some great training resources including the Ritz-Carlton customer service training. A program such as this would be cost-prohibitive for a company such as Harrods Aviation to run independently. By sharing the cost across the network, and with the financial support of World Fuel Services, this excellent training becomes affordable and much valued by our staff."

Should FBOs join elite networks? Two industry experts put forward their arguments

> "Conversations within networks were primarily centered around how to compete against the large FBO chains who offer fuel discounts" Denise Wilson, president and CEO at Desert Jet Center

Right: Desert Jet Center offers FBO services, private jet charter and aircraft maintenance

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Right: Harrods Aviation has locations at London Luton and London Stansted

"The desires of the network have to match your individual business goals"

Will Holroyd, sales and marketing director at Harrods Aviation

Denise Wilson, president and CEO at Desert Jet Center

"Desert Jet Center is a new FBO based at the Jacqueline Cochran Regional Airport (KTRM) serving the greater Palm Springs [California] area. As a new FBO, we were initially interested in joining an elite FBO network.

"We attended the gatherings of two different networks to learn what they were all about and what the individual members hoped to achieve by their affiliation with the rest of the members in the network. We discovered that the conversations within these networks were primarily centered around how to compete against the large FBO chains who offer network fuel discounts, with little conversation about how to elevate service and safety levels.

"Although our FBO is a relatively new company, Desert Jet has been in business since 2007 and has deeply ingrained commitments to customer service principals and high safety standards. Desert Jet was one of the first operators to embrace the IS-BAO standard for aircraft operations and we immediately pursued IS-BAH registration after beginning FBO operations. Safety and providing the 'wow factor' is important to our team, so if we were going to join a network, it would need to be on the leading edge of developing progressive ways to engage our team with service and safety principals.

"The leadership team at Desert Jet Center has tossed around the idea of starting its own network with other like-minded FBOs that want to continually improve their safety and service standards. We feel we are aligned with our company values if we compete on service and safety – not necessarily just on fuel pricing – and hope to learn from other FBOs who share the same values." \bigcirc

"With strong intent and good planning, Subang can become a leading center for business aviation"

Nishant Dey Purkayastha

The consultant for Asia-Pacific aerospace and defense at Frost & Sullivan explores the potential for an expanded business aviation market in Malaysia

he ASEAN – Association of Southeast Asian Nations – region is one of the top three fastest growing economies globally. Malaysia has been one of the key drivers of this growth and the future looks promising. However, the contribution of business aviation to the Malaysian economy is currently less than in developed economies such as the USA, the UK and Singapore. A favorable economic outlook and increasing interest from companies and investors around the globe make it an opportune moment to develop the business aviation industry.

Business aviation has always been a catalyst for economic development. The two major economic centers in Asia-Pacific, Singapore and Hong Kong, have airports that facilitate business aviation activities. The key stakeholders in Malaysia's business aviation industry have understood that developing the business aviation industry will not just result in economic activity and employment, but also support the growth of other industries.

Sultan Abdul Aziz Shah (SZB) Airport at Subang, Malaysia, has historically been the preferred business aviation airport in the country as it is closest to Kuala Lumpur, the central business district. Being a city airport, SZB attracts much lesser commercial aviation traffic than Kuala Lumpur International Airport, thereby ensuring availability of slots and parking stands for business jets.

The industry ecosystem at Subang is reasonably developed, with a combination of leading global players such as ExecuJet and Hawker Pacific and established local players offering FBO, MRO, charter, aircraft management and related services. SkyPark, a local industry major, has been operating the state-of-theart Business Aviation Center at Subang for a decade. The availability of ample land within the airport premises presents an opportunity to further develop the ecosystem and include facilities such as a modifications center, paint shop and parts distribution center.

The timing is also suitable

considering the regional dynamics. Singapore's Seletar Airport is today the most prominent business aviation hub in ASEAN. Seletar currently has no commercial flights, so business aviation users enjoy privacy and flexibility. However, a new passenger terminal will be operational by the end of 2018. The shift of some commercial flights from Changi Airport to Seletar will hamper the privilege business aviation users have. Singapore's high land rates, parking congestion and high parking charges are lingering concerns. In such a scenario, if Subang can offer the right incentives and operating environment, it can potentially attract new investors looking to move into the regional market.

A Frost & Sullivan survey conducted among players across the business

Above: Malaysia's airport in Subang is a popular option for a business aviation hub aviation value chain in the Asia-Pacific region revealed that a substantial majority consider Subang to be the most appropriate destination for a business aviation hub, ahead of Bangkok, Jakarta and Manila.

The road is not easy, though. While regulatory challenges related to registration, financing and cabotage hamper the domestic industry, operational processes related to securing permits and slots need to be streamlined. The development of the industry will require the key stakeholders to work in tandem. The Ministry of Transportation, the LAPANGAN TERBANG SULTAN ABDUL AZIZ **Civil Aviation Authority** of Malaysia and the Malaysian Aviation Commission will have to take the lead to ease the regulatory hurdles. Malaysia Airports will need to work with agencies such as the Malaysia Investment Development Authority (MIDA) to prospect and attract the right investors. Sultan Abdul Aziz Shah Airport has the right ingredients, and with

Airport has the right ingredients, and with strong intent and good planning it can become a leading center for business aviation activities. \bigcirc

Nishant Dey Purkayastha is a consultant based in Frost & Sullivan's Kuala Lumpur office. He is a part of the aerospace and defense team and has worked with several leading aviation and aerospace industry players in the Asia-Pacific region

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Your guide to flying to the Finnish capital Words | Kirstie Pickering

Main airports in Helsinki

Helsinki Airport

Operating hours: 24/7 Facilities: Fixed-base operations by Finavia Business Flight Centre. Services include de-icing, customs and immigration, restaurant, self-service briefing, hotel and transportation reservations, and VIP services. Fuel: Jet Runway length: 04R/22L – 3,500m (11,500ft); 04L/22R – 3,000m (10,000ft); 15/33 – 2,900m (9,500ft) Distance from Helsinki: 11 miles (18km)

Helsinki-Malmi Airport

Operating hours: 7:00am-10:00pm Facilities: Maintenance provided by Joen Service and Helitech Oy, customs and immigration, and hangar space. Fuel: 98E, AvGas 100LL, Jet A-1 Runway length: 18/36 – 1,300m (4,200ft); 09/27 – 1,000m (3,400m) Distance from Helsinki: 9 miles (14km)

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Ivalo Airport

Finland's northernmost airport, Ivalo Airport is nestled within Lapland, the home of Santa Claus.

Operating hours: Service available to meet operational requirements Facilities: Handling by Airpro Oy, de-icing, customs, meeting room and a restaurant. Fuel: Jet Runway length: 04/22 – 2,500m (8,200ft) Distance from Helsinki: 680 miles (1,100km); 2 hour 20 minute flight

Kemi-Tornio Airport

Situated on the coast, Kemi is famed for its huge Sampo icebreaker and seasonal carved-ice complex.

Operating hours: 24/7 Facilities: Ground handling by Airpro Oy, customs, wi-fi, restaurant, car rental and a gift shop. Fuel: Jet Runway length: 18/36 – 2,500m (8,200ft) Distance from Helsinki: 445 miles (720km); 1 hour 30 minute flight

Tampere-Pirkkala Airport

The southern Finnish city of Tampere is settled between two picturesque lakes and is the most populous inland city in the Nordic countries.

Operating hours: 24/7

Facilities: Maintenance provided by Polar Aviation, de-icing, customs and immigration. Fuel: Jet/Avgas Runway length: 06/24 – 2,700m (8,800ft) Distance from Helsinki: 115 miles (185km) Futurists predict that in the near future, vertical take-off and landing (VTOL) aircraft will find their way into the business aviation fleet, but can these jets be safely integrated into our skies? VERTICAL TAKE-OFF AND LANDING AIRCRAFT

n recent years, a combination of new technologies, regulatory flexibility and public desire for timely short- and medium-range transportation has resulted in major investment into, and the development of, VTOL aircraft, particularly hybrid or electric VTOL (eVTOL). In

fact, according to Greg Bowles, vice president of global innovation and policy at GAMA, "There is now a strong potential for VTOL aircraft to engage the general public in alternative forms of flight, offering the potential for strong growth in the business aviation market.

"One can imagine taking a VTOL aircraft from your home or office to the local airfield," he continues, "and then boarding a longer-range and faster business aircraft for your onward journey. By improving the short- and mediumdistance travel experience using VTOL aircraft, huge demand for short-range aviation solutions may become apparent. There are tremendous opportunities for general and business aviation if we engage in the VTOL and eVTOL ecosystem early to assure potential synergies develop."

A number of companies are now actively developing VTOL aircraft in one form or another, including global behemoths such as Uber (via its Elevate arm), Googlebacked Kitty Hawk and Daimler-backed Volocopter. Another of the early trailblazers in this sector is A³, the advanced projects outpost of Airbus in Silicon Valley, which is currently carrying out flight testing of the Vahana self-piloted eVTOL aircraft.



According to Zach Lovering, project executive for Vahana, the early primary uses for the aircraft will "almost certainly be those serving high-throughput areas" such as business or transit centers, with commuter missions being followed up straight after.

"We envision Vahana being used by everyday commuters as a cost-comparable replacement for short-range urban transportation methods such as cars and trains," Bowles adds. "As with nearly all new technology, we'll charge a premium at first, since we'll only be able to serve a small portion of the market. As our operations expand, we'll serve more and costs should come down."

Elsewhere, Germany-based aviation start-up Lilium is developing what it describes as a "revolutionary on-demand air mobility service," built around the design, manufacture and eventual operation of the Lilium Jet, the world's first allelectric VTOL jet. It is an air taxi for up to five people.

According to a Lilium spokesperson, "The jet can perform vertical take-offs and landings in urban areas and only requires minimal space and infrastructure to do so. It has an estimated travel range of up to 300km [186 miles] at a top speed of 300km/h, powered by electric jet engines that give off zero emissions. A typical journey with the Lilium Jet will be at least five times faster than by car. To put this into perspective, a flight from Manhattan to JFK International Airport will take a Lilium Jet only 10 minutes instead of 30 to 40 minutes by car.

"The Lilium Jet will be certified using the existing EASA CS23 regulation. Creating the necessary infrastructure to

"To begin fielding VTOL in meaningful numbers, aircraft designs must be certified and integrate into airspace"

Greg Bowles, vice president of global innovation and policy at GAMA

operate an air mobility service will be key to Lilium's commercial launch. To ensure this, Lilium is in promising talks with multiple commercial partners, including a range of international cities and state governments."

After the successful flight of the most recent prototype, Lilium is now in the process of building a five-seater version, with a manned test flight planned for 2019 and the launch of the full Lilium Service expected in the early 2020s.

Urban air mobility

Another organization working in this area is NASA, which is carrying out research and development to help define the characteristics and operations of VTOL aircraft and using the X-57 Maxwell experimental aircraft to deepen its understanding of distributed propulsion systems.

NASA vertical lift research teams are also researching noise models to understand how much noise different VTOL aircraft configurations generate and working on research to examine efficient and safe vehicle configurations. Alongside this, NASA is looking at unmanned aircraft systems, particularly in relation to the development of robust communication systems, as well as how they can sense and avoid other objects.

According to Dr Parimal Kopardekar, senior technologist for air transportation systems and principal investigator for the Unmanned Aircraft Systems Traffic Management (UTM) project at NASA, the administration is examining how unmanned aircraft systems and urban air mobility vehicles, such as VTOL aircraft, can be seamlessly accommodated



VERTICAL TAKE-OFF AND LANDING AIRCRAFT

Market developments

As well as Lilium and Vahana, there are a number of VTOL aircraft currently in development and testing. Here are some of the most recent announcements:

EHang 184

The all-electric 184 is a single occupancy autonomous VTOL aircraft. It can travel up to 16km (10 miles) or roughly 23 minutes of flight. The passenger inputs their destination and the aircraft takes over. A human pilot is on hand in a remote command station to take over the controls if anything happens to go wrong.

BlackFly from Opener

This aircraft has been heralded as the world's first ultralight all-electric fixedwing VTOL aircraft. It has a single seat and can travel up to 40km (25 miles) with a top speed of 100km/h (62mph). It also has a super-charging option, which means it takes less than 30 minutes to recharge the battery.

2X from Volocopter

The 2X is a two-seat multirotor electric helicopter. The craft can either be piloted or has the option of being controlled completely autonomously. The 2X features a flight time of 30 minutes and a maximum range of 27km (17 miles). It has also been designed with a unique battery replacement system that allows a fast swap between journeys.

TriFan 600 from XTI Aircraft

This aircraft lifts off vertically and reaches cruise speed within 90 seconds. It has a capacity of five passengers and one pilot, and a cruise speed of 570km/h (354mph). The TriFan uses a hybrid electric drive and has a range of around 1,200 nautical miles. It includes adequate space and payload for overnight bags.

Starling Jet from Samad Aerospace

This electric VTOL business jet has a range of 2,400km (1,490 miles) and can carry four passenger and a pilot, plus a further 80kg of baggage. The Starling Jet can travel at 725km/h (450mph) and includes fully autonomous capabilities. The aircraft can take-off and land from an area as small as a helipad. Right: **The EHang 184** has enough power for 23 minutes of flight

Remotely piloted passenger VTOLs

Another potential route to the introduction of VTOL aircraft is the development of remotely piloted or even fully autonomous models, with some companies, such as Chinese company EHang and Passenger Drone, which was recently acquired by Texas-based Astro Aerospace, now trialling prototypes.

According to Dr Parimal Kopardekar from NASA, there are currently different schools of thought related to the role of pilots for VTOL aircraft, particularly for urban air mobility. Some argue that, from a certification and user-acceptance perspective, having a pilot is advantageous, whereas from a purely economic and operational perspective it may be more affordable to have autonomous operation.

There are also intermediate solutions, such as remotely piloted systems of the type currently used for unmanned aerial vehicles, as well as aircraft with simplified operation systems.

Even so, Kopardekar stresses that challenges relating to the safety of fully autonomous operation are not yet completely solved, particularly in terms of potential incidents such as bird strikes, large-scale disruptions due to unexpected weather and sudden energy depletion that require coordination between vehicles to make way for an aircraft that's in an emergency.

"We saw this in case of the Southwest airlines engine failure in April 2018, when an air traffic controller had to move flying aircraft out of the way of the affected aircraft," Kopardekar says. "Another example is reserve fuel. General aviation aircraft generally have a requirement for 30 or more minutes of reserve fuel. Given that urban air mobility vehicles operate for only 20 to 30 minutes, such a requirement does not apply. However, the intent of the requirement is to assure the safety of operations, as well as people inside the aircraft and assets outside.

"To address such requirements, we may need air, ground, infrastructure and cloud-connected systems. Automated systems will advise which vertiports are safe to land on, based on weather conditions, and an affected aircraft will be guided to an open vertiport."





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VERTICAL TAKE-OFF AND LANDING AIRCRAFT

in airspace without impacting current operations and overloading air traffic management systems.

"NASA is also developing methods and techniques to examine the safety of increasingly autonomous systems," he says. "The research related to urban air mobility is just beginning. We are currently examining how best to leverage the research and development that's been done in the past, understanding the market needs that are related to urban air mobility," says Dr Kopardekar.

"Many companies are developing vehicles that are intended for urban air mobility operations, some of which use electric propulsion. Enabling urban air mobility requires a close examination of many factors, including distributed electric propulsion, vehicle design and increasing autonomy in vehicle, airspace and air traffic operations, battery capacity and reliability, community acceptance in terms of noise, understanding the impact of winds and weather, and user experience during flights."

Ultra-redundancy

Set Can

GAMA's Bowles explains that great efforts are underway in Europe and the USA to develop policies for the design of e-aircraft, including eVTOL, with the developers of several currently operational e-aircraft "already working with the European Aviation Safety Agency [EASA] and the FAA toward vehicle design certification and operational approval.

"In addition to the mature aviation markets in the USA and Europe, there are efforts underway in emerging markets such as China and the Middle East. There is also a significant level of development and activity in South America and Oceania.

"Although the early entry of eVTOL will be methodical, the potential for these aircraft to open new opportunities for the populace can cause even the most traditional aviation experts to grin."

In terms of ensuring the safety of eVTOL aircraft, Bowles points out that e-aircraft require significant electronic hardware and software to properly control the propulsion systems, leading to a high degree of automation and

"Many want to see the high-density urban air mobility operations to reduce traffic congestion and commutina times"

Dr Parimal Kopardekar, senior technologist for air transportation system at NASA Above: A rendering of what Lilium landing pads could look like after a mass roll-out of the product

simplified operations that can result from the electrification of the propulsion source.

"With respect to eVTOL, most of these designs include highly redundant fly-by-wire and automatic flight regimes that which can make the task of controlling these aircraft simpler and safer," he says. "The industry has been working to develop proper safety and reliability criteria for a

range of piloting solutions that are intended to make the task of flying even safer."

> Bowles also observes that much of the technology that has been, or will be, developed can be integrated into the cockpit to "help pilots do their jobs even more safely". He points out that some companies are looking to "fully automate e-aircraft in a responsible and reliable way".

The Lilium spokesperson is also keen to stress that safety is the company's key focus, and has prompted it to introduce a new and sophisticated safety paradigm into small aircraft aviation, setting a brandnew industry standard. "To fulfill our safety objectives, we chose the concept of ultra-

redundancy, equipping the jet with small independent components so that, for example, a single engine failure does not have consequences for the aircraft's safety or stability," says the spokesperson. "The jet can still make a safe, vertical landing even with multiple engine failure. This philosophy of ultra-redundancy has been applied to all flight systems."

Business aviation

According to Bowles, the business aviation community has been very welcoming to the concept of VTOL and eVTOL aircraft, and there is great interest. "As people see the new





around public safety and acceptance alongside us. We see vehicles like Vahana being able to expand the usefulness of transportation centers such as airports. Besides moving people quickly to destinations of their choice, there is also the potential to connect nearby airports in ways that have never been done before. This increases both travel flexibility and potential cost savings by expanding route possibilities."

Critical needs

Looking ahead, Lovering believes that full-service VTOL operations will not be implemented overnight. Instead, he predicts that much of the next decade will be spent building the required infrastructure to support the system, for example scaling the number of vertiports and helipads in cities and electrifying landing sites.

"Additionally, as technological advancements continue to occur, eVTOL aircraft like Vahana will continue to further develop their capabilities," he adds. "For example, we expect our aircraft to have a range of about 100km [62 miles] or more with reserves, but for each year that

> passes, batteries are able to store more energy for the same weight, so our range will therefore increase in parallel."

> > Given the amount of investment in new types of VTOL, and the many applications that it could satisfy, Kopardekar believes there is "a good possibility that such operations will occur". However, he also stresses that the extent and speed of such developments will depend on how quickly and reliably we can address safety, autonomy, noise, battery, airspace operations and acceptance-related considerations.

"Clearly we all want these operations to occur in the safest manner, and aviation typically uses a crawl-walk-run approach to ensure safety and viability from simpler conditions to complex operations," he says.

"There are many places, such as the Grand Canyon, where deliveries by mule, or deliveries by boats such as cargo operations between Hawaiian islands, which may serve as good initial test operations.

"Many want to see high-density urban air mobility operations to reduce traffic congestion and reduce commuting times. That's the mature state of the crawlwalk-run approach. Regardless, this new era of aviation has been exciting and brings new prospects of using aviation to address critical needs," he concludes. \bigcirc

technology and understand more fully the possibilities, their excitement will increase, especially given the new transportation options and markets that will become available," he comments. "In order to begin fielding eVTOL in meaningful numbers, aircraft designs must be certified, operations approved, and they must integrate into the airspace. Key aviation authorities are working with GAMA and the VTOL industry to solidify the regulatory landscape for the design, operation and introduction of these aircraft. The path for the design is mature and the focus is now on specific means of compliance."

Generally speaking, Kopardekar agrees that there is currently great interest in democratizing airspace for use by new entrants such as drones and eVTOLs, with "tremendous potential" to use them in urban, suburban and rural airspace. Although further research, development and testing is needed to ensure efficiency, safety and viability, given the emergence of unmanned aircraft systems, autonomous systems, battery developments and IoT, he believes there is an increased prospect of making these operations reality. "A range of vehicles and operations are needed based on the distance and cost of operation. For very short distances, such as San Jose to San Francisco, electric or hybrid VTOLs will be suitable. For longer distances, such as Los Angeles to San Francisco, you will still need other business jets with a longer range."

Vahana's Lovering also points out that regulators and standards organizations are "working diligently to ensure that they don't slow down progress, motivated by a collective recognition of the importance and great potential of urban air mobility to transform our lives for the better. "In our communication with the FAA, for example, we have found that they are eager to solve complex problems

"The potential of these aircraft can cause even the most traditional aviation experts to grin"

Greg Bowles, vice president of global innovation and policy at GAMA



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Growth & **challenges**

hat did your career involve prior to founding MEBAA? I graduated in the USA

Flight, the business aviation airline. I was a member

of the group that put the company together. I worked with consultants Booz Allen – now called Booz Allen Hamilton – to establish the board of directors and they selected me to be director of finance and administration. Later that year I was made chief financial officer, and I also acted as CEO during my time at the company.

During my 25 years at Presidential Flight, I bought and sold older aircraft and looked after recruitment, IT and engineering. I was also involved with spare parts, procurement, HR, accounting and facility management. I even had the idea of establishing a charter company in Abu Dhabi, leading to the creation in 2003 of Royal Jet, of which I am the founder. In 2015 I was granted early retirement so that I could focus on MEBAA. Ali Ahmed Alnaqbi, founder and executive chairman of the Middle East and North Africa Business Aviation Association, discusses the looming talent shortage in business aviation, the need for smaller aircraft across the Middle East, and what to expect at MEBAA Show 2018

"MEBAA has raised awareness of how important business aviation is to economies across the Middle East and North Africa"

What led you to create MEBAA?

While I started setting up Royal Jet in 2000, I discovered that there was a lack of awareness of business aviation in the Middle East and North Africa. This made me consider how I could raise awareness of the industry, because I am very passionate about business aviation. After speaking with my friends in the industry in the USA and Europe, they recommended setting up an organization much like NBAA in the USA or EBAA in Europe.

I gained support for the idea of MEBAA at a conference in 2005 after speaking about my idea, to gauge interest. Six companies joined immediately, so I knew I had to go and establish the association in Dubai as soon as possible. We soon had 16 companies on the board of directors, including Boeing Business Jets, Gulfstream and Dassault. This led to the official founding of MEBAA in 2006, covering 24 countries. Today we have 260 members.

What is MEBAA's role in the business aviation sector?

MEBAA has raised awareness about how important business aviation is to economies across the Middle East and North Africa. The main users of aircraft in these regions are investors, so if we make flying rules and regulations easier for them they will keep coming back to do more business in these cities.

MEBAA promotes the business aviation industry all over the world to both governments and the media. For example, when we talk to governments we always ask them to include business aviation in their plans when looking to expand airports. We emphasize that we need private airports, not more international airports. We don't need a huge terminal; we need small terminals that customers can get in and out of quickly.

There will be a large static aircraft display at MEBAA Show 2018



Above: Experts from around the world attend MEBAA's conference to discuss the latest trends and challenges facing the business aviation sector Right: Some 10,000 visitors are expected to attend the MEBAA Show 2018 in Dubai in December

> "When we talk to governments we always ask them to include business aviation in their plans when looking to expand airports"





MEBAA Show 2018

The MEBAA Show 2018 will be held at Dubai World Central from December 10-12, 2018. For the first time, the event will incorporate the MEBAA conference, which is expected to attract 500 delegates. Split into four sessions across two days, the conference will include a UAE market focus and in-depth analysis of the global business aviation market.

"The MEBAA Show 2018 is important because buyers themselves attend, meaning princes, board members and governments looking to buy aircraft are all present," says Ali Ahmed Alnaqbi, founder and executive chairman of MEBAA. "We will have lounges for meetings and deal signing, a chalet where people can network and make announcements, and for the first time a product demonstration theater on the show floor, for exhibitors to promote their products and services.

"We know that the market needs 100,000 pilots and 100,000 engineers for airlines, and even more varied staff in all employment areas when you consider the needs of business aviation too. With this in mind, we will have 500 university students visiting our Future Day to learn about roles available in the industry from a range of speakers across business aviation. We will encourage students to look into joining the sector because business aviation is going to have a staff and skills shortage very soon."

The show is expected to attract 10,000 visitors this year, making it the biggest ever MEBAA show to date. Around 50 aircraft will be on the static display, with more than 500 exhibitors.

MEBAA's role is also to represent our members to all industries. We act as an advocate for business aviation so that the sector is never left out of the wider aviation conversation, as authorities tend to prioritize looking after big aircraft over private jets. In the Middle East, all rules and regulations are set to serve the commercial airlines and in the 12 years since MEBAA was founded, we have managed to change private flight legislation in countries including Morocco, Abu Dhabi and Jordan. We are continually talking to civil aviation authorities to adopt rules that better suit business aviation.

What has been your career highlight so far?

I am very passionate about business aviation and I am set to become more involved in the industry worldwide as I have been chosen to be vice chairman of the International Business Aviation Council (IBAC). This is effective from January 2020 for a three-year term, after which I will automatically become chairman. I am proud to be serving the business aviation community worldwide.

With IBAC, I am working on finding a system where senior members can pass on their experience and learnings to younger generations. This is my main passion and I would like to be seen as a person pushing for the continuation of the industry that we love.

How are the Middle Eastern and North African business aviation markets performing at the moment?

Our market is continuing to grow at single-figure percentages. We are facing a number of challenges in the Middle East and North Africa, with public perception of member countries sometimes being unfavorable. This can have an impact on the movement of business aircraft.

The market is always affected when major events happen. For example, we haven't had business aviation activity in Syria and Yemen for a long time – and not in Iraq for over 20 years – so those countries don't have an impact on our figures. The Egyptian market, however, has been really impacted since the unrest in 2001, but all the aircraft have been moved to other countries and continue to do business.

I am happy to see the Middle East and North Africa showing healthy growth. Movement in the UAE, Jordan and Morocco, for example, is very good at present.



"The pricing of private charter in the Middle East is very high because we only have wide-body aircraft. We need more aircraft and the right equipment to bring prices down"



Above: Al Bateen Executive Airport offers first-class service to visitors from across the globe

What is unique about these markets compared with others around the world?

Our market has the highest number of business aviation wide-body aircraft in the world. We travel heavy and in large numbers, be it for business or pleasure. However, we don't have the smaller aircraft that passengers can take for short journeys. This is because airports aren't equipped for such jets and our harsh weather means that extra systems with air conditioning would need to be used on the ground, but they simply aren't in place. We have the same number of midsize jets as Europe, but our wide-body offering is what really sets us apart from other markets around the world.

Our region also rates highest when it comes to jet purchase orders, according to reports by GAMA, Bombardier and Honeywell.

The pricing of private charter in the Middle East is very high because we only have wide-body aircraft. We need more aircraft and the right equipment to bring prices down. We miss out on a huge part of the market because we don't have the correct equipment. Airlines take over those passengers because it is so expensive to fly on wide-body aircraft. We need light jets or light turboprops to help that market grow, boosting productivity and profitability in the region.

Business jet forecasts

Honeywell's Global Business Aviation Outlook report predicted up to 8,300 new business jet deliveries worth US\$24bn from 2017 to 2027, down 2-3% from the 2016 10-year forecast. For the Middle East and Africa, the

report found: • The share of projected five-year global demand attributed to the Middle East and Africa is 4%, in line with the historical range of 4-7%

• In the Middle East and Africa, 18% of respondents said they will replace or add to their fleet with a new jet purchase

 In line with the global average, around 36% of operators responding to the survey plan to schedule their new purchase within the first two years of the five-year horizon

What business airports impress you and why?

I'm very impressed with TAG's impact following its takeover of Farnborough Airport. The airport is doing a great job at handling aircraft and that is what MEBAA members want to replicate, because we don't have any airports that have been taken under the control of one FBO.

At Al Bateen Executive Airport in Abu Dhabi we are working closely with the government to activate the airport and open up the facility to other FBOs, which is also impressing me greatly.

How do you see the business aviation sector progressing over the next decade?

The Middle East and North Africa have to continue to adopt the newest technology and be ready for the growth of the drone industry, which business aviation covers. We have to be ahead of everyone else in these areas, employing the right people who understand future technologies so that they can be implemented as soon as possible.

I would love to see the price of private charters come down so that more people can fly in this way, not just HNWIs or high-level businessmen. I would also love to see rules and regulations be implemented that suit and benefit business aviation more than they do at present. We are currently working with civil aviation authorities and are certainly progressing in the right direction. This would particularly benefit remote areas in MEBAA's region. I want to see authorities such as ICAO and IATA think more about business aviation and consider it an important factor in future plans.

We need to spread the message that aviation is not simply just airlines. Business, general and private aviation fly to places airlines cannot reach, such as delivering food and goods to those in need. MEBAA has its own humanitarian program with the World Food Program (WFP), and we are playing our part to help fight hunger and war. We want to raise awareness of everything business aviation does. \bigcirc

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COVER STORY: FATIGUE

NBAA will unveil the results of a 2017 survey at NBAA-BACE exploring how fatigue affects personnel. Ahead of the event in October, *Business Airport International* asks, what can the industry do to prevent fatiguerelated safety issues?



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COVER STORY: FATIGUE

n 2013, five passengers died after a business aviation jet crashed during landing at Georgia's Thomson-McDuffie Regional Airport in the USA. In the subsequent accident investigation, the US National Transportation Safety Board (NTSB) blamed the disaster in part on pilot

fatigue. Commenting at the time, NTSB acting chairman Christopher A Hart said, "Just as pilots should not take off without enough fuel, they should not operate an aircraft without enough rest."

The Georgia crash is just one of many airplane accidents in which fatigue has been found to have played a part. An NTSB study from the mid-1990s cited fatigue as a factor in nearly 30% of all US aviation accidents. Meanwhile, a 2012 survey of 6,000 European commercial pilots discovered that over half said their ability to perform well while on flight duty was impaired by fatigue.

A 2017 University of North Dakota survey of more than 1,300 US business aviation aircrew was even more definitive, with more than 90% of pilots citing fatigue as a "moderate" or "serious" concern in their flight operations. Worryingly, 66% of this pilot group admitted to having unintentionally "nodded off" during flights.

"Clearly a pilot under fatigue is not a safe operator," comments Louisa Fisher, program manager for cabin safety

Above: The ultimate responsibility for fatigue management lies with pilots themselves

Circadian rhythms

For a pilot flying across time zones, the brain and body are thrown out-of-sync

Why long-haul flights make us so tired

One of the key factors that makes pilots and cabin crew susceptible to sleeprelated fatigue is the fact of not being able to get sleep at the same time and in the same place each day. As human fatigue specialist Clinton Marquardt puts it, "Our brain and body love regularity."

Disrupted sleep patterns are problematic because they interfere with our circadian rhythms. A circadian rhythm is any natural process that occurs in a 24hour cycle – what in humans you might call the biological clock. "Although a human being's circadian rhythm is self-sustaining, it does respond to external triggers," comments Marquardt.

"So every morning when we get up we get exposed to light that resets our circadian rhythms and keeps us synchronized. But for a pilot flying across time zones, the brain and body are thrown out-of-sync. For example, your brain cortisol level may not be synchronized with your core body temperature."

This condition of being out-of-sync is known by sleep experts as 'internal de-synchronization'. In extreme cases, it can lead to a condition known as circadian de-synchronisis syndrome, where the body has no sense of what time of the day or night it is. Marquardt explains, "In this state, your body is always a little bit fatigued, which means your performance is always suffering."

Circadian de-synchronisis syndrome is rare, but even when the situation is not this extreme, crossing time zones takes a toll on the body that it can be hard to catch up. "Going East is often more difficult. So if we use a psycho-motor vigilance detector to measure someone's performance after

a transatlantic flight to Europe, for example, we'd expect to see a dip in performance," Marquardt adds. at FlightSafety International, a US company offering safety training to business aviation aircrew. "On the other hand, it's very uncommon for a pilot to be perfectly rested. It's the nature of the job: a lot of early starts and disruption to circadian rhythms, a lot of time in an uncomfortable position," she adds.

Longer working hours

Even so, the problem of aircrew fatigue seems to be getting worse. The 2017 University of North Dakota survey was carried out in collaboration with the NBAA and reproduced a similar survey conducted in 2000. "There was an almost doubling of pilots who say that fatigue is a serious concern in 2017 compared with in 2000," says study author Tim Wollmuth, a certified aviation manager and a business aviation pilot of 20 years.

The survey also revealed that the rise in reported fatigue went hand-in-hand with an increase in longer working days. "In general terms, the number of duty days that are exceeding 12 hours is up 150% compared with 2000, while the number of days per month that exceed eight hours is up two-thirds," adds Wollmuth.

Wollmuth puts the longer work days down to the growing use of long-haul jets. This is reflected in the data, with business aviation pilots reporting a 600% increase in operations that cross more than six time zones. He explains more, "In simple terms, we're going a lot longer



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How to create a successful fatigue risk management system

Business aviation companies can manage the problem of human fatigue by creating their own fatigue risk management system (FRMS). Human fatigue specialist Clinton Marquardt talks *Business Airport International* through the important things to keep in mind when setting one up.

Be able to quantify the problem.

"You have to put in place systems that can measure fatigue both pro-actively -before it has caused any negative outcomes; and retroactively - after an incident has occurred."

Put in place a continuous improvement philosophy.

"If you set stagnant safety goals, it tends to encourage complacency. In other words, people will comply initially, but then they will let things drift. But if you're constantly trying to improve the health, productivity and safety of your workforce, you'll never go backward. You'll always be safer and safer."

Create a robust training regime:

"You have to set everyone in the company up for success. This means good training and a good scheduling system around fatigue. In terms of training, this means the workforce needs to understand how they can fight fatigue during safetycritical times – like driving home from a shift. This can involve using counter-measure strategies such as drinking caffeine or being exposed to bright lights."

Encourage staff to take responsibility for their sleeping regime.

"The whole thing falls apart if the employees don't play their part. This means doing whatever they can to prevent fatigue in off-duty time and at work." Above: The Flight Safety Foundation provides training and advice on how to cope with and prevent fatigue

"The workforce needs to understand how they can fight fatigue during safety-critical times – like driving home from a shift"

> Clinton Marquardt, human fatigue specialist



and doing a lot longer duty days than we were 20 years ago and that probably has to do with the new equipment and technologies that we're operating."

According to Fisher, the problem has been compounded by cost-cutting among operators, which has heaped further pressure on air crews to work longer hours. "This includes a reduction in the practice of pre-positioning replacement aircrews en-route," she adds.

Operators are opting instead for the more cost-effective method of taking an extra pilot on board with them, which makes the flight technically legal, while allowing them to forego the cost of hiring replacement staff for the cabin crew and flight technician. Fisher comments, "It's wonderful to be able to travel those long distances without stopping, but it's difficult for the flight attendants and technicians if they're not part of a crew that gets relieved by a prepositioned crew."

According to Fisher, flight attendants and technicians are being further short-changed in long-haul operations because of a lack of access to rest facilities on board the aircraft. She explains more, "Some of the long-distance aircraft like the Globals and the large-cabin Gulfstreams have a crew rest area that's sufficient – a separate compartment equipped with a full bed – but on these long-haul trips, it's usually being occupied by the third pilot. There's a perception in the industry that if that's the case they can rest in the cabin, but I've never spoken with a cabin crew member yet who's comfortable resting in the cabin with passengers on board."

Working regulations

Fisher also believes that current regulations around work hours are not enough to ensure aircrew get adequate rest. She says that the FAA rules on rest are "very lenient on the side of the operator". In any case, a large portion of the US business aviation fleet is not even covered by the FAA rules, which only apply to commercial carriers or private jets being used for charters or as air taxis.

For the operations that fall outside of the FAA's remit, the industry self-regulates via a set of recommended guidelines for work-hour cycles published by the US Flight Safety Foundation in coordination with the NBAA. According to the NBAA's Wollmuth, roughly one in eight operators do not comply with these guidelines, which he says have "remained largely unchanged since they were first introduced in the late 1990s".

However, he points out that non-compliant operators may still be managing fatigue in their own way. He says that he is aware of "some operators that ask air crew to work longer days, but who punctuate these work periods with mandatory time off for recovery". Moreover, he says that the higher number of aircrew reporting fatigue as a problem may be due in part to increased awareness. "There's an overall larger understanding that this is an issue," he adds.

Raising awareness

If awareness is growing, this is surely thanks to the efforts of people like Clinton Marquardt, an Ottawa-based human fatigue specialist, who advises aviation companies on how to manage fatigue in their workforce. Marquardt, who created a human fatigue manual for the Canadian Transportation Safety Board (CTSB), believes that in order to manage fatigue, you must learn how to recognize it.

"When we think about sleepiness, we normally think about feeling groggy or drowsy," says Marquardt. "But when we're talking about sleep-related fatigue, we're talking about a larger spectrum of symptoms."

According to Marquardt, while extreme fatigue results in physiological signs that are easy to spot – the head bobbing up and down, increased fidgeting or eye blinking – people often have a hard time sensing low-level fatigue either in themselves or in others. "Where the real science is focusing on now is at these lower levels, where your performance has already started to deteriorate, but where there are no overt signs," he adds.

According to Marquardt, most of us need between six and nine hours of sleep per night. But the research shows that if you short-change yourself by just an hour per night, then after two or three nights you will likely be fatigued. If your sleep drops to five hours, it only takes a single night for fatigue to set in.

Two key indicators of low-level fatigue are slowed reaction time and decreased vigilance: "Basically, your ability to stay focused on a task," he adds. Marquardt believes both these factors can have potentially fatal effects on pilot performance. "With decreased vigilance, you can become distracted more easily. So if you're hand-flying an aircraft and you get an unexpected ATC call during landing, then it's not unlikely that you might miss a step when you come back to the task."

Risk management

Just a small level of fatigue can also adversely affect decision-making abilities. Marquardt gives the example of a CTSB accident he investigated in which a fatigued pilot had chosen to fly an overweight airplane in icy conditions. "To manage these dangers, national aviation regulators are increasingly proposing tighter prescriptive rules around work hours," says Marquardt.

But since most operators are opposed to tighter rules, the regulators are offering a compromise – allowing operators to set up their own safety management system dedicated to managing sleep-related fatigue. Depending on the regulatory environment, the operator has to show that the system, known as a Fatigue Risk Management System (FRMS), is within a certain percentage of quantified risk of the regulatory regime.

Marquardt says, "In Canada, for example, Transport Canada is toying with idea of a 5% differential. In other words, you have to show that your FRMS is within 5% of CONBRAIBACE OCTOBER 16-18, 2018 - ORLANDO, FL NBAA-BACE 2018, October 16-18

> Where: Orange County Convention Center, Orlando, Florida Executive Airport

When: Wednesday, October 17, 9:15–10:00am Topic: Fatigue – the silent safety epidemic Education track: Human resources

The results of a 2017 NBAA survey exploring how fatigue affects business aviation personnel will be unveiled during this timely, important session at NBAA-BACE. Attendees will leave with a better understanding of how fatigue affects performance of crew members, including cabin crew, and what business aircraft operators can do to prevent fatiguerelated safety issues.

the safety levels you would get by following the regulatory regime. This means you have to build a large safety case around it. You have to show that there's a parity between the two systems in terms of employees' sleep hours and performance levels."

> According to Marquardt, performance levels can be tested using a psycho-motor vigilance detector, a device that measures accuracy and reaction time by flashing green and red squares on a screen and asking participants to respond

whether they are the same or different. "The detector is currently used in research and is slowly making its way in to the FRMS field," Marquardt explains.

But many operators are reluctant to commit to creating an FRMS because of the extra workload it entails. At the same time they don't like the prescriptive rules. "Faced with these options, a lot choose to keep fighting the rules," says Marquardt. "You see that happening the world over."

According to Fisher, this reluctance is reflective of a work culture in business aviation that continues to underplay the dangers posed by fatigue.

She concludes, "In the business aviation industry nobody wants to be the whiner; no one wants to be the one who says they can't do the job. But if someone is seriously fatigued, there should be some mechanism where they can speak up without retribution. If we don't address it, eventually there will be a problem. There have certainly been problems already in fact."

"In our industry nobody wants to be the whiner; no one wants to be the one who says they can't do the job"

Louisa Fisher, program manager for cabin safety at FlightSafety International



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CARBON NEUTRAL

As TAG Farnborough becomes the first carbon neutral business airport in the world, *BAI* explores what it takes to win the status, how to maintain it and what environmental efforts other airports are making

Words | Kirstie Pickering







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ith awareness of plastic pollution at an all-time high thanks to widespread social media coverage, and governments around the globe pledging to tackle emissions, the world is becoming increasingly environmentally conscious.

Businesses have a part to play in this growing drive to become more sustainable, and airports are no different.

Industry body ACI Europe launched its Airport Carbon Accreditation in 2009 (see box, page 43). The program acts as a framework for active carbon management at airports, covering the operational activities with the greatest impact on carbon emissions.

"It is becoming more and more evident that responsible, sustainable activity is what society expects from businesses and corporations," says Marina Bylinksy, head of environmental strategy and intermodality at ACI Europe. "It's not just us – this Airport Carbon Accreditation program exists because of a desire by the industry to address the issue of climate change and give airports a clear path to cutting their carbon footprint. Reducing an airport's carbon footprint requires investments in new technologies, infrastructure or operational changes.

CARBON NEUTRAL

Kickstarting an airport effort

Overwhelmed at where to start an airport's environmental effort? *BAI* speaks to those in the know about how to begin your team's sustainable journey.

Marina Bylinksy, head of environmental strategy and intermodality at ACI Europe, says, "Be ambitious, be patient, and consider every aspect of the company's activities. Never stop communicating the substance of what you are doing to become carbon neutral."

Miles Thomas, environment manager at TAG Farnborough Airport, advises, "Before you do any kind of improvement work, you need to be able to make sure you can monitor those changes. Getting your monitoring and data together to get that first baseline footprint is also really important, such as knowing how much electricity, gas, liquid fuel and other elements you use that contribute to the carbon footprint. Having robust monitoring schemes for those is important before you start making the changes, otherwise you lose the benefit of understanding or quantifying those benefits you're realizing."

Devon Brubaker, airport director at Southwest Wyoming Regional Airport, notes, "Don't feel like you need to be breaking the barrier. There are larger airports with much bigger bank accounts that can do that for you. Follow their lead and adapt their lessons learned for your airport. Don't be afraid to look at how other industries are tackling the problem too."

Jason Archambeault, chief operating officer at Granite Air Center, says, "Don't dismiss ideas based on pre-conceived notions. In the past, things like solar arrays have been expensive, and provided only marginal benefits. Don't let those old ideas drive current decisions. Technology has greatly improved, and costs have come down. Even little incremental changes like swapping out standard light bulbs for LED bulbs can have a significant impact. Look into government initiatives and other incentive programs, as there may be money available to help offset the cost of reducing your carbon footprint."



Above: Representatives from ACI Europe visited TAG Farnborough to see the airport and offer congratulations

"To be the first carbon neutral business airport is fabulous and we're extremely proud"

Miles Thomas, environment manager at TAG Farnborough Airport



"The steps that a business airport has to take to become carbon neutral are exactly the same as those taken by any airport," she continues, "namely, identifying and mapping their carbon emissions, taking measures to reduce them, and bringing collaboration into the equation by engaging others on the airport site to reduce their emissions. Then, finally, after all of those steps, the airport operator

can invest in responsible carbon offsets to compensate any remaining residual emissions under its direct control."

New and neutral

In July, TAG Farnborough Airport became the first business airport in the world to achieve carbon neutral status. The airport's journey to carbon neutrality began in 2008, when the board of directors was asked for its support in working toward this goal. From there, it was crucial that the rest of the team across the site was on board with the mission and

that individuals understood what part they played. Miles Thomas, environment manager at TAG Farnborough, was, from the very beginning, instrumental in helping the airport achieve this goal.

"We knew we were going to work toward carbon neutrality over a long period of time and we weren't in a rush to reach it," he says. "We wanted to do it slowly, thoughtfully and properly, and this meant looking at everything. Technology is always developing in ways that can help you meet reduction targets, but you also have to look at how the staff operate on-site, how they interact with technology, and how third parties are engaged regarding their activities and potential impact." Left-Right: TAG Farnborough Airport terminal; electric vehicle charging point; the airport's Meadow Gate solar array installation

He continues, "It was important to have training programs, procedures and high-level policies that directed people in a way that helped them understand that environmental performance is extremely important to us. We then looked at the breadth of our operation to ensure we could address every part, from large to small."

Taking action

The process began with a site review from the Carbon Trust, an organization that helps businesses reduce their carbon emissions and become more resource-efficient. The TAG Farnborough site is home to a mixture of old and new buildings, with some hangars inherited from an earlier UK Ministry of Defence airport dating back to the 1940s. Carbon Trust began by looking at the buildings, equipment, heating and lighting, before setting out its views on where there were areas for improvement.

From this inspection, Thomas and his team began making changes such as lagging the hot water pipes to reduce heat loss, installing destratification fans, which hang in the roof of the hangars and push rising hot air back down to the ground. The team also replaced all of

ACI Europe's Airport Carbon Accreditation program

The program's framework is made up of four levels, with airports being upgraded as they meet the criteria.

Level 1: Mapping – footprint measurement Airports must:

- Determine emissions sources within the operational boundary of the airport company
- Calculate annual carbon emissions
- Compile a carbon footprint report
- Engage an independent third party to verify the carbon footprint report

Level 2: Reduction – carbon management toward a reduced carbon footprint

- Airports must do all of the above, plus:
- Provide evidence of effective carbon management procedures
- Show that reduction targets have been achieved

Level 3: Optimization – third-party engagement in carbon footprint reduction

All of the above, plus:

- Widen the scope of carbon footprint to include third-party emissions
- Engage third parties at and around the airport

Level 4: Neutrality – carbon neutrality for direct emissions by offsetting

All of the above, plus:

 Offset remaining emissions to achieve carbon neutral operations for all emissions over which the airport has control

"Reducing an airport's carbon footprint requires investment in new technologies, infrastructure and operational changes"

Marina Bylinksy, head of environmental strategy and intermodality at ACI Europe



Above: The team at TAG Farnborough planted trees at a local school as part of their carbon offsetting project the lighting across the airport's buildings with LED technology, which can reduce electricity consumption by 80%. In the airport's tower alone, overall electricity consumption fell by 13,902kWh (15%) in the two months following LED installations.

Sustainable travel across TAG Farnborough has also helped minimize liquid fuel use, and a network of 20 chargers has enabled the use of electric vehicles, from small ground-handling trucks to a Tesla Model S car. A bicycle fleet is available for staff, to enable footprint-free travel between buildings.

"We have reduced our footprint by 42%, which of course means there's 58% to be offset," says Thomas. "In 2017, our residual carbon footprint was 3,500 metric tons, so we were required to offset that amount via an accredited scheme. Organization Verified Carbon Standard [VCS] provides projects that achieve offsets in a credible and robust manner.

"That year, our chosen offset project had two arms. The first involved our local community through tree planting in schools around the Farnborough area. I, our events team, TAG Farnborough CEO Brandon O'Reilly and members of customer services, accounts and facilities all came to assist with tree planting over a period of three months, during which we planted over 3,500 trees involving schoolchildren and faculties to aid understanding of what a carbon footprint is.

"The second part involved investment in the REDD+ project, which works to prevent deforestation and forest degradation, foster conservation and promote sustainable management of forests. This officiated the 3,500 ton offset required.

"For 2018 we have selected another school project, funding solar power systems for schools and providing a renewable, carbon footprint-free electricity supply. This will be coupled with an overseas project in India for solar power, together achieving the full offset."

Application process

Thomas has to submit documents including photos, statistics and descriptions every year as part of the verification process of the Airport Carbon Accreditation program. Reports are submitted to WSP, the program administrator appointed by ACI Europe. An airport must have reports independently verified every other year unless it is moving up a tier, when it must be independently verified.

"To be the first carbon neutral business airport is fabulous and we're extremely proud," notes Thomas. "Globally, we are the 39th airport to achieve neutrality and that puts us on a platform with large commercial airports, which is great for Right: The solar farm at Southwest Wyoming Regional Airport powers the general aviation terminal and hangar Below: The solar panel installation at Granite Air Center

us as a relatively small business aviation airport. It sits with our company ethos to be at the forefront of this work as we look to demonstrate that environmental performance is at the heart of our operation.

"We're aware there's more work to be done," adds Thomas. "Our plan is to further reduce our carbon footprint. We will continue with the work we are doing to identify new projects, embrace new technology, refine our procedures, and ensure we maintain carbon neutral status."

Environmental efforts

TAG Farnborough isn't the only business airport to be making environmentally conscious efforts. General aviation hubs around the globe are playing their part in the guest for a more sustainable industry.

For example, Southwest Wyoming Regional Airport in the USA has opened a new general aviation terminal and hangar that is powered by renewable energy. The airport invested US\$110,000 in a solar farm that includes more than 100 solar panels. Of that sum, 85% came from Rocky Mountain Power's Blue Sky program, which buys renewable energy certificates on behalf of its members to help develop small-scale renewable projects in the communities it serves.

Devon Brubaker, airport director at Southwest Wyoming Regional Airport, says, "I have always had a considerable interest in renewable energy and the economic benefits it can bring an organization. When I learned about the Blue Sky Program, I saw an excellent opportunity to be a leader in our very conservative state.

"As a small airport in rural America, it is difficult to operate a self-sustaining airport. Any time we can reduce our continuing operational costs through targeted capital investment, we jump on the opportunity.

"We have invested hundreds of thousands of dollars in energy-efficiency upgrades over the past three years. Primarily surrounding heating, ventilation and air-conditioning [HVAC], and lighting upgrades, these investments have allowed us to see significant reductions



in our electrical and natural gas usage. We have a few more programs left to undertake, such as HVAC systems in secondary facilities, airfield LED retrofits, and more renewable energy projects, including a plan for two more solar farms during the summer of 2019."

Over on the US East Coast, Granite Air Center in Lebanon, New Hampshire, is also benefiting from the perks of solar energy. In partnership with Norwich Solar Technologies, the FBO installed solar power technology on its main hangar rooftop earlier this year. In addition to long-term energy savings, the solar array will provide

"We have invested hundreds of thousands of dollars in energy efficiency upgrades over the past three years"

Devon Brubaker, airport director at Southwest Wyoming Regional Airport the environmental benefits of offsetting the equivalent of 5,554,000 lb (2,500,000kg) of CO₂ over its 25-year lifespan – the equivalent of 11,341,000 miles (18,250,000km) driven by automobile, or around 268,000 gallons of jet fuel burned. Jason Archambeault, chief operating officer at Granite Air Center, says, "As a fixed base operator, we use a lot of electricity. Energy costs

are always on the rise, and as such our costs are always on the rise. By installing solar power technology, we were able to stabilize our energy costs and shield ourselves from any sudden or unexpected increases in the cost of electricity.

"At this time, we do not have a goal to try to be carbon neutral entirely as there are restraints that would prevent us achieving that kind of goal, but it is certainly our intention to do the best we can within the constraints we have. For example, we try to use our electric ground power unit [GPU] for clients, as opposed to our diesel unit, whenever we can, and we are looking at potentially replacing our crew car with an electric car.

"We are also looking into upgrading our facility lighting to high-efficiency LEDs, to further reduce our electrical needs. When all is said and done, we want to do the best we can to be good stewards of the environment."

TAG Farnborough Airport has set the benchmark for business airports. From aiming to be carbon neutral to switching to LED lighting, even small-scale efforts from airports will play their part in the industry's quest to become more sustainable. Although a level of investment is necessary to make a real impact, business airports can start by educating their teams, to ensure everyone understands the benefits of becoming more environmentally friendly. \bigcirc

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As operators and FBOs in Atlanta begin preparations for Super Bowl 2019, *Business Airport International* looks at the main considerations when catering for the thousands of jets that travel to the big event

Main image: Super Bowl LIII will be played in Atlanta on February 3, 2019, at Mercedes-Benz Stadium



Words I Keri Allan



igh-traffic and special events, such as the Super Bowl, present unique and complex logistical challenges for charter operators, business aviation airports and FBOs alike. Recent Super Bowl

events have seen between 1,000 and 1,500 private jets fly into host cities, bringing passengers to the big game. With such a spike in demand over a short period of time, business airports and FBOs must be highly organized if they want to manage the situation well, while aircraft charter operators need to think about securing slots and parking much earlier than usual.

Here *Business Airport International* takes a look at the different ways business airports, FBOs and operators can ensure they provide the best possible experience during the run-up to and during a high-traffic event.

Forward thinking

Success in hosting a high-traffic event lies in the planning. Past Super Bowl hosts have all highlighted that plans should start no less than six months before a big event, if not up to a year in advance. If you're in a position to get ahead of the game, you can even monitor earlier events to see how things are managed.

"We know of FBOs who knew the Super Bowl was coming to their city in a year's time, so they sent representatives to observe how that year's FBOs handled the increase in traffic," says Joel Hirst, Avfuel's vice president of sales. "Planning that far in advance is the only way to ensure everything is in order for the big event, including accommodation, facility upgrades, enhanced security, on-site maintenance and weather contingency plans. There is certainly no shortage of considerations."

Houston hosted the Super Bowl in 2017 and Sugar Land Regional Airport began planning for the big game a year in advance. Elizabeth Rosenbaum, the airport's assistant director of aviation, admits that it gained a lot from reaching out to past hosts.

"The first thing we did was speak to other airports and FBOs that had gone through a similar large event. We also spoke to volunteers and staff who were in Houston during



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the big event in 2004. This allowed us to work through the issues that the previous FBOs had and prepare for every detail," she says.

David Ostwald, president of the Minnesota Business Aviation Association, was part of operations at Minneapolis-Saint Paul International Airport when Minneapolis hosted the 2018 Super Bowl. He agrees that the best thing the planning team did was to contact previous host cities: "I attended several airport planning meetings and the lessons learned from past hosts were invaluable in planning the event in terms of operations and support."

Be prepared

What were the lessons learned? Firstly, make sure you have a coordinated game plan in place. Timothy Sitkauskas, manager of flight operations at Rockwell Collins' ARINCDirect, recommends that airports research the anticipated traffic volume well in advance, as this will allow them to understand the number of arrival and departure slots, parking spaces, fuel supplies and what staffing is needed. Being aware of the restrictions and process that are usually put in place for an event is also important, and communicating early to all operators how the airport will manage the event will ensure a smoother operation.

"Currently, during large events like the big game or the golf tournament in Augusta, FBOs obtain slots from the FAA and coordinate parking with the operator," says Sitkauskas. "This system eliminates the risk of an operator obtaining an FAA slot through the e-STMP (Special Traffic Management Program) system, but then being unable to obtain parking based on the slot time."

James Hardacre, VP of sales for business aviation at World Fuel Services (WFS), suggests that operators start planning at least three months before an event: "This provides sufficient admin time. Some visas or permits can take up to 90 days to secure; having time to get these in order is imperative. However, some aviation authorities start planning well in advance. For example, authorities in Japan are already developing the plan of operations for the Tokyo 2020 Olympic Games. Any special considerations from aviation authorities could have an impact on the trip, so the more time you have to prepare, the better."

Parking plans and fees

Adam Steiger, president of Air Charter Advisors, says he's seen a lot of smaller airports that are not accustomed to events run into problems with parking and slot management. "We saw this with the solar eclipse in 2017 in Oregon. It got rather messy at some of the airports that weren't used to that volume of traffic. My suggestion would be for these kinds of airports to create a system and procedures that help them to arrange and track slots and parking."

But it's not just FBOs that need to plan well in advance for slots and parking – it's also operators. Obtaining a parking reservation from the FBO is crucial for operators. Sitkauskas says that frequently operators can only drop off passengers at the primary airport and then need to reposition the aircraft to a satellite airport for parking. Some

"Daytona Beach International Airport ... has been known to close one of its runways during race events to allow for extra aircraft parking"

Timothy Sitkauskas, manager of flight operations, Rockwell Collins' ARINCDirect

> Above: Avfuel's Avplan Trip Support's flexibility enables the company to personalize trip planning to meet its customers' specific needs

airports have closed operational space at the airport to cater for the additional aircraft. "An example is Daytona Beach International Airport, which has been known to close one of its runways during race events to allow for extra aircraft parking," he says.

Nancy Pierce, business consultant, Jeppesen FliteSupport Services, also believes parking needs to be one of the main considerations: "The most common issue is overnight parking being

available for the full duration of the proposed stay; operators need to look at options to drop passengers and reposition. They should consider using an airport that's not the primary alternative to the event, as the primary may also experience parking and crew accommodation issues.

"In many cases it's best to pick an alternative airport of entry a little further out from the primary airport, possibly even in a neighboring country. Operators need to keep in mind, however, that there may be additional visa and permit requirements to consider with such a scenario," the spokesperson comments.

Slots and parking rules are different for each event, so it's imperative operators look them up and apply for permissions as soon as possible. "In the USA parking



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and slots are typically accommodating for general aviation and straightforward to obtain, as long as charter operators apply early and stick to their schedules," comments David Kang, Avfuel's Avplan Trip Support account manager. "However, in most of the world, slots and parking are given to commercial traffic first. Those events that do recognize the importance of general aviation traffic often prioritize the likes of state diplomats and government representatives for slots and parking. The rest of the traffic can then try to reserve what's left over.

"While many countries have formalized processes with clear rules for slot and parking applications, in other countries we have unfortunately seen slots go to the highest bidder for large events," he adds. "While uncommon, it can happen and it's important to plan accordingly and far in advance. We often tell operators that Plan A should be to reposition and park their aircraft elsewhere, and then be pleasantly surprised if they receive permission to stay."

Operators also need to look into any potential additional fees. "One of the problems I notice is that a lot of operators don't contact FBOs to find out about special event fees," says Air Charter Advisors' Steiger. "They charge a customer a certain amount of money for a flight and then later discover there's a special event fee and must look to find a way to recover this cost."

Steiger says special events fees can range from US\$50-US\$1,500 per aircraft, depending on the event and how late you arrange a landing slot and parking. "I always suggest operators contact FBOs ahead of time and create a list of these fees," says Steiger. "Then you can factor them into your pricing models."

Above: Rockwell Collins' **ARINCDirect provides a** comprehensive suite of flight planning tools to help operators prepare for flights during high-traffic events

Below: Sugar Land Regional Airport's FBO received approximately 350 planes during the week of Super Bowl 2017, which is about double its normal traffic

Airports and FBOs are known for providing special services for passengers during high-traffic events. "These can include special giveaways and fuel or loyalty rewards, viewing parties, free transportation, accommodation or catering," says Joel Hirst, Avfuel's vice president of sales.

"Operating hours may be extended, additional VIP services may be made available and companies may implement a process to help expedite passenger processing," says Timothy Sitkauskas, manager of flight operations at Rockwell Collins' ARINCDirect.

"The best thing airports can offer is access to the local market, which is what the business traveler is actually there for in the first place," adds Jason Howard, general manager of Universal Aviation, UK.

During the 2018 Super Bowl in Houston, Sugar Land Regional Airport offered passengers several different transportation options. It worked with a local company to offer high-end rental cars and ensured there would be enough taxis and limo services for all customers.

Staff also worked with a local dry cleaning company to make sure they would have quick turnaround times on any linens for the aircraft.

But it wasn't just passengers that received special treatment, as Elizabeth Rosenbaum, the airport's assistant director of aviation, points out. "We had volunteers take pictures of arriving aircraft, place them in a nice frame and give them to the pilots as mementos. GlobalSelect held a watch party and served a barbecue to the pilots, and also worked with a large aircraft charter operator, providing a facility for them to run their operation out of for the event," she comments.





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Top tips for hosting and traveling to a high traffic event

1 For aircraft operators, contact the airport/FBO of choice early to reserve a slot and ensure there is parking available. Have a backup parking option in place in case circumstances change at the airport of choice. "Every operator should have a Plan B contingency in case their preferred arrangements can no longer be made," says Nancy Pierce, business consultant, Jeppesen FliteSupport Services.

2 Certain fees, such as landing and parking, may be more expensive during some events. "In preparation for high-volume events, vendors often bring in extra resources, such as additional transport vehicles, to support the period, which results in them charging a premium for services," says James Hardacre, VP of sales for business aviation, World Fuel Services.

3 Operators should regularly check in to confirm arrival and departure times with the airport/FBO. "There should be multiple follow-ups where the operator contacts the FBO confirming and re-confirming that the aircraft is allowed to land at a specific time," says Adam Steiger, Air Charter Advisors president.

Backup option

"Every operator should have a Plan B contingency in case their preferred arrangements can no longer be made" Nancy Pierce, Jeppesen

Iancy Pierce, Jeppesen FliteSupport Services 4 Services at airports and FBOs may be slower than usual – especially with fuel trucks. "The trucks are going to be busier than usual and they will always prioritize commercial aircraft. We recommend the crew fill their aircraft on arrival if at all possible to avoid complications during the day of departure," comments David Kang, Avplan Trip Support account manager at Avfuel.

5 For business airports and FBOs, give yourself as long a lead time as possible. "We believe that our Super Bowl operations within the Twin Cities region were aided by the fact that almost two years in advance of the event we had been holding meetings with all the stakeholders, including the Metropolitan Airports Commission (MAC), the FAA and even the local limo companies. This way everyone was on the same page and had thoroughly vetted all of our procedures," says Nancy Grazzini-Olson, president of Thunderbird Aviation.

6 Business airports and FBOs need to be as flexible as possible to ensure they can cope when the unexpected happens. "When we hosted flights during the Ryder Cup in 2016, the event went to the final hole to be decided, so many customers with early departures didn't leave, which created a ripple effect down the line. Don't be afraid to hold customers accountable for missing a slot, so as not to delay those that upheld their slot times," adds Grazzini-Olson. "Transfers are another element that is often an afterthought," comments Hardacre at WFS. "This presents an additional challenge if traveling to a country where you don't speak the local language. For these reasons and others, we issue event advisories to keep our customers up to date. We also maintain staffed local offices in all major operational areas to ensure we have the first-hand details others may not know."

Paul International handled

1,100 jets during Super

Bowl 2018

Got the staff?

Big events call for additional personnel, so it's also imperative that business airports and FBOs ensure they have enough staff in the run-up to and during a big event. Avfuel's Hirst recommends that FBOs have staff members commit to work six months in advance, and make sure that everyone is trained and duties assigned before the event.

"While the ideal employee on a regular day should be able to handle every task, many FBOs opt to further break up their staff into teams for big events: towing, aircraft parking, fueling, running invoices, concierge, accommodation and directions. Each team has an operational leader who oversees that niche area for the day, to ensure operations run smoothly," Hirst says.

It's also important to keep staff involved throughout the planning, as they may be able to contribute fresh ideas to the planning process. "Hold weekly meetings – bring in all key operating employees and think through worst-case scenarios, from weather to disabled aircraft," says Nancy Grazzini-Olson, president of Thunderbird Aviation, a fullservice business aviation services provider based at Flying Cloud and Crystal airports in Minnesota. "It's amazing the entrepreneurial ideas front-line staff develop from years of experience and being included in the process."

Many larger FBOs are able to bring in staff from other locations, but what if you don't have that capability? The answer may lie in volunteers.

Sugar Land Regional Airport took this route, splitting up the volunteers into groups for ramp arrival and departure, transportation and security, logistics, hospitality, concierge and photography, and then holding several training



sessions. "This allowed our experienced members of staff to focus on our customers' needs on the ramp,"

Fully equipped

Rosenbaum comments.

"Just as with staff, FBOs and airports need to ensure they have extra equipment on hand to properly handle the increase in traffic," explains Avfuel's Hirst. "This may mean extra refuelers, golf carts, service carts, mats, de-icers and/ or a higher inventory of necessary fluids and products."

For example, for the 2017 Super Bowl, Sugar Land Regional Airport purchased new equipment, including ground power units and vacuums, and hired a freezer for ice and a refrigerator for catering. Staff also worked with a fuel provider to arrange an additional fuel truck and ensured fuel allocation during the event.

"You'll also want a contingency plan if the internet goes down and the point of sale [POS] machines don't work," notes Hirst. "FBOs should consider investing in a quality customer resource management system and POS system with features that enable greater service, such as systematizing fuel orders so they are immediately shared with fueling and ground-handling staff for easier operations during peak traffic times," he adds.

In summary, FBOs, airports and charter operators need to undertake a lot of preparation when hosting or flying passengers to a high-traffic event. Ostwald of the Minnesota Business Aviation Association shares his two biggest takeaways: "Constant communication and early planning. I know it's fairly simple, but it works."

Thunderbird's Grazzini-Olson, meanwhile, is keen to stress the enjoyment you can get from such events. "If you love aviation then events like this are a blast," she points out. "Yes, they are lots of work, but with the proper planning they're also lots of fun!" O

On the web

David Kang, Avplan Trip Support account manager at Avfuel, looks at how new automated technologies are providing greater convenience for trip support, although he stresses that they are no replacement for human assistance. Read more: www.businessairportinternational.com

Above: There are a number of airports to choose from when traveling to Mercedes-Benz Stadium for Super Bowl 2019. Nine are within a 40-mile radius (see right)

Where: Atlanta Mercedes-Benz Stadium When: February 3, 2019

Key airports to fly in to:

Fulton County Airport-Brown Field Distance from stadium: 10 miles (16km) W

Hartsfield-Jackson Atlanta International Distance from stadium: 10 miles (16km) S

DeKalb-Peachtree Airport Distance from stadium: 12 miles (19km) NE

Cobb County International Airport Distance from stadium: 25 miles (40km) NW

Henry County Airport Distance from stadium: 28 miles (45km) S **Gwinnett County Airport**

Distance from stadium: 33 miles (53km) NE

Atlanta Regional Airport Falcon Field Distance from stadium: 35 miles (56km) SW

Covington Municipal Airport Distance from stadium: 38 miles (61km) E Silver Comet Field

Distance from stadium: 39 miles (63km) W







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Could better technology and greater collaboration be the answer to overcoming capacity constraints for business aviation operators in Europe?

Words | Hazel King



viation traffic in Europe is expected to have grown to between 16 and 20 million flights by 2040, according to Eurocontrol's *European Aviation in* 2040: Challenges of Growth report,

published in June 2018. And business aviation will make up a fair proportion of those flights – European business aviation grew by 6% between 2016 and 2017, and according to Eurocontrol it constitutes the third-largest market segment in Europe, after scheduled and low-cost.

As flight numbers grow, airports will need to boost capacity to keep up with demand. Despite 111 airports planning to increase passenger capacity by 16% over the next two decades, Eurocontrol believes this is not enough. "These airport capacity expansion plans, even if they can be delivered, are not sufficient," the report states. "By 2040 there will be 1.5 million more flights required than can be accommodated for. That is 160 million passengers unable to fly." Business aviation passengers and operators are bound to be affected by this capacity gap as airports struggle to accommodate both commercial and business aviation flights.

This was a big topic of discussion at EBACE 2018, with representatives from European industry and governments gathering to talk about constraints currently affecting business aviation operations in Europe and exploring methods by which these constraints can be mitigated.

Space-based approach

One of the main initiatives aimed at increasing airspace capacity for commercial and business aviation users is







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SESAR – the Single European Sky ATM Research project set up in 2004 as the technological pillar of the Single European Sky (SES) initiative. "The objectives of SES are to reform air traffic management to better use scarce airspace and airport resources, to reduce the fragmentation of European airspace management, and to optimize the flight trajectory without being constrained by airspace configuration or national boundaries," explains Róman Kok, communications specialist at EBAA.

"All of the SESAR solutions that we come up with are equally applicable to business aviation and to commercial aviation," adds Robin Garrity, ATM expert – airport and airspace user operations at the SESAR Joint Undertaking. "As well as the specific things we're doing for business aviation, the ATM network as a whole is constantly being improved by the use of new and evolving technologies, and the business aviation community can take full advantage of all of these."

Smaller regional airports have an important part to play when it comes to alleviating capacity issues in Europe, and those with fewer than 100 departures a day handle 70% of business aviation flights in Europe. GlobeAir CEO Bernhard Fragner, who was part of a panel discussion on capacity constraints at EBACE 2018, comments, "Small regional airports are essential for business aviation as they help reduce transfer times as well as ensuring maximum flexibility for the passengers."

Therefore, SESAR is looking at how it can help regional airports boost capacity without the need for large monetary investments, by improving their runway systems. Spacebased approaches are a major factor. "Many of the slightly smaller regional airports don't have an instrument landing system [ILS] on every runway or don't have an ILS down to Category III, which is essentially zero

"Space-based systems give you the ability to reduce the minima of a precision approach and increase accessibility for business aviation users"

Robin Garrity, ATM expert – airport and airspace user operations at SESAR

visibility, so they're looking at increased use of satellite technology. Space-based systems give you the ability to reduce the minima of a precision approach and increase accessibility for business aviation users," Garrity explains.

Robert Fisch, chief aviation operations officer at Luxaviation Group, agrees: "Technologies like satellitebased approaches would open up underdeveloped airports, enabling them to cater for more activity."

Space-based approaches using satellites also offer the ability to have more creative approach paths. With ILS, the approach is usually straight in, but the satellite-based method allows a curved approach to landing.

"We are providing research into some complicated styles of approaches to increase the accessibility into airports that don't have a Cat III or where there are major terrain features that hinder a straight-in approach," says Garrity.

"You can also use space-based approaches to increase access into busy terminal maneuvering areas [TMAs]. There are many business aviation airports that are located near to a major airport, and if you have parallel activities then the approach into a business aviation airport can have a negative effect on the capacity of the major airport. I'm not saying one has priority over the

other, but the two types of operations do interfere with each other, so by having satellite-based curved approaches and flight paths that can be deconflicted safely with a formally published IFR approach, you can have non-interfering approaches between the two airports, which is better for everybody," Garrity adds.

Thomas Romig is head of the airport operations center at Geneva Airport, which is part of an innovation program known as CHIPS (Swiss-wide Implementation Programme for SESAR-oriented objectives) that aims to introduce new satellite-based flight procedures throughout Switzerland.

What is the SESAR Joint Undertaking?

As the technological pillar of the Single European Sky initiative, SESAR aims to modernize and harmonize air traffic management in Europe. The SESAR Joint Undertaking (SESAR JU) was established in 2007 as a public-private partnership to support this endeavor. It does so by pooling the knowledge and resources of the entire ATM community in order to define, research, develop and validate innovative technological and operational solutions. The SESAR JU is also responsible for the execution of the European ATM Master Plan which defines the EU priorities for R&D and implementation. Founded by the European Union and Eurocontrol, SESAR JU has 19 members, who together with their partners and affiliate associations represent over 100 companies working in Europe and beyond.





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He agrees that "the use of satellite-based technology for aircraft operations will increase performance," but adds that "operators need to train their pilots and ensure that the equipment is available on board for the aircraft to operate."

Facilitating rotorcraft

Rotorcraft are an important part of business aviation, with 27% of the global rotorcraft fleet operated in Europe, according to Flightglobal. Access to many European airports can be restricted for this group of aircraft, owing, for example, to some TMAs and airport-controlled airspace being Class A where VFR operations are forbidden.

"We are designing a number of IFR approaches for rotorcraft – one is the low-level IFR routes that are defined within a TMA and designed to IFR procedure design standards, but generally lower than where fixed-wing aircraft would normally fly," says Garrity. "That means you can have routes that are designed for rotorcraft in Class A airspace where IFR services can be provided to those helicopters without interfering with the larger aircraft. The performance – particularly the speed – of helicopters means that if you were to have your helicopters on an IFR approach that is also being flown by jumbo jets, then you'd have a significant impact on the throughput of that particular airport."

"That leads in to the second type of specialist procedure we're designing, which is a simultaneous non-interfering approach [SNI]. These allow the procedures into the airport to be deconflicted right down to the landing area between rotorcraft and fixed wing. And this is most often implemented by a satellite-based point-in-space [PinS] approach where instead of landing on a runway, a point is placed somewhere over the airport to which an IFR procedure can be designed, and once the helicopter reaches that point, they continue the rest of the approach visually, which could be a very low level visual flight across the airfield to a visual landing point. This means that you can have a full IFR approach simultaneously with fixedwing commercial aviation, and the two are procedurally separated so there is no chance of one procedure affecting the other," he concludes.

Both major airports in Milan – Linate and Malpensa – are creating helicopter-specific approaches using a PinS



Performance-based navigation

New regulations are set to improve entry into secondary and tertiary airports

In June 2018, the European Commission published the Performance Based Navigation Implementing Rule that will facilitate the deployment of EGNOS-based procedures at secondary and tertiary airports. The European **Geostationary Navigation Overlay** Service (EGNOS) is the first pan-European satellite navigation system and will enable precision approaches with LPV [localizer performance with vertical guidance]. LPV procedures and lateral navigation/vertical navigation (LNAV/ VNAV) approaches will be implemented on all runway ends without precision approach by December 2020 and on all runway ends with precision approach by January 2024.

In a statement on its website, EBAA welcomed the new ruling: "Ensuring all-weather access at secondary and tertiary airports is very important for the business aviation community. Our sector is now in a position to optimize access at more regional airports, as this technical



innovation is a more economical way to ensure safe operations. LPV approaches guarantee similar performances to ILS Cat I approaches."

According to EBAA, business aviation operators can start using published LPV procedures immediately, without making any upgrades, by obtaining operational approval from the authority where the aircraft is registered. Increasing EGNOS penetration will bring benefits to regional, business, rotorcraft and general aviation.

method to enable simultaneous helicopter operations without interfering with commercial aviation operations.

Free route program

Improving flight planning and route operations is yet another way of alleviating some capacity issues in European airspace, allowing business aviation operators to fly more directly to their final destinations without being impeded by busy commercial routes.

SESAR's Free Route Airspace (FRA) program enables operators to file a user-preferred route which can be straighter and more direct than conventional routes, and then the air traffic management system manages it along with other flight routes. "Previously, operators would have to file a flight plan that went from navigation beacon to navigation beacon, and this would be anything but a straight line," explains Garrity.

"Aircraft would be required to carry sufficient fuel for the filed route, even if the air traffic controller gave the aircraft a more direct but less efficient route. With FRA, the fuel upload is for a shorter route, which makes the aircraft lighter and the flight more efficient and cheaper. The routes are all deconflicted for safety."

According to Garrity, FRA will afford business aviation users more operational freedom. "Business aviation has long said it can generally fly very high above commercial aviation, and free routing definitely helps there. Once the aircraft get above the commercial levels, they can fly in a straight line and make use of the fact that they're flying at 45,000ft and draw a straight line to the destination." However, not everyone is convinced that advances in

Below: Advances in technology are boosting accessibility of business airports across Europe routing and flight planning technology alone will solve Europe's airspace capacity issue. Fisch from Luxaviation Group comments, "Technology will certainly optimize the usage of the available facilities; once capacity is saturated there is nothing one can do. If there is only one runway, traffic will not be increased as a result of technology."

Other ways to increase capacity

The efficiency and distribution of landing slots is another issue that can't be solved by technology alone, according to GlobeAir's Fragner. "My [operations] team reports 60% of their work involves slot requests, because we're sending emails to some airports and going to websites for others. That's time that should be spent doing other things. We need more efficiency in that process," he says.

Iryna Tissot, regional business aviation manager for VINCI Airports, which manages 44 airports around the world, agrees that slots are an issue. "The slot limitations are very difficult to tackle under the current European slot regulation. There needs to be a discussion around slot management for business aviation. We could provide a specific notice period for example, but it is not fair to ask business aviation operators to follow the IATA agenda."

According to EBAA, common rules for the allocation of slots were adopted by the European Community in 1993 (Regulation 95/93) and have been amended several times in response to continuous traffic growth and increased competition. However, this has caused congestion at some European airports and proposals for further revisions are met with caution (see *Regulation revisions*). "There is no doubt that some proposals could improve the functioning of the allocation slot system and thus generate benefits for all airspace users," comments EBAA's Kok. "Indeed, enhancing the independence of slot coordinators and the transparency of slot mechanisms is generally noncontentious and can thus be supported.

"However, the current proposed revision of Regulation 95/93 cannot adequately address the sector's slot allocation needs. As it is, the proposed revision prevents

Slot regulations

Six out of the top 10 airports used by business aviation in Europe are either partially or fully slot-coordinated today business aviation operators getting and maintaining access at any airports that would become slot-coordinated."

Geneva's Romig argues that airports are bound to favor commercial over business aviation operations, due to the revenues they can gain. "An airport will generate more revenue from a fully loaded scheduled operator than a general aviation/business aviation [GA/BA] aircraft landing at the airport," he says. "At a very basic level, this is where the main issue is in terms of access."

There are some exceptions however, where the political and commercial strategy has been developed and tailored to facilitate GA/BA access – Nice, Geneva and London Luton being three. Managers at Chambéry Savoie Airport in the French Alps have also adopted a forwardthinking approach to handling business aviation traffic. "At Chambéry Airport we manage a waiting list of slots for business aviation in cooperation with our colleagues at Grenoble and Lyon-Bron airports. We also closely track slot cancellations to make sure that capacity isn't wasted," comments VINCI Airports' Tissot.

For EBAA, the creation of a business aviation consortium could be the answer to slot allocation and capacity constraints in the future. "To ensure fair competition on the secondary [slot trading] market, the EBAA propounds that a group of business aviation operators should be able to jointly acquire, exploit and maintain slots obtained in the secondary market," Kok explains.

"The sheer size of business aviation operators prevents them from financially acquiring pairs of slots on an individual basis and would thus remove the rationale of secondary trading in any sense, at least for the sector. Such a consortium would then ensure the sharing of slots is done in accordance with each participant's share in the acquisition of the pair of slots."

Greater flexibility, increased use of technology and better collaboration are key to addressing the European capacity constraint issue, as Romig concludes: "Mutual understanding of the other's needs and constraints will help facilitate the potential for improvements."

Regulation revisions

The European Commission suggested four main changes to slot regulation in December 2011:

1 Introduction of secondary trading for slots and increased competition: Airlines would be allowed to buy and sell slots to help grow sustainable competition.

2 Strengthened transparency of the slot allocation process and the independence of slot coordinators: Could lead to the creation of a European coordinator responsible for slot allocation at all EU airports.

3 Amendments to the '80-20' rule on grandfather rights: Airlines will need to use at least 85% of their allocated slots

62

(instead of the current 80%) and the minimum number of weekly slots required for priority allocation for the following corresponding season would rise from 5 to 15 for the summer season and to 10 for the winter season.

4 Integrating slot allocation with the reform of the European air traffic management system: The European Network Manager will be able to request capacity analyses at particular airports and make recommendations to the relevant Member State.

Commenting on the proposed revisions, EBAA's Róman Kok says, "Six out of the top 10 airports used by business aviation in Europe are either partially or fully slot-coordinated today. Yet, considering its nonscheduled nature and need for flexibility, business aviation cannot adapt to the current mechanism of slot acquisition as it is described in Regulation 95/93, nor can it fit the definition of 'programmed non-scheduled'. It therefore risks being marginalized, if not effectively banned, from

operating at these airports. The EBAA hence calls for a definition of 'non-scheduled air service' more suitable to business aviation operators and suggests the introduction of a mechanism that will allow business aviation operators and other nonscheduled operators to still reap the benefit of investments made during previous decades if their home airport becomes coordinated."

Source: House of Commons Briefing Paper Number CBP 488, 12 June 2017: Airport slots



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Boeing Field International, Washington

Operating hours: 24/7 Facilities: Aircraft MRO, avionics and aircraft supply, FBOs from Kenmore Aero Services, Clay Lacy Aviation and Signature Flight Support, and helicopter services. Fuel: 100LL, Jet A **Runway length:** 14R/32L - 10,007ft mpio rtland alerr (3,050m); 14L/32R - 3,709ft (1,131m). Location: 5 miles south of downtown Seattle, in the Duwamish corridor

Friedman Memorial

Operating hours: Monday-Sunday – 6:30am-9:00pm (summer); 6:30am-8:00pm (winter) Facilities: FBO services from Atlantic Aviation Sun, including pilots' lounge and snooze room, heated hangar space, crew cars, conference facilities and on-site aircraft maintenance. Fuel: 100LL, Jet A-1+ **Runway length:** 13/31 – 7,550ft (2,301m) Location: Idaho

Portland International

ncot

Operating hours: 24/7 Facilities: FBO services from Atlantic Aviation, including heated hangar space, international customs, cargo and ground handling, conference room, pilots' lounge, snooze room and showers, and maintenance services through Flightcraft. Jet charter and maintenance from Clay Lacy Aviation. Fuel: Jet/Avgas **Runway length:** 3/21 – 6,000ft (1,829m); 10L/28R - 9,825ft (2,995m); 10R/28L -11,000ft (3,353m) Location: Oregon



The world's leading air charter sourcing platform, Avinode, reveals its top 10 most requested airports in the US Northwest in 2018 so far

Words | Helen Norman

Seattle-Tacoma International

Operating hours (for FBO): 5:30am-11:00pm (call out available on request) Facilities: FBO services from Signature Flight Support, including 24-hour aircraft surveillance, business center, conference rooms, crew room, customs and immigration on-site and passenger lounge. Fuel: 100LL, Jet A, Jet A-1 Runway length: 16L/34R – 11,901ft (3,627m); 16C/34C – 9,426ft (2,873m); 16R/34L – 8,500ft (2,591m) Location: Washington

Boise Airport/ Gowen Field International

Operating hours: 24/7 Facilities: Full service aviation facilities from Jackson Jet Center and Turbo Air, including hangar space, passenger lounge, quick turnarounds and US customs. Maintenance services from Western Aircraft. Fuel: 100LL, Jet A+ Runway length: 10L/28R – 10,000ft (3,048m); 10R/28L – 9,763ft (2,976m) Location: Idaho

Southwest Oregon Regional

Operating hours: 24/7 Facilities: Full service FBO from Coos Aviation and Ocean Air Aviation, including VIP lounges, conference room, pilots' lounge, cinema room, showers, snooze room, full kitchen and putting green. Fuel: 100LL, Jet A Runway length: 4/22 – 5,321ft (1,622m); 13/31 – 4,471ft (1,363m) Location: Oregon

Pappy Boyington Field/ Coeur d'Alene Airport

Operating hours: Monday to Friday – 7:00am-5:00pm

Facilities: FBO services from Resort Jet Center, including air conditioned lobby and pilots' lounge, large aircraft parking adjacent to FBO, 24-hour call-out service on request, hangar space and aircraft ground services. Fuel: Jet A and 100LL Runway length: 6/24 – 7,400ft (2,256m); 2/20 – 5,400ft (1,646m)

Location: Idaho

In the know

Saskia de Jong, director of sales, Avinode Americas, reveals the key growth areas for the US Northwest market

"Overall requested traffic through Avinode to the top 10 airfields in the US Northwest region has leapt by 79% so far this year, compared with the same period in 2017, with Washington, Idaho and Oregon the three most popular states.

"The majority of traffic in the region is driven by leisure, so areas with an emerging or thriving tourism industry have seen a significant increase in charter requests. Portland, Oregon, is one such city. In the past year Portland International Airport has overtaken Seattle-Tacoma International Airport as the third most popular destination, with a 139% increase in arrival requests year-on-year.

"Nevertheless Seattle remains the top destination for travelers to the US Northwest, with flights to Boeing Field International (located five miles south of downtown Seattle) retaining the top spot in 2018 and seeing a 115% increase in the number of arrival requests from 2017.

"Most of the air charter traffic in the Northwest is domestic, or from Canada and Alaska. The shorter flights usually associated with domestic US travel account for the increasing popularity of turboprop aircraft such as the Pilatus PC-12, flight requests for which have doubled since 2017. Overall, jets have been the most-requested aircraft types in both 2017 and 2018 – except for the PC-12 – with the top three including the mid-size Learjet 60, the light Citation CJ2 and the Gulfstream G-IVSP (in order of most requested), demonstrating the full range of jet sizes suitable for domestic travel in the region."

COL

Spokane International

Operating hours: 24/7 Facilities: FBO services from Signature Flight Support, including conference rooms, crew rooms, on-airport customs and immigration, passenger lounge, showers, long-term vehicle parking. Fuel: 100, 100LL, Jet A Runway length: 3/21 – 11,002ft (3,353m); 7/25 – 8,199ft (2,499m) Location: Washington

Redmond Municipal Airport/Roberts Field

Operating hours: 24/7 Facilities: Newly renovated FBO facility from Leading Edge Jet Center, including flight planning room, kitchen, conference room, and pilots' and passenger lounges. Leading Edge also provides hangar space and MRO services. Fuel: 100LL, Jet A Runway length: 4/22 – 7,038ft (2,145m); 10/28 – 7,006ft (2,135m) Location: Oregon

Bellingham International

Operating hours: 24/7 Facilities: FBO services from Bellingham Aviation Services, including large ramp space, pilot lounge, passenger terminal, hangar space, conference room, US Customs, and volume fuel discounts. MRO services from Command Aviation Fuel: Jet, 100LL Runway length: 16/34 – 6,701ft (2,042m) Location: Washington

Newcomer in the Avinode Top 10 list

Bellingham International entered the Avinode Top 10 most requested airports in the US Northwest for the first time in 2018. One of the reasons for this, according to Vanessa Oliver, president of the airport's FBO services provider, Bellingham Aviation Services (BAS), is that thanks to a recent redevelopment project the airport is better able to cater for general aviation.

"In September 2017 we had a massive remodel that really opened up our space and enables us to better serve our customers with amenities such as conference facilities, a private crew lounge, showers and a flight planning station," says Oliver. "We have incorporated the beauty of the Pacific Northwest in our remodel including aerial photographs of the Pacific Northwest, wood trim and a maple customer counter. In May this year we expanded further and are now the sole tenants in the Bellingham Airport GA terminal, allowing us to bring our flight school closer to the operation." Alongside its remodeling project, BAS also made the decision to join the World Fuel Services (WFS) network as a WFS-branded FBO. According to Oliver, this is another reason for flight numbers

increasing at the airport. "We recognized the worldwide reach that WFS has in the industry and wanted to be part of it," she comments. "Since partnering with WFS we have experienced a huge increase in the number of contract fuel customers stopping in Bellingham. With the reach of WFS, we have the potential to maximize our networking and marketing opportunities."

Bellingham International Airport is an ideal location for Canada-bound customers. "We are only 50 miles [80km] from downtown Vancouver and have plenty of aircraft parking for those who prefer to drive across the border," comments Oliver. "We are also the closest contiguous-US airport to Alaska, making tech stops to both Alaska and the Pacific Rim very convenient."

According to Oliver, the beauty of the airport's location is one of the main reasons for the increased numbers of people visiting the region. "Located on Bellingham Bay, with the San Juan Islands to our west, Canadian Rockies to the north and Mount Baker and the North Cascade Mountains to the east. our location truly is the epitome of the beautiful Pacific Northwest," she says. "I believe that Bellingham will continue to attract customers looking for a healthy lifestyle and to enjoy the outdoor experience - those wanting to ski, kayak, hike or simply relax and sail around the San Juan Islands. The Northwest is growing fast and gaining popularity as a great place to live."

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Experts from MITRE's IDEA Lab reveal how it is developing advanced technologies for use in the business aviation industry Words | Helen Norman





aunched in 1958 as a private, not-forprofit company to provide engineering and technical guidance for the US government, MITRE supports federally funded research and development centers (FFRDCs) to advance the use

of technology in various industries in the USA and globally. One of those industries is aviation, and the company has been running the Center for Advanced Aviation System Development (CAASD) FFRDC since 1990.

In 1992, as part of CAASD, MITRE launched the Integrated Demonstration and Experimentation for Aeronautics (IDEA) Lab, which is used to explore new technologies, procedures and ideas designed to improve the efficiency and safety of the US National Airspace System (NAS) without interrupting live operations.

"The IDEA Lab was created in response to a need to provide an experimentation platform to answer the questions and challenges the FAA was facing in terms of testing and implementing new aviation technology," says Matthew Pollack, co-department head of Aviation Human-Centered Experimentation and Training at MITRE. "We recognized that there was a lot of experimentation being

Left: MITRE's ATC simulator

INNOVATION LAB

done by different industry components but there was a lack of coherent vision overall. There were multiple labs, each responsible for different research areas, so we integrated those labs into a single larger, more seamlessly integrated, unit – the IDEA Lab."

The IDEA Lab facilitates rapid testing and prototyping of aviation technologies and includes simulation areas for all aspects of the air traffic system, including general aviation. The lab has a control tower, ATC workstations, two Boeing 777 flight deck simulators and a general aviation aircraft flight deck simulator. "We have 30 ATC workstations and three traffic management areas," says Paul MacWilliams, department head of Aviation Human-Centered Experimentation and Training at MITRE. "We also have a dedicated room for our simulation pilots and an area where we work on training modernization, so we don't just look at the technology but also how it can be transitioned. We have an ATC tower simulator with a 220° visual system that includes representation of automation systems."

Pilot safety

CAASD is run in partnership with the FAA, and the aviation authority brings ideas and challenges to the IDEA Lab to be tested. "We work very collaboratively with the FAA to define and prioritize our work program," comments MacWilliams.

That work includes a number of innovative programs that are currently being tested or have been implemented in the USA and globally, such as Digital Copilot, the User Request Evaluation Tool (URET) and the Converging Runway Display Aid. "Digital Copilot is the application of cognitive assistance technologies to light aircraft flight decks – typically those flown by single pilots in the business aviation sector," explains Pollack. "It's the idea of bringing some of the safety you get from a two-pilot crew to general aviation [GA] flight decks that have solo pilots."

MITRE engineers designed Digital Copilot to support GA pilots throughout the flight process, from preflight to landing, and to act in a similar way to a human co-pilot. It responds to spoken commands, looks up information and announces it audibly. It can also intuitively determine what the pilot is trying to do, and can issue notifications, alerts and updates as needed. For instance, before beginning a flight, pilots can tell Digital Copilot what runway they've been assigned, and if they taxi to a different runway the system can issue an alert.

"We are in the process of transferring the technology to the industry and we already have a couple of industry partners, plus others that are interested in taking the technology and incorporating it into their products," Pollack says. According to Pollack, the technology has received very positive feedback from the GA industry, with everyone agreeing that the Digital Copilot "would certainly have a positive impact on the safety of GA operations".

The IDEA Lab is working on a number of other GA projects at the moment, including two mobile-based solutions – one that will allow smaller operators to receive their instrument clearance via a mobile device, and one


"We also have a dedicated room for our simulation pilots and an area where we work on training modernization"

Paul MacWilliams, department head of Aviation Human-Centered Experimentation and Training at MITRE

> Left: One of two aircraft cockpit simulators used in the IDEA Lab

CAASD's contributions to aviation

• Creating the logic for the Traffic Alert and Collision Avoidance System (TCAS) – one of the most important safety systems in aviation. TCAS is now the world-standard system for collision avoidance on commercial aircraft.

• Building the prototype of the User Request Evaluation Tool (URET). This nationally deployed tool enables controllers to detect and resolve potential conflicts among aircraft in en route airspace.

• Engineering Automatic Dependent Surveillance-Broadcast, or ADS-B, which enabled the shift from a radar-based surveillance system to one where aircraft transmit their locations, altitudes and speeds not only to ATC centers but also direct to nearby pilots. ADS-B is expected to provide substantial efficiency gains while also reducing infrastructure costs in the years ahead.

 Inventing the Universal Access Transceiver (UAT) Beacon Radio, a lightweight and cost-effective means for small aircraft and unmanned aircraft systems to use ADS-B technology to obtain greater situation awareness and alert other airspace users of their presence.

 Improving airspace use throughout the USA with the development of airspace redesign processes and the TARGETS tool, which is now the FAA-approved tool for the development of performance-based navigation (PBN) procedures. PBN enables equipped aircraft to fly more efficiently to and from airports, saving time and fuel.

• Partnering with government and the aviation industry to create the Aviation Safety Information Analysis and Sharing (ASIAS) initiative, a program in which US airlines, aircraft manufacturers and government entities share and analyze their safety data to proactively identify and address safety issues.

• Developing the Arrival Departure Window capability, which provides controllers with a visualization tool to help them maintain safe distances between aircraft in the terminal area.

that will enable smaller operators to inform a surface scheduling tool of their departure readiness using a mobile device. "The first technology will free up some frequency congestion and reduce transcription error, allowing the flight deck to receive clearance directly from the air traffic automation systems," says Pollack. "The second should improve the ability of surface scheduling tools to make accurate and reliable schedules."

Trajectory-based operations

MITRE is also developing solutions around trajectory-based operations (TBO) as part of the FAA's bid to encourage the aviation industry to adopt the use of time-based management (TBM). TBM improves the flow of aircraft within congested airspace by enabling controllers to manage traffic based on time rather than distance, to achieve more efficient aircraft spacing and sequencing.

MacWilliams explains, "We're doing quite a bit of research into TBO to help mature key ground and flight deck capabilities and procedures, things like time of arrival control, advisories for en route controllers, resilience to disruption, validating operational integration and proposing risk mitigations for the deployment of TBO. We also use the IDEA Lab to demonstrate to stakeholders how TBO capabilities are going to be used in an integrated way across domains. There is a wide range of capabilities and a lot of different understandings of what TBO is across various stakeholders, so the lab is a fantastic way to bring everyone together to get them on a similar understanding of what these future capabilities look like."

The next few years for MITRE IDEA Lab operations look set to be spent further developing TBO and moving toward successful deployment of initial operations. "There are still a number of challenges there," explains MacWilliams, "such as validating that the enabling systems are going to work as intended, and the cultural changes required for successful TBO implementation. We need to look at how we're going to train the workforce on those new capabilities and goals while maintaining proficiency in their conventional techniques, and continuing to resolve operational integration gaps."

Pollack concludes, "I think we'll also continue to focus in a similar fashion on successful implementation of technologies that help increase the efficiency of operations on the flight deck, for both airlines and light GA aircraft, and I think we'll increase our focus on the successful integration of commercial space-based operations into the US national ATC system."

By royal appointment

Andrew BoxerMissen, newly appointed director of flight operations at Voluxis, speaks to *BAI* about his career with the RAF, flying with Her Majesty the Queen, and translating his experience to a new role

Words | Kirstie Pickering

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he news that private jet charter and aircraft management company Voluxis named Andrew BoxerMissen as its new director of flight operations will be no surprise to many who know him. An established figure in the RAF,

BoxerMissen started his career in aviation aged just 17 years old, completing his private pilot's license prior to studying at Cardiff University.

While in Wales, he joined the University Air Squadron and spent three years learning to fly the Bulldog T Mk1 aircraft, which turned out to be his elementary RAF flying training due to accumulating almost 200 hours on the aircraft during his degree. The RAF deemed that sufficient for the first stage of training.

"Joining the University Air Squadron opened my eyes to the possibilities of flying in the RAF," says BoxerMissen. "The lure of potentially flying a fast jet along with the best training in the world was hard to ignore. Once I finished my degree at Cardiff, I completed my assessment tests to join the RAF at Cranwell and attended the college in December 1996."

"Flying with Her Majesty the Queen standing next to us in the cockpit happily chatting away is one of my fondest career memories"





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From here, BoxerMissen undertook basic flying training on the Tucano – a turboprop aircraft – at RAF Linton-on-Ouse in Yorkshire, followed by the Hawk T Mk1 at RAF Valley in Anglesey in the UK.

Prestigious appointment

Next came a career change, when he was posted to The Royal Squadron at RAF Northolt to fly the Hawker (HS125), a midsize business jet. This was a highly prestigious job as he was responsible for flying the highest-ranking members of the military, the government, Prime Minister, members of the royal family and – once he was deemed suitably qualified – Her Majesty the Queen herself.

"There would be a royal or senior ministerial task on a minimum of a weekly basis, but usually more frequently than that, so I would regularly find myself flying high-profile individuals around," says BoxerMissen. "It was always interesting to have a quick chat with them when they got on board, and I will never forget that extra special feeling of responsibility with the highest-profile passengers.

"Flying the Hawker with Her Majesty the Queen standing next to us in the cockpit happily chatting away as if it was completely normal is one of my fondest career memories. I was also honored to be responsible for flying HRH the Prince of Wales on a tour of Afghanistan when he was

Below: BoxerMissen is the main point of contact between Voluxis and the CAA

"The client should want

for nothing and everything

should be considered and

arranged in advance"



visiting the British troops. It was a pleasure working with his team to keep him safe over that week and he was kind enough to present me with a special leather wallet as a thank you.

> "I enjoyed a phenomenal 17 years in the RAF and having learned so much within the service, I wanted to move my career in a new direction in the civilian world. My time on 32 [The Royal] Squadron provided me with exceptional training and the experience defined my career path to corporate aviation. It was a natural step to join a private jet operator and aim for a top-level management position as I wanted to develop my aviation management skills."

Going private

After retiring from the RAF in May 2013, BoxerMissen's first step into civilian corporate aviation was just a few months later when he

joined CTC Private Jet as their Hawker client aircraft manager. This role subsequently morphed into being the fleet manager, firstly for the Hawker and then bringing into service two new Gulfstream 280s, completing the line training of the crews and managing the new fleet.

The opportunity to step into the role of director of flight operations at Voluxis came in March 2018. BoxerMissen now hopes to translate his experience to his new position.

"The role at Voluxis has a wide-reaching remit whereby I am responsible for the supervision of all departments within the company's flight operations," says BoxerMissen. "I am the principal liaison between Voluxis and the Civil Aviation Authority on all operational and safety matters, and am the flight operations member of the senior management group, serving as a director of the company and sitting on the board.

"On The Royal Squadron, the highest of standards was demanded. Not only that, it was expected that the aircraft would arrive exactly on time – to the minute – to avoid embarrassing meet-and-greet situations occurring, so there was always a relentless drive to improve and maintain standards. At CTC Private Jet, there was a number of ex-Royal Squadron personnel, so this ethos has carried forward in that operation. I recognize that the staff and

Andrew BoxerMissen has flown some of the most famous aircraft in the industry. Here is a rundown of the aircraft he discussed with BAI

Cessna 152

Bulldog T.Mk1

This American airplane debuted in 1978 as an update for the C-150. It boasts two seats and is one of the cheapest personaluse aircraft on the market.

The British aircraft is a two-person airplane with an optional third seat. Its biggest client was the RAF, which used it for training recruits.

Flying high

Tucano T.Mk1

This jet provides basic fast jet training to RAF crew on their training pathway to frontline fast jet aircraft. Its maximum speed is 319mph (513km/h).





Hawk T.Mk1

The jet is used primarily

in the aggressor role by

the RAF's 100 Squadron.

It is also used by the RAF

aerobatic team and the

Hawker HS.125

Now known as the British Aerospace 125, this is a twin-jet midsize business iet. More than 60% of its total sales were to North American customers.







past 10 years - has helped see a rapid growth in the private jet market," says BoxerMissen. "This is an exciting time to bring a new player to the table, one where guality and standards are set to the highest level. The ability to enjoy a rapid transfer to your personal aircraft and arrive at airfields that much closer to your final destination offers high-networth individuals the opportunity to save considerable amounts of valuable time. This is leading to new and exciting opportunities within business aviation."

With political turmoil impacting the industry, there are undoubtedly challenges ahead. "There are significant bureaucratic challenges to overcome and Brexit is the current headache buzzword," says BoxerMissen. "The next couple of years will most likely shape the industry for the next two decades. I think the sector will continue its upward vector with strong growth as private fortunes continue to grow. The European market still has considerable potential."

Building success

For now, BoxerMissen will be focusing on his role at Voluxis and expanding on the company's success to date. His experience means BoxerMissen will have an abundance of ideas on how to make his mark at the company. "Voluxis has come a long way since its

inception," he says. "We have moved into large aircraft management and charter, while implementing a program of improvements to ensure that the company operates to the highest possible safety standards and has the capability to evolve into a key player in the marketplace.

"Voluxis' main aim is to consolidate our position in the market and continue to grow on an aircraft management/ charter basis. Our aim is to grow, while retaining that personal touch our clients know us for. For us, it is all about providing the best possible service and engendering the kind of loyalty that naturally fits with that." O

crews at Voluxis also demonstrate much of this ethos and it is my intent to further develop it and drive forward the operation to the highest possible standard."

Picking favorites

BoxerMissen's breadth of experience means he has his industry favorites, from aircraft to service, to airports offering sweet treats.

"I have flown the Hawker now for over 15 years, so it will always have a special place in my heart," says BoxerMissen. "It is such a well-designed and well-built aircraft. It's a great piece of British engineering and the fact that there are still so many of them around despite their age is testament to that quality. It is a lovely aircraft to fly and operate and is the ideal aircraft for short business trips without breaking the bank.

"When it comes to customer service, a top-end business aviation service will provide the ultimate in customer experience while maintaining the highest possible standards of safety. The client should want for nothing and everything should be considered and arranged in advance. In essence, it is our job to know what the customer wants and to arrange for it to happen before they even know it themselves.

"Bromma Airport in Stockholm will always stand out for its superb level of service and the fact that it has a grand piano, a talking parrot and free ice cream!"

Shaking it up

As the business aviation industry continues to evolve to meet the change in client demand, regulation and strategy, emerging trends continue to dominate how companies are expected to perform.

"The fact that airport transfers take so long - coupled with the upturn in the industry's financial fortunes over the

"I will never forget that extra feeling of responsibility when flying with the highestprofile passengers"

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Orlando's

What: NBAA-BACE 2018

When: October 16-18, 2018

Where: Orange County Convention Center and Orlando Executive Airport, Florida 1,100+ indoor exhibitors

Dozens of educational sessions

Over 25,000 attendees expected

calling

Networking opportunities

Nearly 100 aircraft on static display

Conference highlights

NBAA-BACE will feature special events and dozens of education sessions covering topics of interest to all attendees, from those considering the use of a business jet to support their business needs, to those who are veterans in the industry.



When: October 15, 2:00-5:30pm This is a half-day event focused on small flight department management and operations. Small flight department managers will have the opportunity to participate in audience-engaging sessions on how to manage the many responsibilities of operating and managing an aircraft, ranging from maintenance to safety management, including finding safe and reliable contract help. Experts will lead the discussions, with time for a Q&A session and interaction with the audience.



When: October 16, 10:30am-12:00pm Retaining talented employees in flight departments is difficult and problematic for the industry at present. In the first half of the session, members of NBAA's business aviation management and domestic operations committees will discuss the current workforce environment and what some operators are doing to combat the risk of employees leaving, with special emphasis on small flight departments. In the second half of the session, there will be roundtable discussions about the issues faced by those in the room, with a focus on practical tools and solutions.

Continued on page 81

Exhibitor news



Organically grown from a single aircraft operation to a multibase fleet operator and privately owned since its founding, **ACI Jet** is a premier provider of aircraft ground support services, maintenance and inspections, full-service aircraft management, and private jet charter services on the west coast of the USA.

The company will be showcasing examples of how it delivers experiences for customers, its innovative safety through technology, and the economy of scale, depth and capability that it brings to aircraft owners and operators. ACI Jet will be exhibiting in two locations at NBAA-BACE, with both its aircraft MRO, aircraft management and private jet charter services, and then with its executive terminals and FBO staff members at AvFuel's booth.

ACI Jet recently announced that authorization had been given by avionics and communications manufacturer Honeywell for the company to operate Honeywell's newest avionics and communications equipment dealership and service center at San Luis Obispo County Regional Airport. The new operation is expected to have a considerable economic impact on the county and state, generating sales, employment tax revenues, and new employment opportunities for residents.

Support network

Booths 4616 and 4600

Private jet operator **Clay Lacy Aviation** has opened a new office at Westchester County Airport in White Plains, New York. This office is an extension of the company's East Coast headquarters in Oxford, Connecticut, further enhancing service and support for aircraft management, jet charter, and maintenance clients in the New York area. Clay Lacy manages a growing fleet of jet charter aircraft along the eastern US seaboard in White Plains, Boston, Oxford, Teterboro, Philadelphia and Miami, with additional locations opening later this year. The company has a fleet of more than 100 business jet aircraft, nationwide, with close to 70 airplanes available for charter. Five more charter jets joined the fleet in Q2 of 2018.



Tech talk

As a leader in aviation document digitization solutions, Web Manuals is helping to reduce an outdated dependence on paper. Hurricane, the company's recently updated flagship software, ensures that aviation businesses can access. edit and distribute all of their documentation through a single computer or tablet. Web Manuals makes complying with the latest industry regulations a straightforward process, as documents can be updated immediately. Previously, this would have required using a word processing tool to manually update specific areas before printing and redistributing. The company therefore provides considerable time and cost savings.

Booth 225

At NBAA-BACE, the company will be offering live demonstrations of its document digitization tools suitable for business jet operators of all sizes. These include Hurricane and the recently launched customer portal, providing compliance managers with an instant overview of their Web Manuals digital dashboard. Demonstrations will be available at the company's booth, where CEO and founder Martin Lidgard will be on hand to provide information on how Web

Manuals can help businesses make the move away from paper.

City stop

Located 12 miles (19km) and just a six-minute helicopter ride from central London, **London Biggin Hill** offers VIP handling, a choice of FBOs, and extensive hangarage and maintenance services for all ranges of business jets. It is a designated UK port of entry and free of runway slot constraints.

At NBAA-BACE, the airport will be demonstrating its status as the gateway to the capital and its popularity with travelers from the USA, particularly thanks to its extended operating hours. Open from 6:30am to 11:00pm from Monday to Friday and 8:00am to 10:00pm at weekends, the airport provides the fastest and earliest route into London. This summer, after the success of its London Heli Shuttle service with Castle Air, the airport launched the New York Heli Shuttle. The new service connects London Biggin Hill's New Jersey sister airport, Teterboro, with Manhattan's East 34th Street Heliport, again in just six minutes. By providing a transfer between New York and London, the service is a catalyst for international business travel and investment. The hub has experienced more than 15% year-onyear growth in flight movements and a 39% spike in transatlantic traffic.



Booth 1075

Breaking ground

The city of McKinney is constructing the new **McKinney Air Center**, which is set to be a state-of-the-art FBO terminal at the McKinney National Airport in Texas.

The terminal will span 17,000ft² (1,580m²) with an additional 40,000ft² (3,720m²) transient hangar. The new executive terminal will include two conference rooms alongside a flight planning room, training room, media room, pilot lounge and refreshment center, as well as an outdoor lounge and package storage.

There will be build-to-suit office space available for lease, curbside luggage service and on-site car rental fleet and services. City funding comes from the McKinney Economic





Development Corporation and the McKinney Community Development Corporation, who contributed US\$4m toward the project. The remaining US\$2m has come from the airport construction fund. Construction is expected to be completed in summer 2019. Visit McKinney Air Center's booth to learn more about the new FBO and how its services could benefit you.

Refreshed facility

TAC Air is leading the US\$100m redevelopment and expansion of the Braniff International Airways facility at Dallas Love Field Airport to provide visitors with hangar space and FBO facilities.

In partnership with the Texas Historic Commission, the existing DalFort Aerospace building – originally known as the Braniff Airlines Operations and Maintenance Base – will be transformed into 200,000ft² (18,600m²) of hangar space and aviation support facilities. The project also includes the construction of retail space, a restaurant, offices, an auto-dealer showroom, entertainment venues and hospitality facilities. TAC Air's FBO will feature amenities such as



controlled access to the private hangars and executive terminal, concierge services comprising catering from local celebrity chefs, auto detailing, local event/venue reservations, auto-to-aircraft valet, and secured personal access to all retail facilities located at the Braniff Center. Visit TAC Air at Booth 2956 to find out more about the facilities, which are expected to open in summer 2019.

Continued from page 79



When: October 16, 1:00-2:00pm

In a cost-conscious business environment, it's important for aviation managers to articulate the enterprise value of their operation. This session will provide guidance on how to justify company use of a business aircraft through statistics and reallife success stories.



The electric aircraft revolution

When: October 17, 9:15-10:00am

Many factors are boosting interest and intrigue in electric aircraft – particularly environmental and financial considerations – but is there real potential for wide-scale use of the technology? This session will examine current research and development efforts, identify technical challenges, and speculate on a timeline for market viability.



When: October 17, 1:00-2:00pm

Cybersecurity has never been more critical to businesses. How do such threats specifically affect business aircraft and passengers? This session will break through the jargon to provide practical advice to help attendees develop and enhance their cybersecurity protocols.



Ethical business aviation transactions

When: October 17, 3:00-4:00pm

Ethical business transactions are critical to maintaining a healthy industry. This session will explore NBAA's recent 'Ethics in business aviation' statement, which provides guidelines to help operators prioritize ethics.

Information correct at time of going to press

Global service

Banyan Air Service is a 24-hour, full-service FBO at Fort Lauderdale Executive Airport (FXE) with more than 1,000,000ft² (92,900m²) of hangar and office space within an 85-acre (34ha) aviation complex. The company provides business aviation services including ground services, aircraft sales, heavy maintenance, avionics installations and services and aircraft part sales. Banyan is authorized as a Part 145 FAA repair station and also a Part 145 EASA repair station. At NBAA-BACE, the Banyan FBO team will be promoting its expansion on the north side of FXE in partnership with Sheltair (see page 4 to learn more) and the ease of international US Customs clearing and support for Canada, Europe and South America visitors. The Banyan MRO team will be promoting the expansion of its Part 145 capabilities for the Gulfstream IV and V and the Challenger 300. The Banyan aircraft sales team will be showcasing the HondaJet and the Kodiak aircraft.



Fresh partnerships

Booth 1908

Execujet has opened a new FBO

facility in the Seychelles. The FBO is located at Seychelles International Airport on the island of Mahé and is operated by ExecuJet in partnership with Euro Aviation. The new facility offers full FBO and ground-handling services including aircraft parking and fuel coordination, VIP passenger and crew support services, flight planning, and flight permit assistance and coordination. Discreet and secure airside transfers are provided to and from the aircraft at the domestic and international terminals.

Elsewhere in the business, ExecuJet's MRO facility in Lagos has entered a strategic alliance for maintenance services with local operator Izy Air, based in Abuja, Nigeria. The partnership is part of ExecuJet's ongoing development plan in West Africa. Visit ExecuJet at NBAA-BACE to find out more about new developments.



Open for business

Booth 4114

Jet Linx has opened its new member-only private terminal at Oakland County International Airport. Located 35 miles (56km) from Detroit, the new terminal offers members a private meeting room, executive lounge, wi-fi connectivity and local staff available to assist with requests. The terminal is inclusive of a dedicated hangar for clients who fly with Jet Linx.

Customers of Jet Linx have access to local services and facilities, including the team, airplanes, pilots and terminal, with a wide array of services and amenities available exclusively for clients. Members will also benefit from the convenience of boarding and taking off in a matter of minutes as there is no third-party FBO to bypass. The new terminal was the first new development at the Oakland County International Airport in 20 years. Jet Linx has additional plans to expand to the northeast US market with bases in New York and Boston, and will also increase its presence in the midwest with a Chicago base.



Safety first

Discussion surrounding safety will play an important role at this year's NBAA-BACE, with two key events being bookmarked as must-attend sessions.

NBAA's 10th annual Single-Pilot Safety Standdown will take place from 9:00am-2:00pm on October 15, featuring interactive learning opportunities, expert speakers and peer-to-peer discussions. Singlepilot business aviators will have the opportunity to expand their knowledge and skills, while exploring practical tips to enhance operational safety and risk mitigation.

Scheduled presentations include a detailed analysis of single-pilot business aviation accident data; Conference highlight!

interactive discussions on mitigation best practices; and leadership briefings from NBAA president and CEO Ed Bolen, AOPA president and CEO Mark Baker, and Experimental Aircraft Association (EAA) CEO and chairman Jack Pelton.

NBAA's fourth annual National Safety Forum is scheduled for October 18 from 9:00am-1:00pm. Following the theme of 'Safety Begins with You', this event will focus on the basics of maintaining skills and understanding automation in aircraft, examining the physiology and psychology that affects human performance and exploring the relationship of leadership and professionalism in aviation safety.

Added hangarage

Meridian has opened a new, state-ofthe-art hangar at its New Jersey-based headquarters at Teterboro Airport. The new building replaces the original Hangar 12, which was demolished in the summer of 2016. This modern facility includes a 40,000ft² (3,720m²) hangar and a twostory support building, doubling the size of the previous facility.

The first floor includes tenant office space and a customer reception area. The second floor is primarily reserved for charter support including maintenance, quality assurance and inflight services. The hangar Booth 4212

will serve as a maintenance facility, as well as provide parking accommodations for both managed and transient aircraft. Hangar 12 is designed to handle a variety of large cabin aircraft, including the Gulfstream G650 and Global 6000. The facility features larger hangar doors for easy access.

Meridian owned and operated businesses include FBOs, air charter, and aircraft maintenance. With a second base at Hayward Executive Airport and charter sales offices at Van Nuys Airport and Sonoma County Airport, visit Meridian to find out how it could help your operation. \bigcirc







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The lost summer

Although warm summer days seemed to have gone missing in Iceland this year, **South Air** has experienced one of its busiest ever periods

Vital statistics

Airports Keflavík International Opening hours: 24/7 Facilities: Customs and immigration, large ramp space, de-icing, weather briefings, flight planning

While the European mainland has been dealing with extreme heat in many places and a lack of rain, the same can't be said for the southern part of Iceland. A cold front has been hanging over this part of the country more or less since the beginning of May, causing numerous rainy and cloudy days and relatively low temperatures.

June offered only 70.6 hours of sunshine around Keflavík International Airport (BIKF) and Reykjavík Airport, which is a mere 37% of the average for the past 10 years. With the highest temperature reaching a mere 13°C (55°F) in Reykjavík, the month was 1.6°C (35°F) under the average temperature of the last 10 years. Iceland is starting to live up to its name.

This lack of sun is undoubtedly the cause of a record number of Icelanders traveling to the southern part of Europe this year in search of summer and, to some degree, this has affected the tourism industry, with an increased number of flight cancellations to Iceland.



For South Air, however, this isn't much of an issue. June was one of the busiest months in the company's history, even though the majority of the aircraft it handled came through BIKF. This shows that a good reputation earned through years of dedication and understanding the needs of customers will bring the satisfied clients back again and again.

It also means South Air must be doing something right, as year after year it has serviced 70-80% of all general aviation going through BIKF airport. All sizes of aircraft and all kinds of clients and projects of various degrees and service needs come to South Air for repeat business.

Nothing is too much for this company's 20 or so employees, who act and work as



one big family, serving their clients windedication and passion.

Tourist trap

But all is not doom and gloom when the subject of the weather comes up between Icelanders, although they do love talking about it. The fact is that even though it looks as if summer was a noshow this year in the south, it has been fantastic both in the north and the east. For those traveling to Iceland in search of adventure, where better to start than Akureyri (BIAR) in the north or Egilsstaðir (BIEG) in the east, both airports of entry into Iceland and both serviced by South Air. The airport in both of these locations is right next to the town.

Akureyri is one of the more scenic towns in Iceland and a must-see for anyone traveling to the country. There is great food and fun things to do near Akureyri and Egilsstaðir, or it can serve as a fantastic starting point to an adventure in the country.

Alternatively, these towns are ideal places to go for an overnight stop to refuel, when visitors can enjoy the South Air staff's renowned great hospitality.

SOUTH AIR

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its busiest ever month

Below left: The aerial

Akureyri Airport

Below: Egilsstaðir

international hub on

the east of the island

Airport is an

view of the runway at

in June

Best practice

IAM Jet Centre reflects on the processes required to gain IS-BAH accreditation and the importance of safety certification in an ever-evolving market

The development of the International Standard for Business Aircraft Handlers (IS-BAH), a comprehensive set of standards and best practices for FBOs and ground handlers serving business aircraft operators around the world, grew out of the well-established International Standard for Business Aircraft Operators (IS-BAO), driven by ever-increasing numbers of companies presenting themselves as capable service providers.

As with so many new ideas, IS-BAH has taken some time to gain momentum and broad acceptance as the defined certification for the FBO community, not least because it requires candidate companies to take a deep and honest dive into all aspects of their operation, examining and documenting safety, service and leadership procedures in a bid to refine all to best practices.

Refining processes

IAM Jet Centre embarked on this challenging self-examination and external audit exercise over three years ago for its full service FBOs in Barbados, Montego Bay, Grenada and Tortola. One of the first 20 companies in the world to achieve IS-BAH Stage 1, IAM recently gained Stage 2 status and is continuing the best practice evaluation process as it works toward Stage 3 two years from now.

Like the International Business Aviation Council's IS-BAO program, completion and certification of IS-BAH has – at its core – the development of



a robust safety management system (SMS) to guide and influence the safest possible delivery of the FBOs' services. In fact, IAM Jet Centre found that the outcome actually offers a system of best practices that extends beyond safety. It can serve to enhance the quality of the FBOs' wider customer service, operations, human resources, financial management and security activities, among others. Similar to military recruit training, the process of breaking down all elements of everyday FBO activity for critical review allows them to be rebuilt in the mold of best practice.





Above left: The lobby at Montego Bay, Jamaica Left: IAM Jet Centre has lounges at every FBO Vital statistics

FBOs: Barbados, Montego Bay, Grenada, Tortola Founded: 1989 Services: Flight handling, fuel, FBOs, VIP



Above: IAM Jet Centre's location in Barbados Above left: The Barbados FBO has welcomed aircraft from the RAF

Along with the positive response from its insurers and the various airport authorities it dealt with, IAM has also found that professional flight departments that have made significant investments in time and manpower under the IS-BAO program are more likely to choose ground handling partners with standards as high as their own.

In many ways it is still too easy for some unverified companies to present themselves to the bizav community as competent and capable providers of FBO-type services. It should be a simple notion that aircraft operators and their passengers and crew deserve both the safety and service that audited best practices encourage. It's not easy or quick to achieve, but for FBOs dedicated to their trade and focused on building a positive reputation, it's not intended to be.

IAM Jet Centre complements the increasing number of FBOs and ground handlers worldwide taking up the challenge of IS-BAH certification. The bizav community is the better for it. \bigcirc

IAM JET CENTRE

To learn more about this advertiser, visit www.ukimediaevents.com/info/bai Reader Inquiry Number

Hangar for all

Holger Ostheimer, managing director at **DC Aviation Al-Futtaim**, discusses the facility's newest hangar, what services it offers customers, and the company's expectations for the future

What does your new hangar offer customers?

The new 7,500m² (80,730ft²) hangar more than doubles DC Aviation Al-Futtaim's (DCAF) hangar capacity, bringing its total landside plot area to 24,000m² (258,330ft²) and apron area to 13,000m² (140,000ft²). The new hangar enables DCAF to add multiple single-aisle aircraft maintenance bays and provide enough space for additional workshop and equipment storage.

The additional hangar capacity also provides the foundation to further enhance the strategic cooperation between DC Aviation and Lufthansa Technik, enabling the company to extend its reach within the region and serve as first port of call for VIP carriers from the six Gulf Cooperation Council (GCC) countries, including Oman and Bahrain.

DCAF broke ground for the new hanger in October 2016 and construction was completed in November 2017. The opening ceremony took place during the Dubai Airshow the same year and was attended by VVIPs from Dubai South, AI-Futtaim and DC Aviation.

Why did DC Aviation Al-Futtaim need a new hangar?

The second hangar fits in with our expansion plans and enables us to meet the growing demand for business and private jet operations in the aviation district at Dubai South for years to come.

The new hangar gives us the operational space we need to increase our activities. It is a very simple equation. The existing facilities only provided so much space. The new hangar will be the driving force to allow growth in maintenance, especially the more complex maintenance activities in conjunction with Lufthansa Technik Corporation.

How many hangars do you have?

DCAF has two hangars. Hangar 1 measures 5,700m² (61,350ft²) and can easily accommodate multiple ACJ or BBJ type aircraft, ultra-long-range business jets such as the Falcon 7X, Global Express, or Gulfstream G650. The biggest aircraft Hangar 2 can accommodate is a Boeing 767-300. The new hangar enables DCAF to add two single-aisle aircraft maintenance bays and provide enough space for an additional workshop and equipment storage. It also increases the number and size of aircraft that can be accommodated at the facility.

Located in a prime position just off the airport's runway, DCAF hangars and dedicated ramp parking enable 24/7 support, maintenance services, and operation of private and business jets of all sizes.

Why should customers choose DC Aviation Al-Futtaim?

This is currently the only fully fledged VVIP, FBO and hangar facility at Dubai South, offering customers the highest levels of comfort, convenience and privacy. The facility offers the shortest distance from limousine drop-off to aircraft steps and the highest levels of privacy and safety, thereby attracting continued interest from owners and operators seeking our expertise to manage their assets both commercially and under private operation.

From the aircraft management side, we currently account for six aircraft, including two Bombardier Global Jets, three Challengers and one Falcon 7X.



Top: The construction more than doubles hangar capacity

Above: A VIP lounge is also available for customers to use We continue to work on adding to our managed fleet and remain positive that new aircraft will be joining it over the next few months. On the maintenance side, we are increasing the levels of complexity that we are able to provide with the new hangar.

Our success can be attributed to the tremendous efforts of our team, who continue to raise the bar, enabling us to meet and exceed the expectations of our customers. Since commencing operations in 2013, we have been steadily scaling up our activities and we remain positive on the growth prospects for this year and those that follow. ○

DC AVIATION AL-FUTTAIM

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Vital statistics

Airport: Dubai World Central Facilities: FBO and handling, aircraft maintenance, aircraft management, business jet charter, aircraft parking Did you know? DC Aviation Al-Futtaim is the only fully integrated FBO and hangar facility in Dubai South

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Dallas Executive Airport set to take flight as the premier GA destination in North Texas

Property managers, realtors and house hunters alike live by a mantra: location, location, location. And in the realm of aviation-industry real-estate development, the same is true.

For location, look no further than Dallas Executive Airport (DEA). Conveniently situated less than 10 miles (16km) south of downtown Dallas, the city-owned, general-aviation airport has received approval from the Dallas City Council for a new development.

By the end of 2021, Burchfield & Partners (B&P) will open a US\$1m, 90,000ft² (8,360m²) maintenance hangar and adjoining office space. Included in the development are a common-use aircraft ramp, taxiway connections and apron.

Aviation Maintenance Professionals (AMP) will be one of the new tenants for the Burchfield development on the west side of the airport. A maintenance and repair operator, it is relocating jobs to DEA amid plans to grow and expand. This project will exhibit DEA's commitment to Dallas Mayor Mike Rawlings' GrowSouth initiatives.



Above: The airport is less than 10 miles (16km) from the city of Dallas

In total, the B&P project will comprise 5.25 acres (2ha) of prime land at DEA and serve as the conduit for jumpstarting the airport toward its goal of becoming pilots' and business fliers' top choice for general aviation in North Texas.

The B&P development is not the only opportunity at DEA. The City of Dallas's department of aviation has contracted DCS Aviation to build more than 50,000ft² (4,650m²) of city-owned hangar and office facilities. Construction on this development will be complete by the end of 2018.

The past two years have been a keystone in the transformation of the airfield, with the completion of the reconstruction of the runway and the 600ft (183m) extension, bringing it to 7,000ft (2,130m). The runway extension project includes a new localizer for aircraft navigation and LED airfield lighting. Flight checks for the extension are ongoing. This completion is the final part of the three-phase expansion project.

With a reconstructed runway, hangar space opening at the end of the year and an impending MRO, the time to capitalize on everything Dallas Executive Airport has to offer is here. \bigcirc

DALLAS EXECUTIVE AIRPORT

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Mototok considers the potential of robots in hangars

Repositioning expensive aircraft between four walls and close to other aircraft is not an easy job. The task is carried out by specialists who make sure not to scrape a winglet or a tail or, even worse, force the rotation of landing gear during an excessive maneuver. The consequences go beyond the cost of repairs and heavily penalize the owners, who temporarily lose access to their jet.

Technology can help reduce this risk. Mototok, which has been producing radio-controlled electric tractors without tow bars for the past 10 years, has developed solutions for driving assistance and operating assistance.

While gaining popularity on the roads, autonomous vehicles also



Above: Autonomous tugs could transform the process of moving aircraft

have a place in aviation hangars. A laser guidance system follows a line on the ground and aligns the aircraft with a 3mm (0.1in) margin of error. When it is time for an aircraft to be repositioned, it is possible to determine a plan to move it from the outdoor parking to the indoor space with a precision that the human hand cannot ensure.

Before the move, the user ID will have been registered via an RFID chip and the logbook will be offloaded via a GSM chip, in addition to maintenance and usage data transferring to any mobile device. During the maneuver, the onboard computer couples with probes to control the torque applied to the landing gear. Counter steering will automatically act in the opposite direction of any error. These features already exist on the Mototok Twin.

Those in the industry can imagine that technology will one day enable tugs to autonomously return to a charging area in a corner of the hangar. Future tugs will also be able to recognize aircraft by a system that is similar to facial recognition. As in many other sectors of the industry, handling operators can expect to increasingly be assisted by technology to complete their daily tasks. \bigcirc

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The Business Airport International team will be at: NBAA-BACE in Orlando, Florida, from October 16-18, 2018. Come and meet the team at Booth 644

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MEBAA in Dubai, UAE, from December 10-12, 2018. Come and meet the team at Booth 144

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BUSINESS AIRPORT INTERNATIONAL EXAMINES HOW A NEW ROUND OF FAA GRANTS WILL IMPACT BUSINESS AIRPORTS

US\$770.8m FAA grants

usiness airports across the USA are set to get a boost as the FAA awards US\$770.8m in its third round of airport infrastructure grants. The new funding is part of the overall US\$3.18bn Airport Improvement Program (AIP) funding for US airports.

This third allocation of funding provides 569 grants to 522 airports and will fund 949 infrastructure projects, including runways, taxiways, aprons, terminals, aircraft rescue and firefighting vehicles, and snow removal equipment.

A summary of the business airports benefiting most from this latest round of funding is below. \bigcirc

Key projects receiving funding



• Augusta Regional at Bush Field, Georgia, will get US\$14.7m to fund the repair of the air carrier and general aviation apron

• White Mountain Airport in New Hampshire is to receive US\$4.7m to repair the lighting on runway 15/33, the apron where aircraft park and the taxiway

• Corvallis Municipal Airport, Oregon, has been granted US\$7.6m to reconstruct portions of runway 09/27 and taxiway A. The airport will also repair the lighting for the runway and taxiways A and B • Watsonville Municipal Airport, California, will get US\$1.2m to spend on installing airfield guidance signs on runways 2/20 and 9/27, implementing vertical and visual guidance systems on 02/20, and rehabilitating the same runway

• Great Bend Airport in Kansas will use its US\$6.7m grant to install airfield guidance signs, reconstruct the north and south of runway 17/35 and provide lighting updates on the same runway





• Miami Executive Airport in Florida will get almost US\$1.5m to construct a new taxiway

• Napa County Airport in California will receive US\$13.9m to rehabilitate runways 18L/36R and 18R/36L

• Van Nuys Airport, California, is to reconstruct taxiways A and B after receiving US\$9.1m in grants

Your comments

What do you think? Is the FAA doing enough to support business airports? Is worldwide investment in the sector enough? We'd love to hear your thoughts on this or any other topic affecting the business aviation industry, so visit www.linkedin.

com and search *Business Airport International* to join in with the conversation.





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