PREMIER TRANS-ATLANTIC BUSINESS AVIATION MAGAZINE
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ENGINES NEW STANDARDS IN POWER AND EFFICIENCY

EBACE 19
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THERE’S ONLY ONE THING LEFT TO DO ... 

KEEP RISING

THE ART OF EXCELLENCE

We’ve long had aviation down to a science. You inspire us to reach higher. Every day, we spark innovation, apply passion and perfect details. We advance aviation to an art form.
TIME IS MONEY is a very famous reference widely used in business. The quote is attributed to Benjamin Franklin, a phrase used in a book he wrote in July 1748 called “Advice to a Young Tradesman, written by an Old One”. Although made well before the age of flight, Franklin could just have easily been referring to Business Aviation. After all, the whole reason for Business Aviation is to save time and make money – which is exactly what it has been helping entrepreneurs in the US do since shortly after World War II.

Encouraged by the surplus of available military transport aircraft put on the market, the idea of Business Aviation took root in the US in the 1940s. The DC-3 proved to be tough, flexible and easy to operate and maintain, and its exploits during the war became the stuff of legend, with more than 10,000 being produced as C-47 military transports. Although great for war, they were not designed for conducting business in more civil times. Thus, the interior of these military aircraft had to be adapted to their new business missions. In doing so, they gave the aircraft interiors and customization trade an opportunity to develop into the high-tech Custom Interiors and Refurbishment Centers we know today.

Founded in 1947 and based in Washington, DC, the National Business Aviation Association (NBAA) became very successful at organizing Business Aviation, making the new general aviation sector efficient, productive and successful in North America.

However, the situation on the other side of the Atlantic was – and in some ways remains – more challenging. In 1964, ABELAG became the first real European FBO, established at the Brussels Airport by André Ganshof van der Meersch. In 1970, the company was the primary European Learjet operator. But according to Guy Viselé, former ABELAG executive vice president, Europe did not see the time saving advantages of having an aircraft as an essential asset to doing business. “The managers of the renowned Pfizer Pharmaceutical Group based in Brussels were regularly crossing the Chanel via the Ostend-Dover ferry to reach their plant located between Dover and Manston,” says Viselé. “That’s a four hours journey that the executives were willing to take out of fear of how the unions would react to their use of business aircraft,” Viselé added.

Ex-Volkswagen Chief Pilot and EBAA Board Member Heinz Lichius once told me: “When the president had to go somewhere for business, he was coming to ask me if the aircraft was available and if we could execute the mission without disturbing our planning. But when the Union needed to attend a meeting somewhere, they were demanding ‘Exit the aircraft from the hangar, we need it now!’”

It’s time to change this EU mentality once and for all – and that’s the role of the EBAA. Luckily, EBACE is a marvelous tool for doing so through the manufacturers’ exhibits, the wide array of aircraft on the static display and the educational sessions attended by government officials. Attend EBACE to build relationship and explore the entire marketplace of options. Business growth requires global recognition. So, let’s come together and show our strength in Geneva.

“Alone we can do so little; together we can do so much.”
Helen Keller
OUR COVER

STANDPOINT

Jointly organized by EBAA and NBAA, the 19th edition of the European Business Aviation and Convention will bring together Business Aviation professionals and Decision Makers from around the world. This 19th edition of EBACE will take place on May 21-23 at Geneva airport.

Offering an easy access from Africa, Russia and Eastern Europe, Geneva is the hot-bed of international business.

SWISS GOVERNMENT IS NOW FLYING IN STYLE

The Swiss government officially took delivery of the Pilatus PC-24 on 18 February 2019. Ueli Maurer, President of the Swiss Confederation, took delivery of the PC-24 at a simple handover ceremony held in Berne.

The Swiss Air Force will operate the aircraft for the Swiss government. The military registration is T-786. “I’m delighted the Swiss government opted for a Swiss product, and will travel aboard the PC-24 – the new ‘Swiss Air Force One’! I’m confident that other governments will adopt the PC-24 once they see the unrivalled opportunities and flexibility which it offers”, commented Pilatus Chairman Oscar J. Schwenk.

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HOW TO AVOID AVIATION FUEL DELAYS

Unless it's a predominantly GA airfield such as Le Bourget (LFPB) or Farnborough (EGLF), air carriers will almost always take fueling priority. If you're planning to depart during peak periods of scheduled commercial activity, it might be best to fuel on arrival or the day before departure. Grant Bradshaw is giving tips to avoid delays.

Arrange Your Fuel a Week Before Departure
Whenever possible, notify your fuel provider in advance of your departure, telling them your aircraft type, registration, dates and times of operation and volume requirements. This is doubly important if you operate larger GA equipment. It's best to organize fuel releases about one week in advance – enough time to ensure receipt by the local supplier and to get a confirmation. When planning a quick-turnaround tech stop, it's always a good idea to follow up with the fuel provider and re-confirm the uplift a day prior to refueling.

However, having said all this, we do not recommend requesting fuel releases too far in advance as the local fuel provider may misplace the release, causing possible day-of-operation delays.

Choose Airports and/or Ground Handlers with Their Own Fuel Trucks
To avoid delays due to a commercial airline getting precedence, choose airports and ground handlers/FBOs who have their own dedicated fuel trucks for GA. Although some international airports have GA-dedicated fuel trucks, it is most commonly seen in the US, Canada and certain locations in Europe, such as London-Stansted Airport (EGSS). You'll also see it at airports with a steady, high-volume of GA traffic, such as Sao Paulo Guarulhos (SBGR) and Hong Kong (VHHH).

Some FBOs also have their own fuel trucks. For instance, Universal Aviation operate their own trucks at Universal Aviation Mexico – Toluca (MMTO) and Universal Aviation Ireland – Dublin (EINN).

When making fuel arrangements, ask your contract fuel provider and/or your handler about your fuel truck options.

Avoid Peak Periods of Commercial Activity
An effective means of mitigating fuel delays is to schedule quick turnarounds and destination stop uplifts away from peak periods of scheduled commercial activity. This tactic can be particularly beneficial at busy Mediterranean holiday destinations where scheduled commercial fuel requirements always take precedence over GA.

Fuel on Arrival, not Departure
Fueling on arrival rather than departure is a viable strategy at high-traffic airports and during peak periods. This is particularly important when attending high-traffic events where delays and shortages are common.

Use an Alternate Airport and Consider Quick-Turn Tech Stops
Many destinations have multiple airport options. Do your research to find out the advantages/disadvantages regarding fueling for your final destination and schedule. Certain locations around the world, including Shannon (EINN), London-Stansted (EGSS), Helsinki (EFHK), Bridgetown (TBPB), and Curacao (TNCC), have good reputations as 30-45 minute quick turn tech stops. They are particularly adept at quickly turning around aircraft as they are 24-hour airports of entry (AOE) without overly congested ramps and who have efficient support facilities/staff.

Lean On Your Contract Fuel Provider
When you are traveling to familiar destinations, making reservations through an app is easy and often the way to go. But at new destinations, or ones that can be challenging (due to a lack of infrastructure, congestion, political unrest, strikes, etc.) it’s worth making a quick call or sending an email to your contract fuel provider. For example, the UVair Fuel Program at Universal Weather and Aviation offers a entire dedicated team, staying on top of supply issues worldwide. Part of the program provides pre-trip fuel consultations to operators, providing them with the free information they need to make the best fueling decisions for their mission.

Questions?
If you have any questions about this article or would like assistance arranging your next fuel uplift, contact me at UNIVERSAL WEATHER AND AVIATION grantbradshaw@univ-wea.com.

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Embraer’s new Praetor 600 super-midsize business jet was granted its Type Certificate by Brazil’s Civil Aviation Authority (ANAC—Agência Nacional de Aviação Civil). The Praetor 600 is the best performing super-midsize jet ever developed, surpassing all its main design goals and becoming capable of flying beyond 4,000 nautical miles in long-range cruise speed or beyond 3,700 nautical miles at Mach .80 from runways shorter than 4,500ft.

Garmin has received Federal Aviation Administration (FAA) Supplemental Type Certification (STC) for the GFC 500 autopilot in the Cessna 180/185. Additionally, the GFC 500 autopilot will soon be approved for the 36/A36 Bonanza. Intended for piston single-engine aircraft, the GFC 500 delivers superior in-flight characteristics, self-monitoring capabilities and minimal maintenance needs when compared to older generation autopilot systems.

In a ceremony at Pilatus Business Aircraft Ltd’s facility in Broomfield, Colorado, the Swiss aircraft manufacturer delivered the first of two PC-24 Super Versatile Jets to US customer U-Haul International. In a stylish paint scheme featuring the distinctive U-Haul orange livery, the 27th production PC-24 aircraft took to the skies for its new home base in Phoenix, Arizona, where it will join a U-Haul fleet that includes two PC-12s.

Avfuel and Pacific States Aviation (KCCR) announced their partnership as the FBO selects Avfuel as its branded fuel supplier. Operators flying into the FBO at Buchanan Field will now benefit from Avfuel’s programs, including Avfuel Contract Fuel and AVTRIP rewards. PSA is conveniently located on the largest ramp at KCCR.

Thomas Hirschmann, second son of Jet Aviation founder, Carl W. Hirschmann, passed away on April 3, 2019, in Zurich, Switzerland, of an undisclosed illness. Hirschmann was a well-respected leader at Jet Aviation, where he served for 29 years. The company and its employees mourn his untimely loss. He was 64. He was the second son of Jet Aviation’s founder, Carl W. Hirschmann.
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ATLAS AIR SERVICE AG PRESENTS FOUR BUSINESS JETS AT AERO SHOW

Atlas Air Service AG presented four business jets at the AERO Show in Friedrichshafen. For the first time, Atlas Air Service initiated a Business Aviation Conference in cooperation with the fair organizers to highlight the strength and missions of business aviation in Germany and its economic relevance and presented four business jets at the show. “We are delighted that many regular customers have also travelled with their jets to visit us,” said Atlas Air Service AG CEO Nicolas von Mende.

EGYPTAIR SELECTS FLIGHTSAFETY INTL TO BUILD A220-300 SIMULATOR

EGYPTAIR has selected FlightSafety International to design and manufacture a full flight simulator for the Airbus A220-300 aircraft. The simulator will be installed at the EGYPTAIR Training Academy headquarters located at Cairo International Airport. “We are continuously looking to evolve and ultimately enhance our Training Academy by incorporating new technologies into our full range of training devices,” said Capt. Ahmed Adel, Chairman & CEO of EGYPTAIR Holding Company.

COMLUX RAISING BAR FOR MRO ON LARGE VIP AIRCRAFT

Comlux Completion is raising the bar in maintenance services on large VIP aircraft such as ACJ and BBJ. During the 2018 year, Comlux maintained a steady stream of recurrent maintenance clients but also gained 4 new operators including 3 BBJs based in the US and 1 BBJ2 based in the Middle East. In parallel with the growing maintenance business, Comlux has simultaneously worked to complete 2 VIP completions on both a BBJ and an A330-200 while gearing up for the arrival of the first ever BBJ Max 8 completion and ACJ320neo.

ROLLS-ROYCE TAY 611-8 ENGINE ACHIEVES 10 MILLION FLYING HOURS

The Rolls-Royce Tay 611-8 engine, which entered service in 1987, recently achieved another incredible milestone by reaching 10 million flying hours in nearly 5 million flights. The engine powers a range of Gulfstream’s highly successful large-cabin business aircraft, such as the Gulfstream GIV, GIV-SP, G300 and G400, and has established a reputation for outstanding dependability, efficiency and low noise generation.
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Universal Aviation Singapore celebrated the official inauguration of the new Seletar Business Aviation Centre (SBAC) and its new operations offices at a ribbon-cutting ceremony attended by clients, partners, airport and local dignitaries. SBAC operations are co-managed by a joint venture consortium, SATS Seletar Aviation Services Pte Ltd, made up of Universal Aviation Singapore, SATS, Ltd, and Jet Aviation.

Duncan Aviation announced that although construction continues at its third, full-service Fixed-Base Operator in Provo, Utah, the fully functioning, 90,000-gallon capacity fuel farm is online and its staffed, experienced Line Services Team is ready to help with aircraft fueling needs. Additionally, one new maintenance hangar and the new paint hangar are accessible from the ramp at the Provo Municipal Airport in Provo, Utah.

Pratt & Whitney and Embraer are celebrating a significant milestone as the E195-E2 aircraft receives Type Certification from three regulatory agencies, the Agência Nacional de Aviação Civil (ANAC) in Brazil, the US Federal Aviation Administration (FAA) and from the European Aviation Safety Administration (EASA). The aircraft is exclusively powered by the Pratt & Whitney GTF PW1900G engine and is scheduled to enter into service in the second half of 2019 with Azul Brazilian Airlines.

Two thousand nineteen marks Waco-based Blackhawk Modifications’ 20th year in business – a milestone the company is celebrating with a facility expansion that doubles their Waco, Texas hangar and office capacity. Blackhawk also announced the alignment of several mutually owned aviation-based companies under one umbrella that will be branded as Blackhawk Aerospace. Blackhawk Aerospace will encompass four groups; Blackhawk Modifications, Blackhawk Composites, Blackhawk Aerospace Solutions as well as Blackhawk Aircraft Sales.

Jet Aviation has recently completed the integration of Hawker Pacific’s Aircraft Management business, creating a Flight Services location for Jet in Singapore effective immediately. The new Singapore branch office will operate as Jet Aviation Business Jets Singapore (JBJS) and report to Jet Aviation Business Jets Hong Kong (JBH). Jet Aviation Business Jets Singapore will provide Aircraft Management, Flight Support and CAMO services to Southeast Asian-based clients through its new Flight Services location in Singapore.

MSP Aero is rebranded as a West Star Aviation satellite location. West Star Aviation acquired MSP Aero LLC in November of 2017 and has, until now, operated as a stand-alone facility that retained their independent brand. MSP Aero is an established, well-respected FAA Part 145 Certified repair Station that has been providing avionics, interior, minor paint and aircraft window repair services at KMSP and surrounding areas since 2009.
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QUICK LANE

RECORD GROWTH FOR EXECUJET IN ASIA PACIFIC

ExecuJet, part of the Luxaviation Group, is celebrating a record year in Asia Pacific, with fleet additions, an extended Singapore office and a new management team to oversee operations. A significant increase to the managed fleet has seen three Bombardier Global Expresses, two Challenger and one Gulfstream aircraft added to ExecuJet’s Asia Pacific operations over the last year.

AERO-DIENST DEVELOPS STC AS ADS-B OUT SOLUTION FOR LEARJET 60

Aero-Dienst has received EASA approval for its newest GPS/ SBAS Sensor System Installation STC. This STC provides the basis for a cost-effective ADS-B Out solution for the Learjet 60 (Pro Line 4 Avionics). “Especially in view of the fact that we have less than 14 months until ADS-B Out becomes mandatory in Europe, we are pleased to be able to provide our Learjet 60 customers with a combined STC solution that keeps costs and downtime to a minimum,” says Patrick Morgenstern, Design & Modification Manager at Aero-Dienst.

NESTE AND AIR BP READY TO DELIVER SUSTAINABLE AVIATION FUEL TO SWEDEN

Neste, the world’s leading renewable products producer from wastes and residues, and Air BP, the international aviation fuel products and services supplier, have entered into an agreement to deliver sustainable aviation fuel to airline and airport customers in Sweden in 2019. Neste and Air BP announced in 2018 their plans to explore and develop supply chain solutions for delivering sustainable aviation fuel to airports and airlines.

FLYING COLOURS CORP. RENEWS SELETAR INTERIORS CONTRACT WITH BOMBARDIER

Flying Colours Corp. confirmed renewal of its agreement with Bombardier Business Aircraft’s Service Centre at Seletar Airport to provide interior services at the OEM’s Singapore facility. The renewed relationship between the two Canadian companies confirms that Flying Colours will continue delivering the full-service interiors offering, including preliminary inspections, repair work, modifications and refurbishments, to complement Bombardier’s comprehensive line and heavy maintenance services.

ROLLS-ROYCE EXPANDS ITS SERVICES INFRASTRUCTURE FOR BUSINESS AIRCRAFT

Rolls-Royce is further strengthening its global network of Authorized Service Centers (ASC) for CorporateCare customers. The global ASC network forms an essential component of Rolls-Royce’s services portfolio for business aircraft and adds to its existing global aftermarket capabilities. Rolls-Royce has 76 ASCs with key maintenance providers worldwide allowing for rapid response times to meet its customers’ needs.
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HONDAJET ELITE RECEIVES CANADIAN TYPE CERTIFICATION

Honda Aircraft Company announced that the HondaJet Elite has received type certification from Canada’s Transport Canada Civil Aviation, demonstrating that the aircraft meets the safety standards set by the organization. HondaJet Elite deliveries in the region begin immediately. “Following the overwhelmingly positive reaction to the HondaJet in Canada, we are pleased the HondaJet Elite has now also received type certification in the region,” said Honda Aircraft Company President and CEO Michimasa Fujino.

KING AEROSPACE BBJ BUSINESS CONTINUES STRONG GROWTH

King Aerospace Commercial Corporation was on track to complete work on 29 Boeing aircraft in 2018. Scope included routine maintenance, avionics, paint and interior modifications for Boeing Business Jets (BBJs), Boeing 737s and Boeing 757s. “Significant investments in tooling, equipment, facilities and training have positioned us to serve Boeing aircraft extremely efficiently and effectively,” says Jarid King, president of King Aerospace Companies. “We’re earning a reputation for high-quality, value-priced support.”

TAG AVIATION SELECTS CUTTING-EDGE ERP SOLUTION

TAG Aviation Maintenance Services has selected Sensus MRO as its future operating system to complement Quantum, its legacy system Sensus MRO is a web-based and field-proven Enterprise Resource Planning (ERP) solution for the MRO industry. It is developed and supported by Locatory.com a Lithuania based subsidiary of Avia Solutions Group. Sensus MRO will enhance TAG Aviation Maintenance Services’ customer experience by offering new functionalities.

DAHER INTRODUCES LATEST VERSION OF “ME & MY TBM” APP

The latest upgrade to Daher’s “Me & My TBM” cloud-based application for owners and operators of TBM very fast turboprop aircraft was introduced at the AERO Friedrichshafen 2019 general aviation show. With this third version of the “Me & My TBM” app, feedback for users is provided during every phase of a TBM’s flight, from key parameters of the engine and other systems to a full range of statistics accessible wherever the aircraft goes.
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**FLIGHTSAFETY INTL, TRU ESTABLISH FLIGHTSAFETY TEXTRON AVIATION TRAINING**

FlightSafety International and TRU Simulation + Training, a Textron Inc. company, have formed a new company called FlightSafety Textron Aviation Training. This new joint venture will provide training services for Textron Aviation’s broad product line of business and general aviation aircraft. “Our main goal in establishing FlightSafety Textron Aviation Training is to further enhance the training and services our Customers receive,” said David Davenport, FlightSafety International Co-CEO and President, Commercial.

**SR TECHNICS ENGINEERING COMPLETES MAJOR GALLEY OVERHAUL ON BOEING 777**

SR Technics has successfully completed a galley conversion project for the leasing company AerCap. SR Technics is the only EASA DOA that currently provides this solution. The SR Technics Engineering team’s innovative proposal to modify the galleys on five Boeing 777-300ERs convinced AerCap to upgrade to the popular ATLAS standard. The first installation was completed at the beginning of 2018 and led to the delivery of all five aircraft by the end the same year.

**PIPER INTRODUCES NEW PILOT 100 AND 100I TRAINER AIRCRAFT**

Piper Aircraft announced two new value priced additions to its trainer-class line, the Piper Pilot 100 and Pilot 100i. These new products enter the trainer segment at a competitive price point of $259,000 VFR equipped and offer the same rugged durability and functionality as its stablemate, the Archer TX. The need for a new trainer aircraft at a price point that could support the growing demand for professionally trained pilots was identified following extensive research and the rapid expansion of trainer sales.

**RUAG COMPLETES FIRST INSTALLATION OF GOGO AVANCE L5 IN EUROPE ON F900DX**

RUAG achieved the installation the GoGo Avance L5 system on the basis of a Supplemental Type Certificate, designed by Dassault Falcon Jet Corp, and specifically validated for this project by EASA. “Our Falcon customer required full and seamless connectivity, for the broad selection of business and entertainment applications across various devices, at any given time. The GoGo Avance L5 system quickly became the solution to these exacting expectations,” states Stephan Woodtli, General Manager Site Agno, RUAG MRO International.

**SATCOM DIRECT BEGINS COMMERCIAL IMPLEMENTATION OF FLEXEXEC**

Satcom Direct announced the commercial service introduction of Intelsat FlexExec as part of its SD Xperience portfolio. The first high-speed, managed, end-to-end broadband service designed specifically for the Business Aviation sector, FlexExec is now being commercially delivered in partnership with Intelsat and Astronics AeroSat.
DATA DRIVES DECISIONS

Secure and affordable.
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**G650ER SHATTERS SPEED RECORD**

Gulfstream Aerospace Corp. announced the ultralong-range Gulfstream G650ER once again proved its unrivaled performance, beating a recent competitor speed record while at the same time increasing the distance flown for the farthest business jet flight in history. The G650ER flew from Singapore to Tucson, Ariz., at an average speed of 597 miles per hour/960 kilometers per hour over a distance of 8,379 nautical miles/15,518 kilometers.

**BENDIXKING UNVEILS NEW FULLY INTEGRATED FLIGHT DECK**

BendixKing, a business unit of Honeywell, unveiled its new AeroVue Touch Integrated Flight Deck at the 2019 AERO Friedrichshafen trade show. This advanced Class III cockpit system includes three smart, high-resolution touchscreen displays that incorporate all required functions into one lightweight, panel-mounted flight deck. The system is easily customizable, allowing aircraft manufacturers to create their own unique interface that shows different information applicable to a variety of aircraft.

**LUFTHANSA AVIATION TRAINING’S FIRST CITATIONJET CJ1+ REPAINTED**

Lufthansa has presented its new livery on a Boeing 747-400 in February 2018. Since then, over 40 aircraft of the fleet have been repainted to the new color scheme or joined the fleet as new aircraft in the new colors of the airline. Part of the Lufthansa training subsidiary’s Lufthansa Aviation Training (LAT) fleet will also be adapted to the new brand identity. The first of a total of five Cessna Citation CJ1+ of the LAT aviation pilot school was recently repainted at Augsburg Air Service.

**UNIVERSAL AVIONICS RECEIVES STC FOR INSIGHT TOUCHSCREEN CONTROL**

Universal Avionics has received FAA Supplemental Type Certificate (STC) for the company’s new touchscreen EFIS Control Display Unit (ECDU) for the InSight Display System. Designed for efficiency, the Touch ECDU provides fast, easy access for InSight user control and input. This latest offering further improves the InSight Display System, providing the ultimate in operator choice; the ECDU is now available in touchscreen or non-touchscreen versions.

**STANDARDAERO CELEBRATES 500TH CFM56-7B DELIVERY**

StandardAero recently celebrated the delivery of the company’s 500th CFM International CFM56-7B turbofan engine from its world-class overhaul facility in Winnipeg, MB, Canada. This milestone engine powered a Boeing 737 Next Generation passenger jet operated by a major North American airline supported by StandardAero via offload agreements with its valued partner GE Aviation. StandardAero launched its CFM56-7B program in June 2009.
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IT’S TIME FOR A BETTER APPROACH.
United Technologies Corp. (NYSE:UTX) reported first quarter 2019 results and increased its full year adjusted EPS outlook for 2019.

“United Technologies is off to a strong start in 2019,” said UTC Chairman and Chief Executive Officer Gregory Hayes. “Sales were up 20 percent with all four businesses contributing to the robust 8 percent organic growth in the quarter. Earnings and cash flow exceeded our expectations for the quarter reinforcing our confidence in the full year financial outlook, including our improved adjusted EPS range of $7.80 to $8.00.” Hayes continued: “We made significant progress this quarter on the integration of Rockwell Collins and saw excellent performance from the combined Collins Aerospace business. Preparations for our portfolio separation are progressing well, and we remain on track to establish Otis and Carrier as independent companies in the first half of 2020.”

First quarter results exceeded expectations primarily due to better than expected Collins Aerospace and Otis results as well as a slightly favorable effective tax rate. Net income in the quarter was $1.3 billion, up 4 percent versus the prior year. Cash flow from operations was $1.5 billion and capital expenditures were $363 million, resulting in free cash flow of $1.1 billion. In the quarter, Collins Aerospace commercial aftermarket sales were up 64 percent and up 9 percent organically. Collins Aerospace commercial aftermarket sales were up 12 percent on a pro forma basis including Rockwell Collins. Pratt & Whitney commercial aftermarket sales were up 1 percent. Pratt & Whitney continues to expect commercial aftermarket sales to be up mid-single digits for the full year. Equipment orders at Carrier were down 2 percent organically in the quarter after being up 10 percent in the first quarter of 2018. Otis new equipment orders were down 2 percent organically in the quarter after being up 10 percent in the first quarter of 2018. Otis new equipment orders were down 2 percent organically in the quarter and up 3 percent on a rolling twelve month basis.

UTC updates its 2019 outlook and now anticipates:
• Adjusted EPS of $7.80 to $8.00, up from $7.70 to $8.00;
• There is no change in the company’s previously provided 2019 expectations for sales of $75.5 to $77.0 billion, including organic sales growth of 3 to 5 percent and free cash flow of $4.5 to $5.0 billion, including $1.5 billion of one-time cash payments related to the portfolio separation.

United Technologies First Quarter 2019 Results

Textron Aviation reported a higher-than-expected quarterly profit, benefiting from robust aircraft deliveries, sending its share up 1.6 percent in early trading. Citation deliveries for the three months that ended March 30 totaled 44, a 22 percent increase over the 36 jets it shipped a year ago, while commercial turboprop deliveries also totaled 44, up 51 percent from 29 in the first quarter of 2018. Aviation segment profit in the quarter was $106 million on revenue of $1.1 billion, up 47 percent and 12 percent, respectively, from a year ago.

Textron CEO Scott Donnelly said they expect deliveries of its long-delayed super midsize Longitude jet to begin in earnest in the third quarter after a certification process. On Textron Aviation’s new product front, he said the company continues to anticipate first flights of the Cessna Denali turboprop single and SkyCourier high-wing turboprop twin by year-end.

Textron re-affirmed its full-year profit outlook range of $3.55 to $3.75 per share. Sales in the company’s aviation business, its biggest, rose 12.3 percent to $1.13 billion in the first quarter, while sales in the systems unit fell more than 20 percent to $307 million. The company’s net income fell to $179 million in the quarter ended March 30 from $189 million a year earlier. Textron earned 76 cents per share, above analysts’ average estimate of 68 cents, according to Refinitiv data. Textron’s revenue fell 5.7 percent to $3.11 billion, below analysts’ estimates of $3.17 billion.

Bell delivered fewer helicopters in the first three months of the year but still raised profit. For the first quarter, Bell delivered 30 commercial helicopters compared with 46 in last year’s first quarter. Profit was up by $17 million a year ago to $104 million, while revenue slipped 2 percent in the same period to $739 million.

Bell’s backlog at the end of the quarter was $6.3 billion, a $459 million increase from the end of 2018.

Textron Aviation Deliveries Climb in First Quarter
FINANCIAL YEAR 2018: MTU AERO ENGINES AG ONCE AGAIN POSTS RECORD FIGURES

MTU Aero Engines AG once again set new records in the financial year 2018. Revenues increased by 17% from €3,897.4 million in 2017 to a new high of €4,567.1 million. The group’s operating profit reached a new record level of €671.4 million, similarly beating the previous year’s result by 17% (2017: €572.5 million). Net income also surpassed the previous record of €404.9 million, set in 2017, growing by 18% to €479.1 million.

“MTU Aero Engines AG continued to drive profitable growth in 2018. By not only achieving our target figures, but also slightly surpassing them, we reliably met our commitments to the capital market,” said Reiner Winkler, CEO of MTU Aero Engines AG, summing up the provisional annual results for 2018 at a presentation on Wednesday, February 20, 2019. MTU revised its earnings forecasts upwards twice in the course of the year, for the second time in October, targeting revenues of around €4.4 billion in 2018. The earnings forecasts were for an EBIT adjusted of approximately €660 million and net income adjusted of approximately €470 million in 2018. “We successfully strengthened our already good market position in both of our operating segments – OEM and MRO – in 2018, thus establishing a basis for future growth. In 2019, we are aiming at new record figures,” said Winkler.

Outlook for 2019
MTU expects to generate revenues of around €4.7 billion in 2019. “All business units are geared for growth,” added CFO Peter Kameritsch. In 2019, the commercial series production business looks set to become the fastest growing segment with an organic revenue increase in the low teens. Revenue growth in the mid- to high-single-digit percentage range is projected for the spare parts business in 2019, while revenues in the military engine business are expected to grow by 10%. MTU’s revenue forecast for its commercial maintenance business is for an organic growth rate in the high-single-digit percentage range. MTU expects its EBIT margin adjusted to reach around 15.5% in 2019 (2018: 14.7%). Operating profit and net income adjusted are expected to increase in equal measure (EBIT adjusted, 2018: € 671.4 million, net income adjusted, 2018: € 479.1 million). The cash conversion rate, defined as the ratio between free cash flow and net income adjusted, is projected between 50 and 60% (2018: 42%).

GOGO ANNOUNCES FULL-YEAR 2018 FINANCIAL RESULTS

Gogo (NASDAQ: GOGO), the leading global provider of broadband connectivity products and services for aviation, announced its financial results for 2018.

- Consolidated revenue increased to $893.8 million.
- Service revenue increased to $630.1 million, up 2% from 2017, due to growth in our BA segment that was partially offset by the decline in CA NA service revenue driven by the de-installations.
- Equipment revenue increased to $263.6 million, up from $81.2 million in 2017, due to the post-adoption impact of ASC 606 and the 34% annual growth of BA equipment revenue.
- Net loss decreased to $162 million, an improvement of 6% from 2017, primarily related to the continued strong performance of our BA segment.
- Adjusted EBITDA increased to $71.2 million, up 22% from $58.5 million in 2017, related primarily to strong results in our BA segment and, secondarily, related to decreased losses in the ROW segment.
- Capital expenditures decreased to $131.7 million in 2018 from $280.2 million in 2017.
- Cash CAPEX decreased to $107.6 million from $220.5 million in 2017, driven by an increase in installations under the airline-directed model.

Recent Developments
- On December 6, 2018, Gogo closed its offering of $238 million of 6% convertible senior notes due in May 2022. This effectively extended the maturity of approximately $200 million of our outstanding convertible senior notes from March 2020 until May 2022.
- Gogo surpassed 1,000 2Ku aircraft online and ended 2018 with nearly 1,300 commercial aircraft installed with satellite IFP systems and approximately 1,000 2Ku aircraft in backlog as of December 31, 2018.
- As of February 20, 2019, Gogo had experienced no incidents of 2Ku system degradation on aircraft fitted with Gogo’s recent de-icing modifications. Gogo estimates that aircraft with Gogo de-icing modifications have now flown 15,000 flights that had been de-iced, based on Federal Aviation Administration (FAA) data listing airports under de-icing conditions.
- The Airbus A220 has now entered revenue service with Delta offering both 2Ku and Gogo Vision Touch.
- Gogo completed its first satellite IFP installation on a Boeing 787-800 aircraft using a service bulletin.
- As of February 6, 2019, BA had shipped more than 770 AVANCE systems (L3 and L5) with over 500 L5 systems installed and in operation.

Business Outlook
The company provides its 2019 financial guidance as follows:

- Total consolidated revenue of $800 million to $850 million
- CANA revenue of $355 million to $380 million, with ~10% from equipment revenue
- CA-ROW revenue of $135 million to $150 million, with ~30% from equipment revenue
- BA revenue of $310 million to $320 million

Note that CA equipment revenue is affected by the number of installations completed under the airline-directed business model in the period. 2019 revenue guidance reflects the impact of one airline switching from the airline-directed business model to the turnkey business model, which will reduce equipment revenue.

- Adjusted EBITDA of $75 million to $95 million
- $100 million improvement in Free Cash Flow versus 2018
- Increase of 400 to 475 in 2Ku aircraft online
PIEPE

AVIIA has just welcomed Don Hitch into the dedicated role of vice president - Customer Success. Hitch joins the business with a firm understanding of how to optimize luxury assets, having established and successfully ran the (Part 91) flight department for California’s The Wonderful Company LLC as vice president of Aviation. He brings 35 years’ experience in Part 91, 135, and 125 flight operations as both pilot and manager.

Universal Avionics (UA) announced that Dror Yahav has been appointed to the position of chief executive officer for the company. Yahav transitions to CEO as his predecessor, Paul DeHerrera, retires after 25 years of service with UA. Yahav, a commercial aviation pilot, has 22 years of experience as a pilot, flying fighters, trainers, and commercial airplanes.

Dror Yahav

US Senior Sales Manager for UA Robert Randall announced that David Carter has been appointed to the position of regional sales manager for Northwestern US. In his new position, Carter will support UA Authorized Dealers and Integrators in Washington, Oregon, Nevada, Idaho, Utah, Montana, Wyoming, Colorado and New Mexico. He is based in Kansas City, Kansas US.

The company also appointed Marc Bouliane to the newly created position of vice president of Strategic Business Development. In this position, Bouliane will work with UA’s senior leadership team to enhance the strategic planning process at UA and lead market development activities at the corporate level towards OEMs (airframe and avionics) and the Airline market. In addition, he will spearhead the development of strategic partnerships to complement UA’s offering.

Airbus has appointed Julie Kitcher as executive vice-president at Communications and Corporate Affairs. In this role, she joins the Airbus Executive Committee leading all external and internal communication activities, reporting to Guillaume Faury, Airbus Chief Executive Officer. In her new role, Julie will steer and coordinate the transformation agenda of Airbus and manage Audit, Performance Management, Responsibility and Sustainability and Environmental Affairs, in addition to her position as the Chief of Staff to the CEO.

Julie Kitcher

John Aviation announced that Jose Costas has joined its Aircraft Sales and Acquisitions team covering EMEA & Asia Pacific regions. Building on the success of Duncan Aviation’s presence in Europe, Costas joins current Duncan Aviation aircraft sales expert, Tim Barber, who is based in London and has worked with Duncan Aviation since 2017. Barber and Costas will provide brokerage, consignment and acquisition services to clients throughout the world.

Also at Duncan, Trevor Yuschyshyn has accepted the position of regional manager representative for Canada and Jeff Schipper has accepted the manager of Modifications position at the newest Duncan Aviation full-service facility, which is located in Provo, Utah. A lifelong resident of Calgary, Alberta, Yuschyshyn brings more than 23 years of aviation experience and knowledge to his new role. And Schipper, in this position, will provide leadership for the Interior, Avionics Install and Avionics Line departments and for the next several months, his primary focus will be on growing and strengthening the teams’ capabilities and sizes, and responding to the facility’s growing market needs.

The company also appointed Clint Strong to the newly created position of vice president of Unmanned Systems Training programs for drones.

Flying Colours Corp. Asia PTE. Ltd., based at Singapore’s Seletar Aerospace Park, has a new general manager to oversee its continued growth. Too Hin Wee takes over from Paul Dunford who has been GM of Singapore since inception. Dunford has stepped up to the newly created position of managing director of International Operations. Hin Wee reports directly to Dunford whose role encompasses supporting the implementation of Flying Colours’ global strategy.

Jet Aviation announced that Jeremie Caillet has been appointed vice president VIP Completion Programs. In his new role, Caillet will be responsible for the successful execution and delivery of all VIP Completions projects, while providing leadership and direction for all aspects of VIP Completions programs. In addition, he will collaborate across all operational departments and matrixed global support functions to support the company’s OneJet program. He reports directly to Dirk Sapatka, General Manager Basel.

Meanwhile, Dave Paddock has been appointed as the new president of the Jet Aviation Group. Paddock succeeds Rob Smith, who has served the company in this role since 2014.
Michael Kussatz

Kussatz has accepted the position as new regional avionics sales manager, and he’ll be supporting avionics install sales for our East Coast Satellite Avionics Shop network.

The British Business General Aviation Association has elected Aoife O’Sullivan, partner and co-founder of The Air Law Firm, as its new chair and Alex Durand, CEO of aircraft charter and management company SaxonAir as vice chair, a new role. O’Sullivan takes over from Marwan Khalek who has held the position for eight years. His company Gama Aviation Plc has been closely involved with BBGA and its predecessor GAMTA since Gama’s start in 1983. Khalek announced his decision to step down at the AGM at Luton Hoo, highlighting it was time for a successor.

Aerion announced that Matthew Cram has been named deputy general counsel, supporting the company in a variety of legal, contractual and corporate governance matters as it develops the AS2 supersonic business jet. Cram, who has extensive experience in commercial and corporate law, corporate governance and compliance in the aerospace industry, has served in a variety of contractual, legal and administrative positions at Aerion. Also at Aerion, Douglas Coleman has been named general counsel and executive vice president, Governance and Compliance. As Aerion’s chief legal officer, Coleman will oversee all legal matters, contracts, compliance and corporate governance programs as the company develops the AS2 supersonic business jet.

Hal Martin has been named vice president, Global Supply Chain at Aerion, and will oversee a growing network of world-class suppliers contributing to the AS2 supersonic business jet program. Martin brings substantial experience in managing international supply chains at major aerospace companies, and in driving continuous improvement in supply chain performance through Lean Six Sigma strategies.

Samantha Stinson has been hired as a manager at Greteman Group. “Samantha brings a unique mix of people skills and analytical proficiency,” says Ashley Bowen Cook, agency vice president and brand director. “Her aviation knowledge and experience sealed the deal.”

David Davenport, Co-CEO and President, Commercial, of FlightSafety International, has been elected President of The Wings Club Foundation. The Board of Governors voted to elect Davenport during the Wings Club Annual Meeting held on March 27. He will serve a one-year term. As president, Davenport will set the strategic direction of the foundation for the upcoming year. He will serve as chairman of the Executive Committee and preside over the annual meeting, board meetings, Annual Awards Gala and Aviation Leader Series Luncheons.

Bombardier announced the appointment of Steeve Robitaille as senior vice president, General Counsel and Corporate Secretary. Bombardier Inc. Robitaille will succeed Daniel Desjardins who will continue to serve as a special advisor to Alain Bellemare, president and chief executive officer, Bombardier Inc., and as chairman of Bombardier Transportation’s Board of Directors.

West Star Aviation announced that Mark Crotty has been named the program manager for Embraer at their East Alton facility. Crotty will be responsible for the Embraer program at the full-service Authorized Service Center.

Comlux announced the appointment of Domingo Ureña Raso as executive vice president of Comlux Completion, its center of excellence in VIP completions and services based in Indianapolis.

TAG Aviation Maintenance Services has announced the appointment of Thierry Barré as managing director, to be based at TAG’s primary Farnborough Airport UK location. Cyrille Pillet, who was the previous MD of Farnborough Maintenance Services, will now focus his attention on the base maintenance service operations for TAG Aviation at group level. As part of TAG Aviation Maintenance Services’ harmonization initiatives, Pillet will now be responsible for overseeing operations at the two main centers of Farnborough and Geneva.

Hartzell Propeller has named JJ Frigge as executive vice president and general manager. In his expanded role, he will be the company’s business leader with a focus on long-term strategy. “JJ earned this promotion by combining strong personal talents and values with hard work, great judgement, and a deep commitment to our department teams,” said Hartzell President Joe Brown.

Embraer made the announcement that Paulo Cesar de Souza e Silva concluded his tenure at the end of April and now supports the transition process of the company as senior advisor of the Board of Directors. Embraer, following shareholder approval of the transaction with Boeing, announces that he concluded a successful professional cycle with the company on April 22, 2019, which is the end of his current two year elected term.

Gulfstream Aerospace has expanded its senior leadership team to meet the company’s growing number of aircraft programs, manage its worldwide supply chain and innovate for the future. New appointees to the leadership team include Colin Miller, former vice president of Flight Operations, Gulfstream, and Greg Collett, former vice president, Initial and Final Phase Manufacturing, Gulfstream. Leading international aviation fuel products and services supplier, Air BP, has announced the appointment of Daniel Tyzack as managing director, Asia Pacific. Tyzack will be responsible for operations in the Asia Pacific region as well as strategy development and execution. He will be based at Air BP’s Melbourne, Australia office reporting to CEO Jon Platt.
The Business Aviation community has long been committed to reducing greenhouse gas (GHG) emissions from aircraft, and takes its environmental responsibilities very seriously, with a proven record of advances in emissions reduction. Our industry actively promotes investment in, and development of, innovative products, procedures and policies aimed at reducing its overall environmental footprint.

The industry’s commitment to emissions reduction was further strengthened through the publication in November 2009 of the Business Aviation Commitment on Climate Change. The commitment contained three aspirational goals; improve fuel efficiency by 2% per year from 2010 until 2020; achieve carbon-neutral growth from 2020 onwards, and to reduce CO₂ emissions by 50% by 2050 (relative to 2005).

These goals will be met through four pillars: more efficient operations, infrastructure improvements, market-based measures and technology, including the development and deployment of sustainable alternative fuels.

Key to reaching this goal has been the research, development, production and use of Sustainable Alternative Jet Fuels (SAJF). A technically focused Steering Committee – formed under the auspices of the General Aviation Manufacturers Association’s Environment Committee – has been working hard toward the day that SAJF becomes a reality.

The events of the past year illustrate that such a day is getting ever-closer at hand. In May 2018, as part of the European Business Aviation Convention & Exhibition (EBACE), a coalition of aviation organizations unveiled The Business Aviation Guide to Sustainable Alternative Jet Fuels – a practical educational tool and roadmap for introducing SAJF.

In January 2019, the introduction of SAJF was made reality at California’s Van Nuys Airport (VNY) with “Business Jets Fuel Green: A Step Toward Sustainability”. The event, which included demonstration flights fulfilled the industry’s twin objectives; underscore the commitment from Business Aviation toward sustainability and prove the viability of SAJF.

A New Initiative to Build on the Industry’s Strong Emissions Record

In support of the “technology” component of the Business Aviation commitment, a coalition of Business Aviation organizations also unveiled a guide focused on raising awareness and adoption of available and emerging alternative jet fuel options. Titled “The Business Aviation Guide to the Use of Sustainable Alternative Jet Fuels (SAJF)”, this useful resource provides a
roadmap for the education about and use of SAJF. The guide has been authored by an aviation coalition, which includes the European Business Aviation Association (EBAA), the General Aviation Manufacturers Association (GAMA), the International Business Aviation Council (IBAC), the National Business Aviation Association (NBAA) and the National Air Transportation Association (NATA). Each of these stakeholder groups signed a Declaration of Support at EBACE 2018 for the guide upon its introduction.

In the guide, three key themes are outlined:

- **SAJF are safe and available today.** They have been tested by manufacturers of aircraft, engines and components, to ensure their reliability and safety, in the air and on the ground.

- **SAJF offer many benefits.** Within both the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), as well as the European Union (EU) Emissions Trading Scheme, there will be credit for the use of SAJF. Their use allows operators and others in industry to achieve corporate social responsibility goals, and demonstrates the industry’s commitment to addressing climate change. Alternative fuels may also provide improved efficiency, reduce operating costs and extend flight-range capabilities.

- **SAJF are a “win-win-win” for all stakeholders.** With these types of fuels – several of which are based on feedstocks ranging from cooking oil, plant oils, municipal solid waste, waste gases, sugars, purpose-grown biomass, and some crops and agricultural residues – sustainability is a vital component. Even when considering the emissions produced in growing, transporting, harvesting, processing and refining the inputs, there are significant reductions in carbon lifecycle emissions, compared to fossil fuels.

From a practical standpoint, the aim of this SAJF Guide is very clear: answer questions and allay any concerns that operators, fixed-base operators (FBOs), owners, pilots, fuel providers, airports and others may have about the performance, safety and appropriateness of using sustainable alternative jet fuels wherever they are available.

From a global standpoint, our aim with the SAJF initiative is equally certain: Business Aviation is an industry with a past, present and future commitment to emissions reduction, globally and locally. This investment in promoting alternative fuels reflects this reality.

**The Next Chapter in the Business Aviation Industry’s Journey to a Lower Carbon Future**

With this in mind, we are preparing the Business Aviation industry’s next step on its journey toward a lower carbon future. On Saturday 18 May 2019, the coalition behind the SAJF Initiative and Business Aviation SAJF Guide will demonstrate its commitment in-action one year since its launch through a multifaceted event at TAG Farnborough Airport, titled ‘Fueling the Future’.

We are hosting ‘Fueling the Future’ at TAG Farnborough Airport for a reason: it is the first carbon neutral Business Aviation airport in the world run by Airports Council International Europe (ACI EUROPE). Aircraft from many major manufacturers will be displayed on a static display right outside the event, and will fuel up on SAJF during the event in the afternoon session. After this, demo flights will be carried out demonstrating the viability of Sustainable Alternative Jet Fuels, and head on to EBACE 2019 in Geneva for more sustainability and SAJF debates.

More information on the current and future activities of Business Aviation and SAJF can be found here: www.futureofsustainablefuel.com

**EBAA CALLS FOR INCLUSIVE EUROPEAN AVIATION FRAMEWORK**

European Business Aviation calls for an inclusive European Aviation Framework to enable improved connectivity, efficiency, European competitiveness and regional cohesion across the continent. Global passenger traffic is expected to double by 2037 and accommodating this fascinating growth is a major challenge for the European air transport industry and governments. It will require new standards, technologies, harmonized regulations and adequate infrastructure.

On the occasion of Romania’s European Council Presidency, aviation regulators and industry experts met to discuss key topics for the air transport industry in the region.

In this conference, EBAA Secretary-General Athar Husain Khan said: Business Aviation can make an even more significant contribution to local communities and economies because we fly where others don’t. As such we need to ensure that the European Aviation framework is inclusive, taking into account the specific needs and challenges of our sector.”

For instance, since the start of the Romanian European Council Presidency in January, Business Aviation traffic in Romania has increased by 25% compared to the same period in 2018. This demonstrates the everpressing need for the closely tailored, flexible, point-to-point air transportation for governments, businesses and local communities in the most time-efficient way possible that Business Aviation provides.

But Business Aviation is not just a time machine. New technologies such as electrification, VTOL (Vertical Take-Off and Landing), blockchain, artificial intelligence, and alternative fuels are igniting the pace of innovation in aviation. And nowhere is it more prevalent than Business Aviation – the industry that sets the bar for air travel.

These much-needed improvements and technological advances will only be made possible if the EU is able to provide the adequate infrastructure for Business Aviation operators in Europe. In particular, access to airports and airspace which remain major hurdles for our sector.
The annual European Business Aviation Convention & Exhibition (EBACE) traditionally serves not only as the premier showcase for Europe’s Business Aviation community, but also as a forum to discuss the very latest developments across the diverse spectrum of the industry. The 2019 edition of EBACE, coming to Geneva’s Palexo convention center from 21-23 May, will continue this important role with a series of informative and forward-looking education sessions addressing a variety of leading-edge technologies.

Thousands of business leaders, government officials, manufacturers, flight department personnel and all manner of people involved in nearly every aspect of the industry will meet at EBACE 2019, where they’ll be able to speak directly with representatives with hundreds of exhibitor companies, including aircraft manufacturers and financiers, service providers, legal specialists and more throughout three exhibit halls.

A short distance away at Geneva Airport (GVA), more than 50 of the most advanced business aircraft available will be on static display – ranging from mid-range and intercontinental jets, to piston-engine and turboprop aircraft and helicopters – providing attendees the valuable opportunity to examine a vast range of aircraft of all sizes, and for all missions.

As in years past, EBACE 2019 will also provide an important venue to continue the vital dialogue between regulatory authorities and business leaders in the region about the benefits of Business Aviation. The event will feature an impressive roster of speakers from across the European aviation spectrum who will offer their thoughts about the state of Business Aviation across the continent, as well as several emerging technologies that hold promise for the industry.

For example, the EBACE2019 Innovation Zone will feature a detailed discussion about the move towards electrically-powered aircraft that has gained drastic momentum within the aerospace industry in recent years and holds promise for many Business Aviation applications, particularly in Europe. Other Innovation Zone sessions will examine the cost, security and data sharing benefits of blockchain technology, current and future applications for artificial intelligence and machine-learning technologies within the industry and the evolving mobility landscape.

These discussions are among the more than a dozen scheduled education sessions throughout EBACE2019, including discussions regarding the ongoing “Brexit” situation and the need to maintain access to airports used by Business Aviation throughout the continent.
Another key aspect of the industry is the desire to reduce its carbon footprint. Although global Business Aviation operations represent but a tiny fraction of overall CO2 emissions, the industry is committed to exploring ways to further improve on this figure, and one of the most promising options is the use of sustainable alternative jet fuels, or SAJF.

These fuels – derived from a broad variety of renewable sources and blended with petroleum jet fuel, resulting in a cleaner-burning mixture that, operationally, is indistinguishable from straight Jet-A – will be in focus as never before at EBACE2019, illustrating the industry’s long-standing commitment to reducing its already small emissions footprint.

Several Business Aviation stakeholders will recognize the 10th anniversary of the Business Aviation Commitment on Climate Change, which identified SAJF among other initiatives, for further reducing overall emissions in Business Aviation. Over the past year, as part of that commitment, a coalition of international Business Aviation organizations sponsored a U.S. demonstration day at California’s Van Nuys Airport (VNY) to prove the fuels’ viability and safety.

Building upon last year’s introduction of the Business Aviation Guide to the Use of Sustainable Alternative Jet Fuels (SAJF) at EBACE, this year’s event will feature the first European SAJF demonstration day to be held 18 May at Tag Farnborough London Airport, just ahead of EBACE2019. The industry’s commitment to SAJF adoption will also be discussed as part of an overall EBACE show preview, during the 20 May EBACE Media Luncheon, and the show’s opening day of 21 May will feature an SAJF-focused technical panel discussion at the EBACE Innovation Zone.

Sponsored by the European Business Aviation Association (EBAA) and the National Business Aviation Association (NBAA), EBACE2019 promises to be an indispensable event for anyone using or planning to use a business aircraft throughout the European region as well as a catalyst for continued growth, innovation and advocacy of the global Business Aviation industry. Simply put, if you use aviation for business, you will want to be in Geneva for EBACE2019.
EBACE 2019, which will take place from May 21 to 23 in Geneva, is much more than just a showcase of the newest and most modern aircraft, products and services. The agenda also includes a wealth of educational sessions and ample opportunity to network with over 13,000 Business Aviation professionals.

Volker K. Thomalla reports

EBACE 2019: TAKING-OFF INTO A GREENER FUTURE

EBACE is a must-attend event for every Business Aviation professional, and its scope is by no means limited to Europe. In fact, the 19th edition of the show will highlight two global topics that are crucial to the future of the industry: sustainability and the upcoming ADS-B mandate.

EBAA and NBAA, who co-organize the show, expect to welcome over 400 exhibitors this year to Geneva’s Palexpo exhibition halls. Meanwhile, outside the exhibit hall OEMs and aircraft brokers will fill up Geneva Airport’s dedicated EBACE apron with more than 50 aircraft, on par with last year’s numbers. (There’s a waiting list because ramp space in Geneva is limited due to ongoing construction work at the airport). The static display is conveniently located right next to Palexpo and can easily be reached in minutes by a shuttle bus service provided by the show organizers.

A Green Future

As sustainability is one of the major topics on the agenda, most aircraft on display will have flown into Geneva using bio-fuel or a mix of conventional Jet fuel and Bio-fuel, thus underlining the importance the industry is giving to its own sustainable development. Aviation is the only global industry so far that has committed to a carbon-neutral growth from 2020 and to cut emissions by 50% (from 2005 levels) by 2050. In some parts of the world, Business Aviation has started implementing ICAO’s CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) program, showing that the future of our industry is green.

Tick Tock

As BART International has written before, the ADS-B clock is ticking. Aircraft flying in North American airspace after December 31, 2019 must be compliant. There will be no extension of the deadline. At the end of March, NBAA President and CEO Ed Bolen and acting FAA administrator Dan Elwell issued a reminder to the Business Aviation community to install ADS-B Out equipment on their aircraft before the deadline. “Without ADS-B, your operation will not be able to continue flights into any of the nation’s largest metropolitan areas,” reads the letter. “Additionally, you will be required to fly at lower, less efficient altitudes. If you have not yet installed rule-compliant ADS-B Out equipment, or scheduled an appointment, we encourage you to do so as soon as possible.”

In Europe, all aircraft flying faster than 250 knots and/or with a maximum take-off-weight of more than 5.7 tons have to be ADS-B compliant after June 7, 2020. Lucky for you, EBACE is the right place to meet with MRO providers and compare options for your aircraft!
SAVE THE DATE FOR THE PREMIER BUSINESS AVIATION EVENT IN EUROPE

Join thousands of business leaders, government officials, manufacturers, flight department personnel and all those involved in business aviation for the European Business Aviation Convention & Exhibition (EBACE2020), which will take place at Geneva’s magnificent Palexpo from 26 to 28 May. This is the perfect venue for investors considering aviation as a business opportunity; companies thinking of using an aircraft for business; and flight departments who have long used aircraft as a valuable business tool. Save the date and visit the website to learn more.

SAVE THE DATE | ebace.aero

EBACE
26-28 MAY 2020 | GENEVA
Business Aviation likes big aircraft. According to Honeywell’s latest market outlook, the super midsize through ultra-long-range segment is expected to account for more than 87% of all expenditures and 62% of all units of new business jets in the next five years, while midsize business jets will account for 10% of all units. Likewise, in its 10-year market forecast, Jetcraft predicts that the large jet category will constitute 32% of total sales and 64% of total revenue over the next decade.

In this ‘go big or go home’ market, is there still room for the little guy? According to the Honeywell forecast, although small cabin jets will only account for 6% of all expenditures, this represents 28% of all new business jet sales. Furthermore, a recent report by Research and Markets shows the Light Jet market growing at a compound annual growth rate (CAGR) of 5.68% until 2021.

In other words, even if they tend to get overshadowed by their larger brethren, the light jet market demands attention.

Although Business Aviation may be shifting towards widebodies and long-range jets, the light jets have an important role to play – and deserve our attention.

Nick Klenske reports

The World’s Most Delivered Light Jet

Embraer Executive Jets contribution to the light jet segment includes the Phenom 100EV and Phenom 300E, the latter of which was named the world’s most delivered light jet by the General Aviation Manufacturers Association (GAMA). This is the seventh consecutive year that the jet has achieved this mark, having accrued more than 490 deliveries since entering the market at the end of 2009.

“The Phenom 300’s continued success in the market is a reflection of our commitment to fascinate customers and deliver the ultimate customer experience in Business Aviation,” says Embraer Executive Jets President & CEO Michael Amalfitano. “The revolutionary interior design of the Phenom 300E adds even more value to this already popu-
lar model, reaffirming our commitment to continue to invest in true innovation.”

The Phenom 300E has a high-speed cruise of 435 knots and a six-occupant range of 1,971 nautical miles (3,665 km) with NBAA IFR reserves. The aircraft is capable of flying at 45,000 feet (13,716 meters), powered by two Pratt & Whitney Canada PW335E engines with 3,360 pounds of thrust each. It boasts a spacious cabin, large baggage compartments and some of the largest windows in its class. It also features distinct temperature zones for pilots and passengers, a wardrobe and refreshment center, voice data communication options and an entertainment system.

Light Jet Options

 Textron Aviation has by far the largest business jet portfolio of any OEM, which includes three different types in the light jet category alone: Citation M2, Citation CJ3+ and the Citation CJ4 (with the Mustang having been discontinued). Although the Citation Latitude remains the company’s top seller, with 57 aircraft shipped in 2018, its CJ3+ and CJ4 lines all saw increases – increases that helped offset drops in M2 deliveries and the end of the Mustang program.

According to the company, the single-pilot Citation CJ3+ has the best-in-class acquisition and operating costs, seating for nine passengers, up to 1,000 lbs. of baggage capacity and a maximum range of 2,040 nautical miles. The CJ3+ incorporates G3000 touch-screen avionics and high-speed internet capabilities such as LinyaUs to provide real time diagnostics. When equipped with the Garmin GDL59 (Wi-Fi Datalink) and Garmin GSR56 (Iridium Satellite Receiver), LinyaUs technology works with the Central Diagnostics Maintenance system (CDMS) to monitor the aircraft 100% of the time. In the event of an onboard issue, actionable answers are provided in real time, resulting in faster turnaround to get the aircraft back in the air.

Very Good Numbers for a Very Light Jet

With 37 jets delivered worldwide, the very light HondaJet remains the most delivered aircraft in its class, based on GAMA numbers. “The HondaJet finishing as the most delivered aircraft for the second consecutive year is a testament to our team’s dedication to developing cutting-edge technologies that improve the lives of our customers around the world,” says Honda Aircraft Company President & CEO Michimasa Fujino.

2018 saw the company reach a number of important milestones, including the introduction of the HondaJet Elite, the creation of the APMG performance package and the 100th customer delivery. The HondaJet Elite offers a 17% increase in range and a lower cabin noise level.

Another Milestone for the Learjet Family

For Bombardier, the light jet is synonymous with the Learjet. Specifically, the Learjet 70 and Learjet 75. Earlier this year, the Learjet surpassed the 25 million flight-hour mark. In celebration, Bombardier announced that Learjet 70 and Learjet 75 operators will benefit from lengthened intervals between recurring major powerplant inspections, which have been extended from 3,000 to 3,500 engine hours. The extension directly benefits the Learjet Family.

The Learjet platform is designed to deliver immediate returns as a business productivity tool, and reliability and longevity are two of the reasons customers continue to choose Learjet as the most trusted light jet platform,” says Bombardier Business Aircraft Senior Vice President of Worldwide Sales and Marketing Peter Likoray.

Likoray notes that Bombardier continues to invest to support its in-service fleet and the Learjet family. Recently, the company announced a comprehensive Garmin G5000 avionics upgrade, which will allow customers to optimize their routes and pave the way for future technological enhancements. The upgrade is offered as a forward and retrofit for in-service Learjet aircraft.

A Pilot’s Airplane

One of the newest entrants in the field is the Pilatus PC-24. As of last October, the company had delivered a dozen of its Super Versatile Jets to customers in the US, Switzerland, Luxembourg and South Africa — with at least another dozen expected to be in customer operation by the start of this year.

Already, the feedback is good. “Flying the PC-24 is an absolute thrill – it is truly a pilot’s airplane,” says Western Aircraft Chief Pilot Scott Marshall on flying the PC-24 serial number 102. “Whether hand flying in cruise or on approach, the aircraft is one of the most stable and forgiving that I have ever flown.”

“With a larger choice of runways and higher cruise speed, we can significantly reduce point-to-point travel time, making the PC-24 a true game changer,” adds PlaneSense President and CEO George Antoniadis.

Maybe this hits the nail on the head: “There’s just some places that will always remain inaccessible to the larger business jets. And this is where the light jet comes in – ensuring that Business Aviation continues to live up to its promise of access, any time and anywhere.”

CAPACITY

The Learjet 75 beats its competitors in cabin volume, boasting 364 cu ft.
A nyone at EBACE 2014 clearly remembers the news, as it was definitely one of the most important events of that show. Within just 36 hours of having opened the order book for its new PC-24 Super Versatile Jet, Pilatus had registered orders for 84 aircraft. This took production through mid-2020 and forced the company to close its order book (in part to avoid speculation).

The PC-24 obtained its basic certification on December 7th, 2017. The first aircraft was delivered in February 2018 and a total of 23 aircraft were delivered last year. This year, 40 customer deliveries are planned, with 50 more slated for next year. Last year, Pilatus Chairman Oscar Schwenk told BART that his company was planning to accept new orders in 2019, which means that most certainly the Swiss manufacturer will re-open its order book at EBACE 2019 – so expect yet another customer rush to the Pilatus booth!

Special Deliveries
Apart from deliveries to standard customers, which are progressing as planned, Pilatus has started to deliver PC-24s to ‘exotic’ customers. The very first MEDEVAC aircraft was handed over last November to the Royal Flying Doctor Service of Australia (RFDS Western Operations). Configured for patient transport, this PC-24 was especially developed to meet the particular needs of the RFDS.

“The PC-24 will become the emergency ward in the sky and will almost half the time for long-haul critical patient scenarios,” says Schwenk. “I am positive that the PC-24 will ideally supplement the existing fleet of PC-12s of the RFDS.”

The interior was installed under a supplemental type certificate procedure in partnership with Aerolite AG, a Swiss company specializing in aircraft medical interiors. The RFDS Western Operations is the first organization to specifically use the PC-24 for medevac evacuations. The RFDS Central Operations will follow during 2019.

Last fall, Jetfly, a fractional ownership operator founded in 1999 and based in Luxembourg, took delivery of its first PC-24. The company is an old Pilatus customer. Though it started its operations with TBM 700s, it very quickly opted for PC-12 turboprops as its customers wanted a larger aircraft (with toilets!). Since 2000, Jetfly has ordered 22 PC-12s, and it now operates the largest fleet in Europe. Customers of this company with operational bases in Geneva and Paris each own a share in an aircraft, which entitles them to hire it, normally within a day’s notice. Up to now, Jetfly has ordered four PC-24s, but others should be added soon.

Two months ago, the Swiss government officially took delivery of the PC-24 it ordered in 2014. Due to its range (2,000 nm/3700 km), the new “Swiss Air Force One” aircraft will be used primarily for travel within Europe. According to Schwenk, other governments will likely follow suit, adopting the PC-24 once they see “the unrivaled opportunities and flexibility that the aircraft offers”.

PILATUS REOPENS THE ORDER BOOK

Five years on, Pilatus is preparing to reopen its order book for its flagship PC-24.

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Differentiating midsize from super-midsize business jets is not always easy. Following the belief that ‘bigger is better’, some manufacturers have upgraded certain borderline models in name only. Regardless, each category has its own pros and cons. For example, according to NetJets, which operates jets from both categories, midsize jets are an ideal choice for passengers seeking transcontinental travel, additional luggage capacity and more headroom. On the other hand, super-midsize jets win in terms of their intercontinental range, higher cruise speed and more comfortable cabin featuring state-of-the-art onboard technology. Aircraft prices start at $16.75-million (for the Citation Latitude) and go up to $33-million (for the Dassault Falcon 2000 LX).

Below is a look at some of the main models currently on the market.

**Bombardier Challenger 350**

With a true seats-full/tanks-full 3,200 nm (5,926 km) range capability, Bombardier has positioned the Challenger 350 as the definitive super midsize jet – a claim backed by the fact the OEM delivered 60 of the aircraft in 2018, capturing 58% of the market. The 350 offers a direct climb to 43,000 feet to stay clear of weather and traffic, as well as the widest cabin in its class, a convenient flat floor, unlimited access to baggage, a smooth ride and low direct operating costs. The Challenger 350 can connect New York City to Van Nuys or Las Vegas to Honolulu non-stop. Last year, the aircraft completed its steep approach certification flight test campaign and performed several takeoffs and landings at London City Airport to demonstrate this important operational capability.

**Cessna Latitude, Longitude and Sovereign+**

Since its entry into service in 2015, the Citation Latitude mid-size jet has been certified in 43 countries, with the global fleet surpassing 65,000 flight hours. With a four-passenger range of 2,700 nm (5,000 km) at high-speed...
to Cessna, its extended maintenance intervals provide owners with the lowest direct operating costs in the midsize segment.

Last December, Textron announced that its Cessna Citation Longitude super-midsize jet had achieved provisional type certification (PTC) from the FAA. This allows operators to begin flight training in preparation for deliveries and paves the way for the program’s final phase of certification. According to Textron Aviation President and CEO Ron Draper, activity and interest in the aircraft remains strong as customers experience its capabilities firsthand. The Longitude flight test program, including functional and reliability testing, is complete. During testing, the aircraft completed more than 1,650 flights and accumulated more than 4,050 hours. Longitude production is also underway.

With a range of 3,500 nm (6,480 km) and full fuel payload of 1,600 lb (726 kg), the Longitude has a low cabin altitude (5,950 ft/1,814 m). With seating for up to 12 passengers, including an optional crew jump seat, it features the next evolution of the Garmin G5000 flight deck and is powered by FADEC-equipped Honeywell HTF7700L turbofan engines with fully integrated autothrottles with envelope protection. The Longitude has been designed to feature one of the longest maintenance intervals in its class – 800 hours or 18 months – which should make it one of the most cost effective to operate in its category.

A twin-engine midsize business jet capable of flying 3,000 nm (5,556 km), the Sovereign+ is an upgrade to the original Citation Sovereign that began customer deliveries in 2004, which itself was built on the success of the original 340+ sales. It has a new Garmin avionics suite and redesigned supercritical wings that feature range-enhancing winglets – a first for this family of aircraft. Its Pratt & Whitney Canada PW306D engines provide more than 5,900 pounds of thrust, meaning the Citation Sovereign+ offers a maximum range of 3,200 nm (5,926 km), speeds up to 460 kts and a direct climb to 45,000 feet. It can reach this altitude in 27 minutes and needs only 3,530 ft of runway to take off and 2,600 ft to land. With Textron Aviation’s wireless cabin-technology system and redesigned interior options, the Sovereign+ boasts one of the longest and most comfortable cabins in its class, with max seating for up to 12 passengers.

Citation Hemisphere

Sitting at the upper limit of the super-midsize bizjets, the in-development Citation Hemisphere will give loyal customers a next-step-up option. According to Cessna, the Hemisphere will have a flight range of 4,500 nm (8,335 km), breaking the long-held belief that a typical Citation cannot cover more than 4,000 nm (7,400 km). Cessna claims the Hemisphere will have the largest cabin in its class, providing enough room for 12 passengers. Powered by two Safran Silvercrest engines delivering over 12,000 lb (5,440 kg) of thrust and lowering fuel consumption by up to 15%, it will have a top speed of Mach 0.9 and will incorporate a full fly-by-wire (FBW) flight control system. With these advanced features, the Citation Hemisphere demands attention and is sure to be one of the most sought-after jets in its class when it’s finally available for sale.

Dassault Falcon 2000S and 2000LXS

To develop the Falcon 2000S, Dassault started with the original Falcon 2000 platform. With redesigned wings, enhanced engines, an advanced cockpit and improved maintenance features, the 2000S is, according to Dassault, a business jet for customers who want a full size Falcon at a midsize price. With a range of 3,350 nm (6,200 km), the Falcon 2000S is ‘a bird of a different feather’. By this, the company means ‘it’s a big cabin jet without the big cabin costs, offering more aircraft at a cost of operation normally associated with smaller jets’.

More than 550 Falcon 2000 series aircraft are in service today, making them one of the most popular and successful Falcons ever. Optimized in the Falcon 2000LXS, this widebody aircraft offers a 4,000 nm (7,410 km) range and excellent efficiency. With its fully slatted wings, it delivers an exceptional balance of range and airfield performance, especially from
challenging airports with steep approach angles, such as London City and Lugano, Switzerland. At maximum takeoff weight, the 2000LXS uses 1,000 ft (305 m) less runway than its closest competitor. Also, one of its greatest advantages is that it can land at over 90% of its maximum takeoff weight – something many of its competitors cannot do.

**Gulfstream G280 and G350**

The G280 has accumulated more than 60 city-pair records since entering into service in November 2012. It can operate at steep approach airports like London City and can fly four passengers for 3,600 nm (6,670 km) at Mach 0.80. The G280 is propelled by two Honeywell HTF7250G engines that help it climb to 43,000 ft (13,100 m) in approximately 20 minutes. The aircraft’s cabin includes industry-leading cabin sound levels, a vacuum lavatory and 19 super-sized windows.

Earlier this year, Gulfstream reaffirmed its commitment to sustainability by using sustainable alternative jet fuel (SAJF) to power a record-breaking flight by the G280. The Savannah to Van Nuys, California journey covered 2,243 nm (4,154 km) in 4 hours and 49 minutes at an average speed of Mach 0.85 while flying through headwinds averaging 76 kts.

Although the G350 falls next in line to the G300, its interior features, aerodynamic design and advanced cockpit are more like its superior counterpart, the G450. The only difference is the range: The 350’s range is 3,800 nm (7,030 km), while the 450’s is 4,350 nm (8,050 km). The G350 is fitted with the Honeywell Primus Epic avionics suite. The highly advanced PlaneView cockpit of the 450 is also found in the G350. It is comprised of four liquid crystal displays and the first Gulfstream Enhanced Vision System (EVS) with Honeywell 2020 Heads Up Display (HUD). With these advancements, pilots have greater situational awareness and safety.

The G350 is powered by two Rolls Royce Tay Mark 611-8C engines. Each engine produces 13,850 lb (6,280 kg) of thrust. With this amount of power, the jet climbs to 37,000 ft (11,270 m) in 15 minutes, one minute faster than the 300. Its certified flight ceiling is 45,000 ft (13,700 m).

**Embraer Praetor 500 and 600**

Last October, Embraer introduced its new Praetor 500 midsize and Praetor 600 super-midsize business jets. For Embraer Executive Jets President and CEO Michael Amalfitano, the Praetors introduce unprecedented range into their categories. The Praetor 600 will be the farthest-flying super-midsize business jet, which allows nonstop flights between London and New York, while the Praetor 500 will be the fastest midsize aircraft, capable of reaching Europe from the west coast of the US with a single stop. With four passengers and NBAA IFR Reserves, the Praetor 600 will have an intercontinental range of 3,900 nm (7,220 km) and the Praetor 500 will have a continental range of 3,250 nm (6,020 km).

According to Embraer, the Praetors are the only midsize and super-midsize business jets with full fly-by-wire technology and active turbulence reduction. Both jets feature the state-of-the-art Rockwell Collins ProLine Fusion flight deck with the industry-first vertical weather display, air-traffic-control-like situational awareness with ADSB-In, and predictive wind shear radar capability. The Praetor cockpits will also offer options that include the Embraer Enhanced Vision System (E2VS) with a Head-up Display (HUD) and an Enhanced Video System (EVS), an Inertial Reference System (IRS) and a Synthetic Vision Guidance System (SVGS).

The Praetor jets are currently in development, with two Praetor 600 prototypes in flight tests, as well as one production-conforming aircraft each for the Praetor 600 and 500. The Praetor 600 is expected to be certified and entered into service just before EBACE, followed by the Praetor 500 in the third quarter of 2019.
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While the large cabin/long-range segment of the industry does not lead the market in terms of units, it will continue to lead the market in terms of value. Honeywell Aerospace’s market forecasters predict that operators will continue to focus on larger-cabin aircraft classes, ranging from the Super Mid-size through ultra-long range, which are expected to account for more than 87 percent of all expenditures for new business jets in the next five years. The used aircraft inventory in the large cabin class is drying up slowly, releasing the pressure on pricing and driving the demand for new aircraft. For the time being, Bombardier, Dassault Aviation and Gulfstream – and to some extent Embraer – are competing for customers in this market segment with brand-new, better performing and more comfortable and productive aircraft types than ever before. Textron Aviation is about to enter this market segment with its all-new Citation Hemisphere in the future. Customers for this class of aircraft include large corporations and high net worth individuals as well as governments and special mission operators.

Bombardier Business Aircraft started delivering its brand-new Global 7500 ultra-long range jet to customers on December 21st last year, eight years after program launch. The GE Aviation Passport powered jet is the largest and longest aircraft in Bombardier’s Business Aircraft portfolio. Transport Canada had certified the 7,700nm aircraft in September, followed by the FAA in November and most recently in February this year, by the European Aviation Safety Agency (EASA).

Bombardier took its flagship to a record-setting 8,152 nautical miles flight in early March. The Global 7500 took off from Singapore’s Changi Airport at 7.12am local time and touched down at Tucson International Airport in Arizona at 8.19am local time. The arrival con-
included the longest range business jet flight in history, according to Bombardier. It is remarkable that the aircraft landed in Tucson with fuel reserves well above NBAA requirements; 4,300 lb of remaining fuel represented nearly 1.5 hours of additional flight time. The first Global 7500 to have entered service amassed 170 flight hours in the first three months of operation.

The Global 7500 cannot only connect cities which are far apart, but it can also fly fast. In late March it flew from Westchester County Airport in White Plains, New York, to London Luton Airport in 5 hours and 26 minutes with an average speed of Mach 0.92 and a top speed of Mach 0.925. This same week, the aircraft flew from Los Angeles to New York in 3 hours and 54 minutes, sustaining a speed of Mach 0.925 for more than two hours. If this record is certified by the U.S. National Aeronautics Association, it will be the fastest subsonic Business Aircraft flight between these two economic metropoles.

For passenger comfort and productivity, the Global 7500 offers four distinct living spaces in its cabin, which is by the way the longest in the industry. Bombardier is ramping up production of its newest flagship in and targets to hand over between 15 and 20 Global 7500 in 2019.

In 2018, the Canadian manufacturer had delivered 23 of its large cabin Challenger 650 as well as 41 Global 5000/6000. Three of the 23 Challenger 650 headed to Switzerland’s Aeromedical Evacuation company Rega where they serve as ambulance jets, replacing Challenger 604s. “It is with the utmost confidence and pride that we deliver a third Challenger 650 aircraft to our partners at Rega,” said David Coleal, President, Bombardier Business Aircraft in December. “Confidence because we know these aircraft have the reliability that is so important when lives are on the line, and pride to see the Challengerplatform configured into the world’s most advanced air ambulance.”

The three Challenger 650 aircraft, with their widest-in-class cabins, were specially outfitted with two state-of-the-art intensive care units including two patient beds. Bombardier’s signature smooth ride provides a comfortable environment during any special mission.

“Gulfstream and Qatar Executive have been good partners since we announced the G500 and their intention to be its international launch customer,” said Mark Burns, president, Gulfstream. “We are proud to deliver these aircraft just four years later and after the most rigorous flight-test program Gulfstream has conducted. Qatar Executive’s world-renowned executive charter service is gaining mature, high-performing aircraft that set new standards in safety and comfort.”

Gulfstream Aerospace of Savannah, Georgia, has earned FAA certification of its G500 long range jet in July 2018. The Pratt & Whitney Canada PW800 powered aircraft entered into service in September 2018 with a North American customer. The first international delivery of the clean-sheet followed soon thereafter. Qatar Airways’ Qatar Executive took delivery of two G500 at the end of December last year.
Gulfstream Aerospace has tested the G500 rigorously. Even before FAA certification, the new jet toured the world to give customers firsthand access to the aircraft, its Symmetry Flight Deck and its interior. During the tour, the G500 flew nearly 130,000 nautical miles (240,760 kilometers) and set no less than 22 city-pair speed records. In total, the G500 has already achieved nearly 30 city-pair speed records. This by itself is a record for a brand-new aircraft.

The G500’s larger sibling, the ultra-long range G600 should have been certified by the authorities by now. But during the flight testing the engineers discovered the full potential of the aircraft which is capable of a range of 5,500 nautical miles (10,186 kilometers) at high speed cruise of Mach 0.90, a 700nm (1,296 km) increase over the targeted range. When Mark Burns announced the newest range increase, he said: “The incredible high-speed performance of the G600 is a testament to our engineering and design teams. As part of our continuous improvement culture, they have enhanced this aircraft’s capabilities, ensuring we continue to best our customer’s expectations. We started with a range projection of 4,800 nautical miles at Mach 0.90, increased that to 5,100 nautical miles in 2017 and are now at 5,500 — proving once again that delivering more than we promised is a Gulfstream tradition.” The G600 made its Australian debut at the Australian International Airshow in February. Asia-Pacific is a critical region for large cabin aircraft. Of the 335 Gulfstream jets in that region, 290 are large cabin jets. FAA certification of the G600 is expected anytime soon.

But Gulfstream Aerospace has more record-setting large cabin aircraft in its portfolio. The G650 family has more than 85 speed records established. The G650 and G650ER can accommodate up to 19 passengers. The G650ER has proven that it can easily connect Los Angeles to Melbourne, Australia – it did so in 14 hours and 58 minutes, which is needless to mention, a new record. No question that G650 and G650ERs are in high demand. A year ago, in April of 2018, Gulfstream Aerospace has delivered the 300th unit only five years after entry-into service.

The French OEM Dassault Aviation reported a stable order intake for 2018. Customers placed orders for 42 new Falcons and took delivery of 41 aircraft. At the Business Aviation trade show MEBAA 2018 in Dubai, Dassault Aviation had exhibited its flagship Dassault Falcon 8X in the static display, which attracted a lot of attention. But the trade fair visitors were equally interested in the Falcon 6X, which the French manufacturer is currently developing. The so-called Preliminary Design Phase is completed and the design of the twin-engine business jets is now frozen. Designers have already begun designing parts and components as part of the detail design phase. “We are on schedule with the Falcon 6X to begin deliveries in 2022,” said Eric Trappier, Dassault Aviation Chairman and CEO at the NBAA-BACE show last October.

The Falcon 6X has the same fuse-lage and cabin diameter as its predecessor the Falcon 5X which was cancelled due to problems ongoing with the Safran Silvercrest engine. With a cabin length of 12.30 meters, a maximum cabin width of 2.58 meters and a cabin height of 1.98 meters, the 6X offers around 15 percent more cabin volume than the 5X. The 6X has the largest cabin width of all business jets, except business jets that have been developed out of airliners. Dassault has now produced a second cabin mock-up to show the cabin to potential customers of the 6X. It is
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SPACIOUS
The Legacy 650 is larger than the majority of large jets.

based in Paris Le Bourget, while the first one is based in Teterboro, New Jersey in the US.

While the designers still work on details of some parts, the production of complex parts with long lead times has already begun. Parts that have already been manufactured include components of the stern and of the fuselage midsection. “The development schedule is unusually tight for a program such as this,” Trappier noted. “However, there is a good level of embedded maturity in aircraft and component design and we are very confident of achieving a first flight in 2021.”

Engine manufacturer Pratt & Whitney Canada provides both PW800 turbofans for the Falcon 6X. The engine cowling comes from UTC Aerospace Systems. They are in an advanced design stage. Pratt & Whitney Canada has also begun flight testing of the PW812D for the 6X. The aircraft has a range of 5,500 nautical miles (10,186 kilometers) thanks to its efficient engines, sophisticated aerodynamics and abundant fuel reserves. This allows routes such as Los Angeles - Geneva, London - Los Angeles or Sao Paulo - London with long-distance cruising speed. With a cruising speed of Mach 0.85, the Falcon 6X still manages city pairs like Moscow - New York, Paris - Beijing or Paris - Johannesburg nonstop. The 47 million US dollars (38.44 million euros) twin-jet can accommodate up to 19 passengers. However, a typical seating will accommodate 12 to 14 passengers in three separate lounge areas and a number of layout options, including a large entryway, a crew rest area, and a spacious rear lounge. The Falcon 6X’s extra-large windows (30 total) provide abundant natural light, with nearly 5,300 square inches of glass and the highest percentage of window area of any aircraft in its class. The 6X also features an industry-first skylight in the normally dim galley area. And, like the 8X, the Falcon 6X will feature the quietest Business Aircraft cabin in the sky, states Dassault.

The Brazilian manufacturer Embraer has left a footprint in the large cabin market with its Legacy 650 and Legacy 650E. The aircraft type is a derivative of the regional jet ERJ-135. Nearly 300 Legacy 600/650 have been produced and handed over to customers so far. In 2018, the manufacturer added another four Legacy 650 to the worldwide fleet. German charter operator Air Hamburg operates the largest European fleet of this type. They own no less than 15 Legacy 600/650/650E with an additional two scheduled to arrive in the first half of 2019.

Textron Aviation intends to compete in the large-cabin market segment with its Citation Hemisphere, the largest Business Jet ever built by the company. The 4,500 nautical mile range, fly-by-wire jet was to be powered by Safran Aircraft Engines’ Silvercrest turbofan, the engine that killed the Falcon 5X. Textron Aviation had frozen the development of the Hemisphere in April last year. In October, NetJets, the largest fractional-ownership company in the world announced that it is ready to order up to 150 aircraft of this type if Textron will build it. In July this year, Safran’s Silvercrest engine needs to pass some critical tests after which Textron will decide how to proceed with the Hemisphere program. There’s no doubt about it that the tests will not only be monitored by Textron Aviation but all other manufacturers as well because these tests decide whether there will be a new competitor in this market segment anytime soon or not.
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The market for turbo-propeller aircraft has strengthened, sparking innovation and upgrades among the offerings. Traditionally, turboprop airplanes are divided into two broad classifications, pressurized business aircraft and utility planes for whom a pressurized cabin is not required. Business turboprops have become further divided into single-engine and twin-engine designs, and, with the looming introduction of Textron’s SkyCourier twin, along with Viking Air’s Twin Otter, we see the utility market also being split into single and twin variants.

Are two engines necessary? It depends on the mission requirements. Certainly, from the standpoint of safety, not just for redundant power to sustain flight but to provide extra environmental and electrical sources, having two engines makes sense. The facts tend to say otherwise, however, because turbine powerplants run with great reliability if managed well, so the chances of an engine failure in a turbine single is statistically remote. A conventional twin-engine airplane with wing-mounted engines, on the other hand, requires skillful handling to stay aloft with one engine inoperative, potentially increasing the chances of an accident after an engine failure. The market shows there’s room for adherents to both camps.

Examining the broad range of choices in the array of turboprop offerings shows amazing variety. We’ll look at each supplier, noting changes for this year.

**Beechcraft**

The marque “Beechcraft King Air” is fairly synonymous with “multi-engine turboprop” after years of dominance in that market segment. Parent Textron Aviation has responded to its King Air customers with continuous upgrading and strong support, giving choices ranging from a thoroughly-capable entry-level King Air C90GTx to the ubiquitous King Air 250 and the superlative King Air 350i, which is adaptable for special missions as the 350ER. The 10,485-lb C90GTx seats up to 6 passengers, often owner-flown but frequently professionally-crewed as well. The larger King Air 250, with its distinctive T-tail, holds 7 or more in its cabin, but with a takeoff weight of 12,500 lbs normally does not require a type rating for its pilots, while the 15,000 lb 350i carries up to 9 passengers in a double-club seating arrangement.

As unveiled at EBACE 2018, the King Air 350i’s Collins Pro Line Fusion flight deck now has...
improved iTAWS integrated terrain warning, along with standard multi-scan radar and mobile app uploading of flight plans. These improvements were expected to be integrated into the King Air 250 as well.

In October 2018, Textron announced the offering of a special “King Ranch” themed edition of the King Air 350i, featuring exterior and interior appointments associated with the iconic King Ranch cattle ranch in southern Texas, USA. The King Ranch edition of the 350i will be available in mid-2019.

Blackhawk and Raisbeck Modifications

No overview of the Beechcraft King Air would be complete without discussion of the modifications available to existing King Airs. In particular, Blackhawk Modifications, Inc. offers engine upgrades to the stock Pratt & Whitney Canada PT6-A powerplants that enhance performance for King Air models. The latest Blackhawk effort replaces the King Air 300 and 350’s PT6A-60A to larger –67A engines, giving increased horsepower at altitude for sustaining climb rate and boosting cruise speed.

Raisbeck Engineering has an extensive track record of creating aerodynamic and propeller modifications for Beechcraft King Airs, so popular that it’s rare to see a King Air without one or more Raisbeck improvements, some installed at the factory under STC. Aft fuselage strakes are most popular, along with ram-air recovery engine nacelles, wing storage lockers and maingear doors.

Most of the buzz around Cessna turboprops centers on the development programs of two entirely-new models, the Cessna Denali pressurized single and the twin-engine SkyCourier utility airplane. Textron announced the Denali, a direct competitor to the best-selling Pilatus PC-12NG, in 2016, and it is expected to enter service in mid-2020. Powered by a 1240-hp GE Catalyst engine, the Denali will have a Garmin G3000 flight deck and will seat up to 11, its cabin featuring a forward airstair door and an aft cargo door.

Textron’s Cessna SkyCourier twin, on the other hand, is to be a versatile cargo-and-passenger hauler like the Caravans, featuring fixed landing gear and seating up to 19 in its unpressurized cabin. In freighter configuration, the SkyCourier will carry 6,000 pounds, or three LD3 containers. Cruising at up to 200 knots and ranging out to 900 nmi, it will be powered by Pratt & Whitney PT6A-65SC engines and have Garmin G1000 NXi avionics. The SkyCourier is also slated to enter service in 2020.

910 remains available with a G1000 NXi system.

In January, the austral summer, two TBM owners flew their airplanes across Antarctica, starting from Santiago, Chile. And in March a Chicago-based TBM 930 flew non-stop from New York to Paris, breaking a world speed record set by a TBM 700 in 1994.

Daher has announced the opening of a new customer support base at Toussus-le-Noble aerodrome, southwest of Paris, supplementing the factory service center at Tarbes in southern France. With Part 145 approval by EASA and FAA, the new support base will be able to work on both European and U.S. registered TBMs.

Epic

The Epic E1000 carbon-fiber composite single-engine pressurized turboprop remains in pursuit of certification. Late last year, the Bend, Oregon, USA company announced it was hoping to receive type certification in early 2019.
Seating six, the E1000 is powered by a 1200-shp P&W PT6A-67A engine and is expected to cruise at 325 knots, with a service ceiling of 34,000 feet.

**Mahindra Aerospace**

Based on an earlier piston-powered Airvan 8, Mahindra Aerospace’s Airvan 10, as its name says, is a rugged fixed-gear unpresurized utility airplane. Powered by a Rolls Royce 450-shp M250-B17F/2 engine, the Airvan 10 carries 9 passengers at an average 150 knots cruise speed. A belly cargo pod adds 660 lbs. of capacity to a readily-convertible cabin.

**Pilatus Aircraft**

The leading single-engine turboprop business airplane, the Pilatus PC-12NG, may currently live in the shadow of its sibling PC-24 jet, but it shows no sign of slowing its dominance of the SETP market. Powered by a 1200-shp flat-rated P&W PT6A-67P engine, the PC-12NG seats up to 9 passengers and offers convertability to bulk cargo with a big aft cargo door. Cruising at a maximum of 285 knots, it can also offer a VFR range of 1845 nmi, even with over 1000 pounds of payload, thanks to a 10,450-pound takeoff weight.

**Piper Aircraft**

Piper has had a good run of business in 2018 and is looking forward to continued success in 2019, bolstered by strong performance from its flagship M600 single-engine turboprop and sistership M500. Both seat six persons and are powered by P&W PT6A-42A engines, producing 500 shp in the M500 and, logically, 600 shp in the M600. The latter model was introduced in 2016, featuring increased takeoff weight and fuel capacity, along with an upgraded Garmin G3000 panel. The M600 cruises at 274 knots, ranging to 1658 nmi, while the M500 has a cruise speed of 260 knots and a range of 1000 nmi.

**Quest**

Quest Aircraft, builders of the Kodiak 100 single-engine turboprop, introduced the Series II block change package in late 2018, including a single-point fueling option, the Garmin G1000 NXi panel upgrade and numerous interior and cockpit improvements. Over 250 Kodiak 100s are in the field, filling a broad set of roles from a personal utility airplane to bush flying to corporate shuttles. Various interior options are available from those suited for rugged backcountry use to luxurious executive cabins. Seating up to eight passengers, the Kodiak 100 cruises up to 174 knots with a maximum range of 1132 nmi, using a 750-shp P&W PT6A-34 engine.

**Viking Air Ltd.**

Viking Air is holder of the type certificates for all out-of-production de Havilland Canada aircraft and the Canadair aerial firefighting airplanes. Viking Air currently produces an improved DHC-6 Twin Otter Series 400 utility twin turboprop, an unpresurized fixed-gear aircraft that has filled many roles in its history. A legendary bush and charter performer that is adaptable to land, water and snow surfaces, the Twin Otter can work well under harsh conditions. Nota bene. We do not mention the Piaggio Avanti or the One Aviation Kestrel; both being in bankruptcy at this time and their future being uncertain.
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In the last several years, Aerion has been assembling a team of high-profile partners and suppliers as it works to put together its AS2 Supersonic Business Jet.

Nick Klenske reports

Rome wasn’t built in a day – and neither is the first supersonic business jet. But for the Aerion AS2, things are starting to fall into place. In fact, partners and suppliers are being announced at such a rapid clip it’s hard to keep track of who’s who and who is doing what.

Most recently, Aerion and Spirit AeroSystems announced a collaboration agreement for the preliminary design of the AS2’s forward, pressurized fuselage. “Joining a project team this early allows us to apply our technical expertise and commercial best practices to have the most positive impact,” says Spirit AeroSystems President & CEO Tom Gentile. “We can create cost-efficient, innovative engineering solutions that take into account Spirit’s highly-efficient manufacturing processes.”

Then of course there was the big news of the partnership with Boeing. As part of the partnership, Boeing will also provide engineering, manufacturing and flight test resources, as well as strategic vertical content. Boeing replaces Lockheed Martin as a partner.

“Through this partnership that combines Aerion’s supersonic expertise with Boeing’s global industrial scale and commercial aviation experience, we have the right team to build the future of sustainable supersonic flight,” says Steve Nordlund, Vice President and General Manager of Boeing NeXt, a division dedicated to working with industry partners to lead the responsible introduction of a new mobility ecosystem.

Engines and Cockpits

As to the engine, at NBAA-BACE last October, GE Aviation announced the initial design of Affinity, the first supersonic engine purpose-built for business jets. The twin-shaft, twin-fan turbofan is optimized with proven GE technology for supersonic flight and timed to meet the Aerion AS2 launch.

Up front, Honeywell Aerospace is collaborating with Aerion to bring a revolutionary new cockpit to the AS2. “Honeywell will deliver a comprehensive connected aircraft solution that will enable operators to reach their destinations faster than ever before, maximizing their productivity while providing an exceptional travel experience,” says Carl Esposito, President, Electronic Solutions at Honeywell.

Time to Assemble

Put all these pieces together and what you get is a 12-passenger supersonic business jet capable of traveling up to 70% faster than today’s business aircraft. But before the AS2 can start cutting off three hours on an Atlantic crossing and more than five hours across the Pacific, it first needs to be assembled.

So where will the AS2 be assembled? According to Aerion Vice President for Marketing and Communications Jeff Miller, that announcement will likely have to wait until this summer. “We’re very actively pursuing site selection,” he says. “After all, we have to have a place to assemble all these structures!”
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UTC Aerospace Systems and Rockwell Collins are now Collins Aerospace.
Unless you have been asleep you should know about the upcoming ADS-B mandates. The FAA has mandated that aircraft operating in airspace that now require a Mode C transponder must be equipped with ADS-B Out by January 1 2020, while the European mandate comes into effect on June 6 2020. With the deadline being some months away, the worry is that aircraft operators will delay the upgrade until it is too late.

There are operators who are pushing ahead with ADS-B Out installs. But are supplier finding that customers are equipping their aircraft with far more than ADS-B? We asked the industry to find out.

Kevin Kliethermes, director of sales for Flying Colours, said: “Every project is a little bit different. But some customers are undertaking their ADS-B Out updates as part of a maintenance package, which might include refurbishment activities at the same time. We see just as many people who are looking at it from a budget perspective are going to take advantage of the ADS-B mandate this year and put off other work until 2020. If they don’t have a maintenance package a lot of times they will just put off major avionics upgrades until later,” he said.

Kliethermes said he would put the figure at about 50/50. That is, 50% of customers are choosing to do other maintenance work as well as the ADS-B work.

He added that about 70% of Flying Colours customers have maintenance packages. “As far as the aircraft downtime goes, they would rather put the aircraft down and do a lot of work at worse rather than multiple times,” Kliethermes said. “But it is depending upon where they are in the maintenance cycle. It is fairly rare that we see customer wanting only ADS-B out, although it does happen.”

One problem is the amount of time now available. “A lot of companies have left it too long and there is a push now for sure,” he said. “It’s a conversation we have had with every single customer before, but there is now more of a sense of urgency, with only eight months to go.

“There will always be customers who will leave it until later in the year, which is when their maintenance packages is due. We are talking to them right now and ensuring that we have a slot by for them.”

So how far out is Flying Colours booking slots? “In some cases it can be six months out. For example, a Global Challenger customer might not be due a maintenance package check until later in the year. We are booking them in and making sure that we get the ADS-B equipment on order for them, and making a deposit to hold that slot,” he said.

So how much notice do they need to order in the equipment? “We haven’t run into any major shortages. If someone called and said could we do an ADS-B out installation next week, we probably could accommo-
date them, but normally it is more like two to three months notice," he said. “Even if the equipment is not new, but being sent back for upgrade, the shops need that amount of time to slot it in.”

Bill Stone, senior business development manager at Garmin, said: “Reality has set in. What we see in the broad market, from small piston-engined aircraft to full-blown business jets, is that people don’t like to take their aircraft out of service for extended purposes.

“Every time you take an aircraft out of commission it costs money, so it kind of makes sense to batch some of these things. In other words, if you are going to take an aircraft out of service you had better spend some more money on it at the same time,” Stone said.

Garmin said there were a lot of new products on the market – and a lot more coming. “We see very few ADS-B upgrades only right now. Aircraft that are eligible to use the GPS 3000 as an ADS-B position source include the Embraer E135/E145 and Legacy 600/650.

It also announced the availability and certification of its G1000 NXi upgrade for the Citation Mustang, which includes a robust set of features, such as SurfaceWatch, visual approaches, geographical map overlay within the HSI and more.

“The ADS-B updates have been in planning for almost a decade now and a lot of technology has caught up in the meantime.”

Stone also said that there are concerns about backlogs. “There was one forum post that said: ‘What is the current backlog on avionics shops?’ Some of them are getting frustrated. Most avionics shops currently have backlogs that go back six to nine months. I think this is because there are bigger jobs coming through,” he said.

“We don’t see any other mandates coming along. There are other ADS-B mandates around the world and there is talk of a CVR mandates too, but I don’t think we will see any wide-ranging mandates like ADS-B.”

Robert Clare, director of sales, Universal Avionics, had a similar story to tell. “We have been inundated with sales enquiries,” he said. “The mandates have spurred other upgrades for a couple of reasons.

“At Universal, the retrofit market has always been our forte and we try to capitalize on those opportunities. We don’t have a radio product for ADS-B, but we do have a FMS that contributes to that and we have made many sales on the back of it. On top of that a lot times we are finding that once operators get the go-ahead for the ADS-B mandate we often get to bundle other equipment in at a discount. They say what about this CPDLC or FANS stuff and we make a sale,” he noted.

They are being joined by other upgrades, such as low-cost autopilots, upgrades to glass displays and Electronic Flight Instrument Systems (EFIS), and Wide Area Augmentation Systems (WAAS),” Stone said.

Garmin recently announced a standalone and certified WAAS/SBAS GPS. The GPS 3000 meets DO-160 and DO-178B standards and is also designed to interface with select Flight Management Systems (FMS) to support GPS guidance throughout terminal, en-route and approach navigation.

“So definitely I think mandates can kind of kick people to look at what else they can do. On the other hand, there are operators who don’t really know what they are going to do with their aircraft and who will do whatever they can to keep it in the air,” Clare said and added that timing is starting to get tight.

UA is now offering the company’s authorized dealers and integrators two new Supplemental Type Certificate (STC) packages, available at no charge in many cases. The first is for ADS-B Out Data Pairing and the second supports installation of the InSight Display System.
The ADS-B Out Data Pairing Package supports installation by field approval for ADS-B Out with UA’s satellite-based augmentation system (SBAS) - FMS and either Honeywell or Rockwell Collins transponders.

Two MDL data packages are available to support installation of the InSight Display System STC for the Cessna Citation VII 650 model. The -1 MDL data package covers the full installation of the InSight display system, engine interface unit (EIU), TAWS class A, and UNS-1Fw SBAS-FMS with ADS-B Out function. The -2 MDL data package adds the optional eChart and Advanced Performance Databases.

“We are dedicated to providing unparalleled support to our authorized dealer/integrator network,” said Clare. “This is yet another tool to assist our dealers and integrators in streamlining installations and reducing installation costs. We have more than 250 dealers worldwide and our regional sales managers are saying they are booked up. The larger tier facilities are booked up and even the next tier down, they are getting booked up too,” he said.

“In my opinion I think this is going to go well into 2020 as there is no way that everything will get down by the end of the year. A lot of shops are scheduled out until beyond the first of the year. It has been a challenge to keep up with supply and demand, but that is good for us and good for the aviation industry,” Clare concluded.

It was a similar story from Honeywell Aerospace. Ron Smith, senior technical sales manager at Honeywell Aerospace, said that while they found their high-end customers were pretty well sorted, it was a mixed story at the mid and bottom end. “I don’t think that all the aircraft that need to be compliant will be sorted in time,” he said.

“What we find is that the older aircraft need new GPS systems installed as well. Everyone focused in on the transponder part of the ADS-B upgrade, but with some aircraft up to 30 years old plus, many of them have GPS units that are not compliant. “Older GPS systems need upgrading to being WAAS-capable. From a performance navigation perspective they also need Required Navigation Performance (RNP) and LPV approach capability. “So once we get people focused on ADS-B, we also find they need to upgrade their FMS as well,” he said.

Smith said that he was certain that a lot of aircraft will not be ADS-B compliant post January 2020. “Most of the installers I speak to are fully booked out,” Smith said.
WHAT IS ADS-B?

ADS-B is “automatic” because it requires neither pilot nor other inputs. It is “dependent” because it depends on data from the aircraft’s navigation system.

Pioneered originally in the USA, an ADS-B-equipped aircraft finds its own position using a global navigation satellite system (GNSS), typically GPS, and periodically broadcasts this position and other information to ground stations and other aircraft equipped with ADS-B.

ADS-B-equipped aircraft broadcast their precise position in space via a digital datalink (the global interoperable frequency is 1090MHz) along with other data, including ground-speed, altitude, and whether the aircraft is climbing, or descending. This broadcast capability is sometimes known as a “squitter”.

ADS-B receivers that are integrated into the air traffic control system or installed aboard other aircraft provide users with an accurate depiction of real-time aviation traffic, both in the air and on the ground – although this does require additional equipment to be installed on the aircraft.

Unlike conventional radar, ADS-B works at low altitudes and on the ground so that it can be used to monitor traffic on the taxiways and runways of an airport. It’s also effective in remote areas or in mountainous terrain where there is no radar coverage, or where coverage is limited.

One of the greatest benefits of ADS-B is its ability to provide the same real-time information to both pilots in aircraft cockpits and ground controllers, so that, for the first time, ADS-B equipped aircraft can both “see” the same data, as long as all aircraft in the vicinity are similarly equipped.

To ensure that the system is as compatible as possible with both older and newer technologies ADS-B can be used over several different data link technologies, including Mode-S and 1090MHz data link (in Europe).

The great thing about ADS-B is its automatic nature – the pilot concentrates on flying the aircraft and the system merrily transmits his position without any mechanical intervention.

It also benefits from its relative low cost when compared to other surveillance systems, such as radar, its high accuracy, and the fact that it can also support other airborne surveillance applications, which will enable many future updates.

The safety benefits of ADS-B are huge and include improved visual acquisition, especially for general aviation under visual flight rules (VFR) and reduced runway incursions.

While ADS-B therefore offers air traffic controllers useful information about aircraft in their area, some ATC providers were not convinced that it is currently suitable for use in high traffic volume areas, such as in the UK and Northern European airspace.

In the US, ADS-B equipment can also support Traffic Information Services -Broadcast (TIS-B), whereby details of all traffic known to an ATC system can be transmitted back to suitably-equipped aircraft.

There are two commonly recognized types of Automatic Dependent Surveillance for aircraft applications.

ADS-B Out transmits GPS-based position and other aircraft or vehicle information and implementation is now mandated in 2020 (more of that later). ADS-B In allows transmitted signals to be received by other aircraft as well as ground stations, but this is not part of the 2020 mandate.

There is no mandate for ADS-B “In.” However, this optional “In” capability — which receives the tracking data for display in the cockpit — should be a popular upgrade, since it can clearly enhance situational awareness by giving pilots a view of the same basic traffic data that ground controllers are monitoring on their scopes.

Additional in the US FAA inducements for adding ADS-B “In” include free datalink weather and various other flight information services.

But while ADS-B is quite well established in the USA, over here in Europe, pilots might be forgiven for being confused.

The European Commission (EC) issued a notice of proposed rule making (NPRM) announcing its intent to mandate carriage of ADS-B transponders. This was to apply to all aircraft, both European and non-European, but those weighing less than 12,500 pounds and with cruise speeds below 250 knots was to be exempt.

But the EC then delayed the mandate for ADS-B out in its airspace, with the new dates being June 8, 2016, for new aircraft and June 7, 2020, for retrofit.

This applies to aircraft with a civil registration operating IFR/GAT in Europe and with a maximum certified take-off mass exceeding 5,700 kg or having a maximum cruising true airspeed capability greater than 250 knots.

These are required to carry and operate Mode S Level 2s transponder(s) with Mode S Elementary Surveillance (ELS), Enhanced Surveillance (EHS) (for fixed wing aircraft) and ADS-B 1090MHZ Extended Squitter (ES) capabilities.

The revised date for retrofits is more closely aligned with the US ADS-B out mandate that requires the equipment to be operational in aircraft that fly where transponders are currently required after midnight on December 31, 2019.
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TOGETHER, WE ARE REDEFINING AEROSPACE
Large business jets cruise at a higher flight level than most commercial airliners, with some capable of climbing to altitudes of more than 50,000 ft (15,000 m) to fly above the weather and into smoother air. For this reason, new families of engines, which are setting new standards in terms of power and efficiency, have been developed using new materials, advanced design technologies and improved aerodynamics. The result has been game-changing reductions in fuel burn and noise emissions.

Five engine manufacturers are leading the way in this field. Here is a look at their latest innovations.

**GE Aviation**

The GE Aviation Passport engine officially entered service last December with the delivery of Bombardier’s first Global 7500. The high-thrust turbofan engine (described as a smaller-scale CFM LEAP engine) was selected by the Canadian manufacturer to power its Global 7000 and 8000 jets in 2010, and it completed its first flight in 2015. At the beginning of 2019, GE Aviation had completed 12 Passport engines. Production engines are manufactured and maintained at GE Aviation’s facility in Strother, KS, where an extensive production ramp-up continues as planned. Coupled with GE’s OnPoint – a full coverage, concierge, flight hour, service program – the Passport will maximize the Global 7500’s availability and long-term value.

Designed expressly for the large-cabin, global-range business aircraft market, Passport benefits from the breadth of GE’s large commercial engine experience. It includes a high-performance core similar to the CFM LEAP engine, which has accumulated more than 3 million flight hours since entering into service in 2016. “The 18,000 lb (8,160 kg) thrust Passport is more than just an engine – it is a uniquely conceived, integrated propulsion system comprising of the engine and cowling nacelle blended together into a unified design,” says Brad Mottier, Vice President and General Manager of Business and General Aviation & Integrated Systems for GE Aviation. “Passport’s advanced technology provides passengers with the ability to fly ultra-long-range with minimized cabin noise, meaning higher levels of comfort as they fly.”

Concerning future engines, at NBAA-BACE 2018 the company announced that it had completed the initial design of the first supersonic engine purpose-built for business jets. This new engine class, revealed as GE’s Affinity turbofan, is optimized with proven GE technology for supersonic flight and timed to meet the launch of the Aerion AS2 supersonic business jet.

Integrating a unique blend of proven military supersonic experience, commercial reliability and the most advanced business jet engine technologies, the Affinity is a twin-shaft, twin-fan turbofan controlled by a next generation Full Authority Digital Engine Control (FADEC) for enhanced dispatch reliability and onboard diagnostics. The Affinity is purposefully designed to enable efficient supersonic flight over water and efficient subsonic flight over land, without requiring modifications to existing compliance regulations. It is designed to meet stringent Stage 5 subsonic noise requirements and beat current emissions standards.
The next design review for the Affinity is set for 2020, which will be followed by detailed design and test article production. Aerion plans to fly its 12-passenger AS2 supersonic bizjet in 2023, with certification in 2025.

**Pratt & Whitney Canada**

After the decision by Dassault to drop the Safran Silvercrest engine for its Falcon 5X, Pratt & Whitney Canada offered the French manufacturer a new variant of its PurePower PW800 turbofan engine to power its new Falcon 6X. The PW812D engine (thrust 13,000 - 14,000 lb/5,900 – 6,350 kg) is optimized for high-flying, fast, long-range business jets and shares the same core technology used in Pratt & Whitney’s PurePower family of geared turbofan commercial engines, which has amassed more than 585,000 in-service hours.

The PurePower PW800 engine incorporates the latest generation of technologies to deliver double-digit improvement in fuel efficiency. It also sets a new ‘green’ engine standard for emissions with its advanced TALON X combustor, and its low-noise design and low vibration levels will result in an exceptionally quiet cabin for a more comfortable passenger experience. “With the new Falcon 6X, our PurePower PW800 engine will demonstrate its leadership in the long-range business jet category,” says Irene Makris, Vice-President, Marketing, Pratt & Whitney Canada.

The Falcon 6X is designed to have a top speed of Mach 0.90 and a maximum range of 5,500 nm (10,180 km). It will be able to fly directly from Los Angeles to Geneva, Beijing to San Francisco or Moscow to Singapore at long range cruise speed, or connect Moscow to New York, Paris to Beijing or Los Angeles to London at Mach 0.85.

**Honeywell**

With more than 1.7 million flight hours, the Honeywell HTF7000 family of engines has exceeded all expectations for reliability, durability and maintainability, providing business jet operators with outstanding performance and industry-leading fuel efficiency at a lower cost of ownership. From the beginning, the HTF7500E engine was designed with ‘built-in’ thrust potential to accommodate growth.

Perhaps this is part of the reason that Embraer has selected two engines from this family to power its new Praetor 500 and 600 aircraft. By taking advantage of the HTF7500E’s full power capability and excellent fuel efficiency, and through the addition of advanced winglets and fuel capacity, Embraer achieved a 3,900 nm (7,220 km) range for its Praetor 600 super midsize aircraft. Its midsize sibling, the Praetor 500, achieved a range of 3,250 nm (6,020 km).

For Brian Sill, President, Engines and Power Systems at Honeywell Aerospace, the HTF7500E is part of Honeywell’s growing HTF7000 family of engines. With a proven track record of class-leading reliability and low cost of ownership, this family has achieved more than 4 million flight hours. Designed for on-condition maintenance, the HTF7500E’s periodic inspections and standard maintenance are easily performed on-wing, reducing costly downtime. Line-replaceable components can be removed and replaced using common hand tools. The engine is designed to be environmentally friendly, with emissions well below the ICAO’s environmental protection standards.

**Rolls-Royce**

In May 2018, Rolls-Royce announced the launch of the Pearl, a new engine family for Business Aviation. The engine has been purpose-built and will be the sole engine for Bombardier’s latest business jets, the Global 5500 and Global 6500. The Pearl’s pioneering technology, combined with outstanding performance,
will support Bombardier’s Global family of aircraft in reaching new standards in the ultra-long-range corporate jet market.

The Pearl 15 is the first of the planned state-of-the-art Pearl engine family and marks the sixth new civil aerospace engine introduced by Rolls-Royce in the past ten years. The engine combines innovative technologies derived from Rolls-Royce’s Advance2 technology demonstrator programs, with proven features from the Rolls-Royce BR700, which is today’s leading engine family in Business Aviation.

Enabling travelers to travel farther, faster, quicker and quieter, the Pearl 15 will deliver up to 15,125 lb (6,860 kg) of thrust (ISA +15), thanks to the most efficient engine core available across the Business Aviation sector. Despite delivering up to 9% more thrust during take-off than the BR700, the engine will be two decibels quieter and operators will benefit from a 7% improvement in specific fuel consumption (SFC). As well as a new-generation Engine Health Monitoring System that introduces advanced vibration detection, the engine benefits from the incorporation of advanced remote engine diagnostics and bi-directional communications that allow for easy remote reconfiguration of engine-monitoring features from the ground.

The new engine, which has been developed at Rolls-Royce’s Center of Excellence for Business Aviation engines in Dahlewitz, Germany, has undergone a comprehensive test program and received EASA certification on 28 February 2018. The engine is currently undergoing flight tests at Bombardier’s Flight Test Center in Wichita, Kansas, supporting the planned entry into service at the end of 2019.

Last February, Rolls-Royce successfully tested a key component of its UltraFan engine design, developed according to the manufacturer to redefine the world of jet engines, delivering significant weight, noise and fuel burn reductions. For the first time, all composite elements of the Advanced Low Pressure system (ALPS), including fan blades, a fan case and annulus fillers, were tested together on a donor engine.

**Safran**

During NBAA-BACE 2018, Textron Aviation and NetJets announced an agreement for the option to purchase up to 150 Cessna Citation Hemisphere business jets, which are set to be powered by Safran’s Silvercrest engine. According to Olivier Andriès, CEO of Safran Aircraft Engines, the Silvercrest is the only existing model purpose-designed for the large-cabin premium bizjet segment. “We are thrilled with this joint announcement by two world leaders in the business jet market, a formidable springboard for the commercial success of the Hemisphere platform and the Silvercrest engine,” he says.

As the launch customer for the Citation Hemisphere program, NetJets is working closely with Textron on the design of the clean-sheet Citation Hemisphere which, apart from a low fuel consumption, a long range and a high cruise speed, will also deliver excellent performance on short runways, rate of climb and reduced environmental footprint.

A new-generation engine in the 9,500 lb (4,300 kg) to 12,000 lb (5,440 kg) of thrust class aimed at meeting the growing needs of premium business jet manufacturers, the Silvercrest is intended for long-range, large-cabin aircraft in the super-midsized category. The Silvercrest incorporates Safran Aircraft Engines’ top technologies, including optimized 3D aero design, active clearance control, and the ForeVision predictive maintenance system – to name only a few.

According to Andriès, the Silvercrest should offer 15% better fuel efficiency than any other powerplant in the 12,000+ lb (5,440+ kg) thrust category.
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According to CAE’s most recent Pilot Outlook, over 300,000 new civilian pilots will be needed to meet forecasted demand over the next 10 years. This includes over 50,000 new pilots for business aircraft. With the number of business pilots expected to grow from 55,000 today to over 65,000 in 2028, CAE forecasts that Business Aviation will require nearly 40,000 new pilots to replace today’s pilots – including the 20,000 that will likely leave the sector to move to the airlines.

To satisfy this need, flight simulation companies like CAE and FlightSafety International are looking for ways to develop better pilots, faster. For example, CAE is developing programs aimed at assessing and selecting the right candidates before they even start their training. During training, the company is looking to implement more classroom and simulator training components closer to where operators are based.

CAE is also trying to attract more female pilots, as women are grossly underrepresented in today’s pilot population. In fact, only 5% of all professional pilots are female. The company sees an opportunity to increase diversity while also broadening the civil aviation talent pool.

With pilot training being such a crucial issue, here’s a round-up of what’s happening at some of the major Business Aviation flight training companies.

CAE

In mid-March of this year, CAE confirmed the conclusion of its acquisition of Bombardier’s Business Aircraft Training (BAT) business for an enterprise value of $645 million. The Bombardier BAT business includes a modern fleet of full-flight simulators and training devices covering the Bombardier Learjet, Challenger and Global product lines, including the latest large cabin Global 5500, 6500 and 7500 business jets. According to the company, the acquisition expands CAE’s ability to address the training market for customers operating Bombardier busi-
ness jets, which at more than 4,800 aircraft, is one of the largest and most valuable in-service fleets of business aircraft in the world. The acquisition also serves to expand CAE’s position in the largest and fastest growing segment of the Business Aviation training market: medium- and large-cabin business jets. It provides CAE with talented people, a loyal customer base, and an established recurring training business that is highly complementary to CAE’s network.

“We are pleased to welcome Bombardier customers and employees to CAE,” says CAE President & CEO Marc Parent. “Bombardier business jet customers will have access to a seamless training experience in our global network of training centers, providing the most advanced training solutions on the market by leveraging our continued investments in training.”

With this agreement, CAE will be adding 12 Bombardier Business Aviation full-flight simulators located in Dallas and Montreal to its training network (including one deployment already planned for CAE’s fiscal year 2021), for a total of 29 Bombardier Business Aviation full-flight simulators available for training worldwide, with further growth planned in the near-to mid-term.

The announcement comes on the heels of CAE’s signing of multiple Business Aviation training contracts with business aircraft operators worldwide at the close of 2018. The operators include Alerion, DC Aviation, Icon Aviation and Windsor Jet. “These agreements highlight CAE’s Business Aviation training solutions and illustrate our commitment to delivering the best training and customer experience to business jet operators across CAE’s global training network,” says CAE Group President, Civil Aviation Training Solutions Nick Leontidis. “We are excited to support our customers’ growth and we look forward to working with them long into the future.”

TRU Simulation + Training
TRU Simulation + Training, a Textron Inc. company, and FlightSafety International recently entered into a letter of intent to form a joint venture to provide the industry-leading training solution for Textron Aviation’s broad product line of business and general aviation aircraft. The two companies will combine their assets and capabilities, including their simulators, courseware, and world-class teams to support their global customers’ training needs.

“The new joint venture will enhance our ability to service our growing customer base,” says TRU Simulation + Training President Gunnar Kleveland. “With Textron Aviation continuing to expand its product portfolio with aircraft such as the Latitude, Longitude, Hemisphere, Denali and SkyCourier, it is critical we provide the full scope of training services our customers require, and this joint venture will allow us to better address that demand.”

“The combination of our training capabilities will enable us to provide best-in-class pilot and maintenance training programs to our customers around the world,” adds FlightSafety International Co-CEO & President David Davenport. “For more than 40 years FlightSafety has served Textron Aviation customers, and this venture will allow us to offer more flexible training options leveraging the capabilities of both organizations.”

TRU will serve as the exclusive supplier of new Textron Aviation simulators to the joint venture. TRU will also continue its other operations, including the design and manufacturing of training simulators and providing training solutions for the global aviation industry.

FlightSafety International
At the end of 2018, FlightSafety International made numerous announcements about new simulator programs. For example, the company is building a new Dassault Falcon 2000LXS and Falcon 900LX interchangeable simulator, which will be installed at the FlightSafety Learning Center in Teterboro, New Jersey. Training using the new FlightSafety FS1000 simulator is scheduled to begin in August 2019 following Level D qualification by the FAA and EASA. Approval by other regulatory authorities will be completed according to customer needs.

“We are expanding the capabilities offered at our Teterboro Center to meet the changing and growing needs of our customers,” says FlightSafety International Senior Vice President, Commercial, Steve Gross. “The Falcon 2000LXS and Falcon 900LX training program will include a wide variety of initial, recurrent, differences and update training for pilots, maintenance technicians and flight attendants.”

The Teterboro Learning Center currently offers a wide variety of pilot training programs for aircraft manufactured by Dassault Falcon Jet. They include the Falcon 50EX, Falcon 2000, Falcon 2000EX EASy series, Falcon 900EX, and Falcon 900EX EASy series. The Center also offers a new state-of-the-art facility for flight crew emergency training. It includes a pool for sea survival training, a full-scale dunker, a hoist used to simulate being rescued from water by a helicopter,
and a full-scale cabin trainer equipped with a visual system for emergency and cabin service courses.

On the other side of the pond, the company announced that it will offer training for the Pilatus PC-24 aircraft at its Learning Center in Paris. This will be FlightSafety’s second PC-24 simulator and second training location. “We are pleased to offer training for the new Pilatus PC-24 aircraft in Paris starting next year,” says Davenport. “FlightSafety and Pilatus worked closely together to ensure owners and operators of the PC-24 receive the highest quality training and outstanding service they deserve and expect.”

Design and manufacture of the new FlightSafety FS1000 simulator for the PC-24 aircraft is underway at FlightSafety’s simulator design and manufacturing facility in Tulsa, Oklahoma. It will be equipped with the Honeywell Primus Apex avionics suite and incorporates synthetic vision. The simulator is expected to be qualified to Level D and enter service by the end of 2019.

The simulator will feature FlightSafety’s latest advances in technology, including the CrewView collimated glass mirror display and VITAL 1100 visual system. CrewView provides far superior distortion-free optical performance with greater clarity, sharpness, and brightness. The glass technology provides a true spherical shape for exact geometry across the entire viewing area. VITAL 1100 significantly enhances training by providing highly detailed, mission specific imagery with vastly improved scene content and exceptional environmental effects. Training benefits also include a whole-Earth environment and worldwide database that incorporates latest terrain information with geo-specific satellite images.

**A Note on Maintenance**

Even though much of the buzz is about the pilot shortage, the real dilemma is the far greater need for maintenance technicians. In fact, it is estimated that nearly 30% of the current technician workforce is
approaching retirement age, and Boeing estimates that 118,000 new ones will be needed across North American civil aviation in the next two decades. Already, nearly 90% of Business Aviation leaders surveyed in 2017 by Aviation Personal International felt the industry was in the midst of a maintenance shortage.

With training and professional development being key to filling this skills gap, many of the top flight training companies are also providing maintenance training. For example, CAE offers a comprehensive maintenance training program, including for a number of Bombardier, Dassault, Embraer and Gulfstream business aircraft. Available courses cover such topics as initial maintenance and avionics, troubleshooting, engine run and taxi and digital avionics – to name only a few.

Likewise, FlightSafety International entered into an agreement with the University of Southern California, Los Angeles campus to provide a comprehensive series of courses for aircraft maintenance department managers. The courses include Human Factors in Maintenance, Human Factors in Aviation Safety, Aviation Safety Management Systems, Gas Turbine Accident Investigation, Helicopter Accident Investigation, Aircraft Accident Investigation, Safety Management for Aviation Maintenance, Safety Management for Ground Operations and Accident/Incident Response Preparedness.
MRO MEANS BIG BUSINESS

According to Oliver Wyman’s Global Fleet and MRO Market Economic Assessment 2018 – 2028, the global Business Aviation MRO market is valued at $12.3 billion – much of which can be attributed to a growing (and aging) fleet.

Needless to say, such a market means lots of opportunities for growth and competition. On the one hand, this means a likely cycle of consolidation, similar to what has been happening in the FBO sector. As a case in point, see StandardAero’s acquisition of Vector Aerospace.

On the other hand, this also means more and more OEMs are starting to vie to control more of their customers’ in-warranty MRO experience through increased factory-owned facilities. Most recently, this was seen with Dassault Aviation’s acquisition of TAG Aviation’s European maintenance activities. “This acquisition allows Dassault Aviation to reinforce its European service center network,” says Dassault Chairman and CEO Eric Trappier. “With TAG Maintenance Services, we intend to further develop a network of excellence and to support TAG’s different aircraft clients with the same commitment to service quality, while expanding the share of Falcon maintenance activities controlled by the Dassault Group.”

The news follows an announcement that Dassault had acquired the global maintenance activities of ExecuJet, a Luxaviation subsidiary. “The acquisition of ExecuJet’s MRO operations will strengthen Dassault Aviation’s global footprint, especially in Asia-Pacific, Oceania, Middle-East and Africa,” adds Trappier. “With ExecuJet, we will continue the development of our high-quality customer support network, while growing our Falcon market share.”

Dassault’s moves are in-line with what other OEMs are doing. For example, last spring Gulfstream announced that it would be building a new MRO facility at TAG Farnborough Airport. The facility will include office space, customer areas, shop space and a hangar able to accommodate up to 13 large-cabin aircraft. Significant ramp space will also be included, along with a car parking area. The entire facility is projected to cover approximately 180,000 to 220,000 square feet (16,723 to 20,439 square meters).

The news follows a slew of new MRO facilities and expansions happening at Van Nuys, California; Appleton, Wisconsin; Savannah and now the United Kingdom. “The growth of the Gulfstream fleet and increased size of our aircraft are driving the need for continued growth and additional capacity in our service center network,” explains Gulfstream President of Product Support Derek Zimmerman.

Likewise, earlier this year Bombardier announced the next major investment in enhancing its global customer service experience with a significant expansion in the Asia-Pacific region. The award-winning Singapore Service Centre will more than quadruple its current footprint, transforming the facility into a high-capacity, one-stop-shop super center offering its customers a full gamut of maintenance, refurbishment and modification services required throughout an aircraft’s life, directly on site.

The Singapore Service Centre announcement follows last year’s news that Bombardier is growing its North American maintenance capabilities with the construction of an expanded service center at Miami-Opa Locka Executive Airport. This facility will be inaugurated in 2020 and will more than double the current customer service footprint in Florida.

MRO Roundup

As the MRO market continues to evolve, there’s never a shortage of news and developments coming from the marquee players. Here’s a roundup of the latest.

StandardAero

Earlier this year, StandardAero’s Fleetlands UK facility was granted EASA certification by the UK Civil Aviation Authority. The announcement comes one year after the company’s agreement with Honeywell to serve as the only authorized TFE731 heavy engine maintenance facility located in the Europe, Middle East, Africa and India region.

“This was the final step in fully industrializing our TFE731 overhaul capabilities, including CZI, MPI and core repairs at Fleetlands,” says StandardAero President of Business Aviation Marc Drooby. “We are now serving the full needs of EMEAI TFE731 operators locally in that region, with the same quality, speed, service and value that we provide from our MRO shops located in the US.”

StandardAero is now approved for full testing TFE731-2/-3/-4/-5/-20/-40/-60 engine series models at Fleetlands.

RATIFIED
StandardAero is authorized as exclusive provider in EMEAI for TFE731 MRO services.

The MRO business means lots of opportunity, and companies of all sizes want in on the action. Nick Klenske writes.
Jet Aviation

Swiss-based Jet Aviation has established itself as a global MRO juggernaut, providing services to large-cabin aircraft from hubs in Basel, Dubai, Singapore and St. Louis – complemented by other maintenance bases in EMEA, Asia and North America. The company’s maintenance facilities are approved by all major manufacturers and rated as jet aircraft repair stations by aviation authorities worldwide. In other words, whatever your aircraft type or size and whether it needs a routine inspection, unscheduled or heavy maintenance or even structural repair – Jet Aviation is ready to deliver with minimal downtime. The company also boasts a 24-hour AOG team of technicians capable of being immediately dispatched to a grounded aircraft.

Last year, the company received FAA STC for ADS-B Out compliance for the B747 series aircraft. Subject to specific equipment configurations, this approval authorizes Jet Aviation’s MRO and Completions facility in Basel to configure and install ADS-B Out systems on N-registered B747 aircraft.

Duncan Aviation

Shortly after opening its new-construction MRO maintenance hangar in Provo, Utah, Duncan Aviation welcomed its first aircraft – a Bombardier Global Express XRS. The work scope for the aircraft includes a 120-month airframe inspection and 10-year landing gear overhaul.

“We have been working hard to prepare and plan for our new maintenance and modifications center in Provo and are thrilled to have the first maintenance hangar ready and open for work,” says Duncan Aviation Vice President of Operations at Provo Chad Doehring.

A paint facility is expected to be ready in early spring and a second maintenance and completions hangar structure will follow. By the second quarter 2020, all the full-service back shops and offices for the new 275,000-square-foot facility will be completed.

West Star Aviation

In January, West Star Aviation announced the completion of its new 60,000 sq. ft. hangar at its East Alton, IL location. The state-of-the-art hangar features 40,000 sq. ft. of hangar space and 20,000 sq. ft. of back shop and office space that supports West Star’s growing capabilities, allowing the company to fully expand upon existing aircraft maintenance programs. This additional growth will initially employ 28 technicians to support the expansion, in addition to their existing hiring efforts.

Meanwhile, the company’s Chattanooga facility was named an Authorized Service Center for the Embraer Lineage 1000 and 1000E, continuing to enhance the Chattanooga location as a one-stop-shop for Embraer customers. Additional capabilities include avionics repair and installation, airframe and engine inspections, service bulletin installation and compliance, along with full interior redesign and refurbishment, and exterior paint services.

The inclusion of the Lineage models now extends to both the Chattanooga and East Alton facilities.

Flying Colours

Flying Colours, who is celebrating its 30th anniversary this year, kicked things off by moving into its fifth hangar at the Spirit of St. Louis Airport. The existing building, which is ideally located adjacent to the KSUS runway, adds a much-needed 30,000 square feet to the St. Louis footprint.

Flying Colours took over the hangar lease in December 2018. Since then the local team has been outfitting the building, installing new state-of-the-art tooling and sup-

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RENOWN
Flying Colours St. Louis (top). Aero Dienst received Bombardier Excellence Award (center). RUAG is now authorized PC-12 service center (below).

Flying Colours
Complementary maintenance equipment as well as revamping the office décor. The completed facility accommodates up to three parallel large-jet maintenance, avionics upgrades and interior projects at once. It is initially expecting to support heavy maintenance work and two Bombardier Global aircraft are already in-situ for 120-month heavy maintenance checks.

The addition of the fifth hangar runs in parallel to the beginning of construction at Flying Colours’ Peterborough, Ontario headquarters of a fourth hangar, which will be large enough to manage completions, refurbishment, maintenance and paint work in a new dedicated paint shop for Bombardier and Gulfstream large jet types, as well as executive airliners.

Aero-Dienst
The end of 2018 saw several accolades for Aero-Dienst. First, the company was presented with the ‘Bombardier Business Aircraft Authorized Service Facility (ASF) Excellence Award’ as the best service facility in the ‘Europe’ category. It is the fourth year in a row that the Nuremberg specialist for maintenance, operation, sales and management of business aircraft received this distinction for its excellent record in providing Bombardier customers with first-class quality, performance and service.

Towards the end of the year, Frank Hofmann, an apprentice at Aero-Dienst was named Germany’s best aircraft electronics technician by the German Chambers of Commerce and Industry (DIHK). Of a total of 165 final-year apprentices from all over Germany, Hofmann achieved the best final examination results in his sector.

“At Aero-Dienst, the training of young aircraft electronics technicians and mechanics has played an important role for many years,” says Aero-Dienst CEO Viktor Peters. “By giving young professionals a career start, we also secure our own long-term success in the demanding context of maintenance and repair of business jets.”

RUAG
In March of this year, RUAG MRO International received the renewal of its approval status for the Pilatus PC-12. The Authorized Pilatus Service Center agreement allows RUAG to provide customers with the full range of aircraft MRO services, including Aircraft on Ground (AOG) support. RUAG first achieved the Pilatus PC-12 type rating status in 2008.

The dedicated PC-12 team manages an average of 150 aircraft maintenance and support events annually. These include line, base and heavy maintenance checks and AOG events, as well as multi-service visits that feature component and subsystem MRO, avionics upgrades, inflight entertainment system (IFE) and connectivity integrations and cabin modifications.

“Our Pilatus PC-12 team is highly specialized and knows the aircraft inside and out,” says Pio Ming, General Manager of RUAG’s Geneva site. “Over the years, Pilatus PC-12 customers have come to understand that this expertise translates into the prompt and reliable resolution of routine maintenance events and opti-
WE'RE READY, delivering the custom MRO solutions you need today with the only OEM approved TFE731 engine series heavy MRO service center in the EMEAI region and the only OEM authorized independent HTF7000 heavy MRO service center in the world. Benefit from our OEM approved PT6-A and PW300 series engine MRO services, all supported by certified Test Cell performance capabilities, expert technicians and global 24/7 mobile service teams – getting you back in the air, fast. Rely on StandardAero to deliver the quality and customer experience you expect from the global leader in business aviation MRO services.

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Specialists busy working at the hangars of SR Technics (top), Lufthansa Technics (center) and Comlux (below).

mized downtimes, all of which means improved aircraft availability and more time in the air.”

**SR Technics**

2019 has already been a busy year for SR Technics. The company recently announced a further expansion of its UK line maintenance network with the opening of a new line station at Birmingham. Thanks to the addition of the new station, SR Technics is now present at all major international gateways in the UK, serving many international customers. The company also announced its plans for continued growth at its Malta facility. Over the course of the year, projects include delivering a new six-bay hangar and transforming local operations into a Center of Excellence for SR Technics base maintenance.

**Comlux**

Comlux announced that Comlux Completion, its completion and service center in Indianapolis, is raising the bar in maintenance services on large VIP aircraft such as ACJ and BBJ. During 2018, the company maintained a steady stream of recurrent maintenance clients, but also gained four new operators including three BBJs based in the US and one BBJ2 based in the Middle East.

“Comlux provides clients a top-of-the-line VIP maintenance option in the industry with a full pedigree of in-house engineering and back shop fabrication capabilities for their aircraft,” says Comlux Completion CEO Daron Dryer. “We aim to protect the value of the assets of our customers by performing quality maintenance and repair work in accordance with the manufacturer’s best practices.”

**Lufthansa Technik**

Last fall, Lufthansa Technik and MTU Aero Engines laid the cornerstone for their new joint venture EME Aero in Jasionka, symbolically launching one of the biggest and most advanced GTF MRO service centers worldwide. Pratt & Whitney GTF engines power five regional and narrow body aircraft platforms, with the A220 and the A320neo family from Airbus and the Embraer E190-E2 already in commercial service. The total investment for the service center is EUR 150 million by 2020. Plans are to have the facility – with its 40,000 square meters of workspace – up and running by the end of 2019.

“This joint venture is an important step for Lufthansa Technik and our partner MTU in expanding our respective engine maintenance businesses,” states Dr. Johannes Bußmann, CEO of Lufthansa Technik. “That is why this laying of the foundation stone marks an important day, as EME Aero will enable both companies to provide technical support for one of the world’s most important aircraft engines.”

The construction site for EME Aero service center consists of about 160,000 square meters and is set to be completed by the end of 2019.
Every year, operators spend significant amounts of their budgets on various modifications and upgrades. If these upgrades are related to avionics and retrofits, the amounts can quickly add up, and if they are to the power plants, cabin systems, exteriors or interiors, they can double or triple the money spent on upgrades. Regardless of what is being modified, according to Jason Burdette, Textron Aviation’s manager of aftermarket business development, a modification should accomplish three goals: it functions in the manner intended, it increases performance and/or serviceability, and it improves the resale value of the aircraft. Darius Saluga, CEO of Jet Maintenance Solutions, in Vilnius, Lithuania, agrees, believing that the most popular modifications and upgrades are those that bring business aircraft cabins up-to-date with the latest features and comfort.

That being said, many modifications are prescribed by the regulatory authorities and are related to safety. Also, worldwide aviation tendencies show that airspace will become much busier due to the growing number of aircraft that will enter the airspace throughout the next decade. Therefore, air traffic in the near future will become a much more complex issue. Modifications to accommodate this will fall under the Communication, Navigation, and Surveillance (CNS) categories of avionics.

At the same time, upgrades related to in-flight connectivity and pilot glass cockpits are also becoming increasingly popular. Along with the aforementioned upgrades, automatic dependent surveillance-broadcast modification (ADS-B) are in heavy demand (roughly 45% of the business jets registered in the United States have not complied yet), as well as In-Flight Connectivity (IFC) modifications.

Jet Aviation
ADS-B Out compliance is mandated by the FAA and EASA effective January and June 2020, respectively. Among the companies to offer ADS-B Out systems, last year Jet Aviation received FAA Supplemental Type Certification (STC) concerning the

B747 series aircraft. This approval authorizes Jet Aviation’s MRO and Completions facility in Basel to configure and install Automatic Dependent Surveillance (ADS-B) Out systems on N-registered B747 aircraft. “We worked hard to develop and gain approval for our STC well ahead of the mandated deadlines to ensure our customers have time to demonstrate ADS-B Out compliance,” says Estelle Thorin, Director of Program Management for large aircraft in Basel.

JSSI
To beat the ADS-B clock, JSSI has teamed up with Constant Aviation, a full-service maintenance, repair and overhaul business to offer existing clients a special upgrade program. By working with the highly skilled technical team at Constant Aviation, JSSI can secure a convenient slot for this required upgrade, at a preferred rate and well before the deadline. The upgrade program is available now to JSSI Airframe Program clients that need to meet the FAA’s deadline. The company will work closely with clients and Constant Aviation to schedule the appropriate ADS-B and FANS-1/A upgrades. In an effort to maximize efficiency, JSSI can also schedule any upcoming maintenance inspections that may be due at the time.
Constant Aviation

Speaking of Constant Aviation, the full-service MRO company with a US network of facilities will begin extensive modification and upgrade works on Evolution Management’s Challenger 604. This includes a Rockwell Collins ProLine Fusion upgrade, a 192-month cycle inspection, landing gear overhaul, FANS, and a complete customized interior refurbishment on the client’s aircraft. The works will begin in June 2019 and will take place at Constant Aviation’s Cleveland facility.

Duncan Aviation

Duncan Aviation’s Engineering & Certification Department has received approvals from three civil aviation authorities for its STCs (ST01810WI and ST01811WI) that upgrade the Honeywell Primus II system for ADS-B in Cessna 560/560XL and Hawker 800/800XP aircraft. Approved by the FAA in December 2015, the STCs have also been accepted by Transport Canada Civil Aviation (TCCA), Mexico’s Dirección General de Aeronáutica Civil (DGAC), and EASA. These approvals mean that aircraft in the countries that abide by those civil aviation authorities can now access these two Duncan Aviation STCs and comply with the FAA’s January 1, 2020 ADS-B mandate. The company now holds or has access to 42 STCs for FAA-approved ADS-B equipment, which allows the company to perform upgrades on more than 100 aircraft models.

Collins Aerospace

Collins Aerospace’s Pro Line Fusion avionics upgrade for Pro Line 4-equipped Bombardier Challenger 604 series aircraft was recently certified by the FAA. Working closely with Bombardier as the original aircraft manufacturer and Nextant Aerospace as the installation design certification lead, this all-in-one solution complies with pending mandates while modernizing the flight experience for pilots. The upgrade is available exclusively throughout Bombardier’s extensive network of service centers and Nextant Aerospace. The Pro Line Fusion upgrade enhances the operational capabilities of the Challenger 604 aircraft to a similar level as that of the Challenger 605 and Challenger 650 jets equipped with Collins Pro Line 21 Advanced, while providing Challenger 604 operators with a solution to meet future regulatory requirements.

Gulfstream Aerospace

Since the first quarter of this year, owners and operators of Gulfstream midsize jets, including the G280, have access to Wi-Fi connectivity services through Viasat’s high-speed, high-capacity service on the Ka-band frequency. This service is available to all Gulfstream midsize jets as a completion and retrofit option. Concerning the G280, Gulfstream has selected a complete Garmin ADS-B In solution, which features Garmin GDL 88 ADS-B datalink and Flight Stream 210. This ADS-B In solution also integrates with existing TCAS systems and cockpit displays to provide a cohesive and straightforward upgrade, reducing cost and streamlining the installation process.
Dassault Aircraft Services

Dassault Aircraft Services is offering Falcon 2000EX EASy operators the chance to upgrade their airframe to the Falcon 2000LX definition. The winglets and winglet installation kits are purchased by the operator directly from Aviation Partners, Inc. (API). The winglets and associated components are installed per OEM approved data via Dassault Aviation Mods. The result is an aircraft with the Falcon 2000LX commercial designation but with increased resale value and is eligible for all Falcon 2000LX specific Service Bulletins. Modified aircraft offer improved performance and operating advantages such as F2000EX-253 (Increase of Weight & Balance envelope for take-off).

Honda Aircraft

Honda Aircraft Company announced the addition of a performance package for the HondaJet HA-420 developed by the company’s new Advanced Performance Modification Group (APMG), enabling existing HondaJet owners to enhance their current aircraft with several new performance and software features. The $250,000 APMG Performance Package offers current HondaJet owners the opportunity to implement the latest performance upgrades on their aircraft. Among those are a shorter takeoff field length, an increased maximum takeoff weight, and more mission capabilities. The package also features several Garmin G3000 avionics software updates, including, but not limited to, advanced integrated Take Off & Landing (TOLD) calculations, increased connectivity with Flight Stream 510 compatibility and an enhanced electronic checklist.

Blackhawk Modifications

At the end of last year, Blackhawk Modifications announced that flight testing was formally underway for the company’s latest FAA STC program: the XP67A Engine Upgrade for the King Air 300. Jim Allmon, Blackhawk President and CEO, told BART that the XP67A will transform the King Air 300 from a turboprop into a rocket ship. “The expected climb performance, cruise speeds, and load carrying capability will be unlike anything we’ve produced at Blackhawk thus far,” he says. “The XP67A will elevate the King Air 300 into a league all of its own, unmatched by any turboprop or light jet available today.”

This project will certify the installation of factory-new Pratt & Whitney Canada (P&W) PT6A-67A engines to replace the stock PT6A-60A engines on 12,500-pound and 14,000-pound gross weight models of the King Air 300. Both engine models are rated at 1,050 horsepower at sea
However, Blackhawk’s XP67A Engine + Upgrade delivers more available power at higher density altitudes, with very impressive levels of takeoff, climb, and cruise performance well into the flight levels.

Blackhawk expects the King Air 300 XP67A upgrade to surpass its big brother – the XP67A-powered King Air 350 – in the race for the World’s Fastest King Air title due to the lighter-weight airframe. The company expects maximum cruise speeds of 345-350 KTAS, and time to climb from sea level to FL350 in less than 17 minutes. XP67A performance benefits extend to the bottom line. Taking advantage of Reduced Vertical Separation Minimum (RVSM) airspace extends the range and endurance and lowers total fuel consumption. Further, reduced block times will lower operational costs. Blackhawk expects the FAA STC for the King Air 300 to be issued this summer.

With the recent sale of the Phoenix-edition King Air C90-1, Blackhawk has sold 800 XP Engine upgrades since 1999.

Raisbeck Engineering
Raisbeck Engineering recently received FAA approvals from the company’s five-blade composite swept propeller and four-blade aluminum swept propeller for the Beechcraft King Air 300/300LW aircraft. “We are pleased to offer King Air 300/300LW operators the opportunity to upgrade their aircraft with added performance, efficiency and a quieter cabin with either one of these propeller systems,” says Lynn Thomas, acting President of Raisbeck Engineering. “These STCs are the result of many long hours from our engineers and their support team.”

The advanced design of the five-blade carbon composite swept propeller blades allows for unlimited blade life and reduced maintenance costs while providing the strength and durability expected from modern composites. As an alternative, Raisbeck is bringing its four-blade aluminum swept propeller, which has already been approved for the King Air 90, King Air 200 series and King Air B300 series, to the King Air 300/300LW.

StandardAero
Last March, StandardAero received FAA approval for its first STC for installation of the SmartSky Network’s 4G LTE inflight connectivity system on Embraer Legacy 600/650. The company, via its Organization Designation Authorization (ODA), is also working on additional STCs for the Legacy 450 and Legacy 500, as well as the Dassault Falcon 7X, 8X and 50EX. StandardAero will perform Embraer installations at its business aviation service locations, including Augusta, Georgia; Houston, Texas; and Springfield, Illinois. The ground-based components of the SmartSky’s system, which provides over 10 times the speed of legacy airborne connections, are being deployed using a mix of 4G LTE and emerging 5G technologies, similar to some of the recent improvements in terrestrial cellular networks. For StandardAero Certification Services Director John Miedwig, “This allows a significant section of the aviation community to access SmartSky’s affordable and secure inflight connectivity solution.”

Also, worth to mention, The Carlyle Group announced early April that it
had closed its purchase of StandardAero from Veritas Capital. “StandardAero has established itself as one of the true leaders in the MRO industry,” said Adam J. Palmer, Managing Director and Global Head of Aerospace, Defense and Government Services for The Carlyle Group.

GKN Aerospace

GKN Aerospace’s Fokker business has signed an agreement with Honeywell to provide customers with component maintenance, repair and overhaul services for avionics and mechanical components. Customers will have access to Honeywell’s avionics and mechanical solutions at GKN Aerospace’s Fokker Services facilities in the Netherlands, US and Singapore.

Lufthansa Technik

Lufthansa Technik AG recently developed the first robot for fully automated tests of cockpit controls in the world. The test procedure is called RoCCET, which stands for Robot Controlled Cockpit Electronics Testing. In the future, this robot will be used to check the functionality of LED lights and switches on the basis of standardized measurement data. Currently in the integration phase, the robot has integrated sensors to measure the forces that occur when switches are activated. In addition, it is equipped with several industrial cameras with which it captures all display instruments and any outer damage. With another camera, it measures the brightness of all displays from various angles. The robot is thus able to check all switches and LEDs just as well as a human and perform defined functional tests.

Concerning engine parts and accessory repairs (EPAR), the company recently opened Lufthansa Technik Miskolc in Miskolc, Hungary. This new, fully-owned subsidiary of Lufthansa Technik AG will commence operations in 2022. With more than 20,000 part numbers and over 1,500 employees, Lufthansa Technik’s EPAR network is the largest OEM-independent provider for repairs and overhauls of aircraft engine parts.

SR Technics

Last fall, SR Technics’ Spanish subsidiary signed a channel partner agreement for wheels and brakes with Honeywell International Inc. The agreement, in effect until 2023, builds on over 20 years of collaboration between the two companies. It allows SR Technics to offer competitive lead times and pricing on all Honeywell wheels and brakes products. SR Technics also obtains full access to the Honeywell component maintenance manuals and other key IP documentation under the deal.

Sabena Technics

TAT Group entered into exclusive negotiations with investment companies Sagard, Bpifrance and TowerBrook in order to sell them its majority interest in its subsidiary Sabena Technics. TAT’s ambition in the move is to strengthen Sabena Technics’ global position as an independent leader in the aircraft maintenance and modification market.
Designing an aircraft interior is indeed a challenging experience. Just ask Lydia Pierce, who should know as she designed the interior of the Citation Longitude. When she started designing this interior, her obvious inspiration was the customer and the people who would be flying in the airplane. “Often, interior designs are based on specific requests, and it’s not uncommon for something as simple as a light fixture or a carpet pattern to launch the look and feel of a cabin,” she says. “Each time, the goal is to produce an open, comfortable and quiet space that encourages freedom to move with ease.”

According to Pierce, the ample leg spacing between seats, as well as the flexible functionality of the seat design, creates a sense of control over the environment and a freedom to flow from one task to another as the flight progresses. “If the interior is well designed, the passenger will never be in a hurry to leave the aircraft,” she adds. “Also, those same passengers must feel at home as soon as they step into the aircraft, a reason why it’s important to work closely with end-users to select everything from the carpeting and leather to the wood veneers and glassware in the galley.”

Jet Aviation, which has been delivering custom-made aircraft interiors for almost four decades, is also convinced that creating a cabin interior in a V.I.P. private aircraft is one of the most exciting design challenges. Just as each aircraft is different, each client is unique, and each design brief is as individual as the clients themselves. “Customers are more and more willing to get personalized cabins, and for that are often requesting unusual materials to put a unique stamp on their aircraft interior,” says Elisabeth Harvey, Director of Design at the Jet Aviation Basel Completions Center. “Like many contemporary
homes, our design incorporates modern and traditional elements that are contrasted through the use of colors, materials and the general intent of the design.”

Concerning the market situation, the companies we spoke to mention an increase in demand, to which some have already responded by expanding spaces, increasing the volume of sequential aircraft in completion or entering into strategic partnerships with other companies.

Expanding Spaces

Though a large part of day-to-day business remains refurbishment of midsize aircraft, the increasing demand to refurbish larger aircraft has pushed several companies to build new hangars to accommodate them. For example, Flying Colours has broken ground in Peterborough, Ontario for the construction of its largest hangar to date. On completion in mid-2019, the new building will house a climate controlled, dedicated paint-shop, a spacious hangar large enough to hold up to A220-size aircraft, as well as offices, customer meeting rooms, interiors workshops and a board room. The investment of approximately $20 million will add a further 100,000 square feet to the Peterborough footprint.

At its Chesterfield, St. Louis facility, the company opened a fifth hangar in January 2019, adding a further 40,000 square feet to the facility. “Our business has grown significantly over the last twelve months and we were running out of space to accommodate all our clients’ requests,” says John Gillespie, CEO Flying Colours. “Once the building is complete, we will be using it to provide additional capacity for completions, refurbishment and heavy maintenance work scopes on large jet airframes.”

Meanwhile in Singapore, Flying Colours Corp. PTE has expanded its scope of refurbishment services at its Bombardier Seletar Airport facility. Flying Colours has completed four full and three partial interior refurbishment projects on two Challenger and five Global aircraft types. This represents a significant step-change as the Singapore team has progressed from undertaking simple repairs of cabinetry and soft furnishings to using its extensive experience to realize partial and full cabin overhauls on Bombardier aircraft for Asian and Middle Eastern customers. One of the latest projects followed the purchase of a pre-owned Bombardier Global XRS aircraft. As it began extensive maintenance in the Bombardier Seletar facility, Flying Colours worked in parallel to complete an upgrade to the 14-passenger cabin. As the China-based customer wanted to modernize the dated look, Flying Colours outfitted the interior, the cabinetry was refinished, a new carpet was fitted and the divan and seats were recovered. The galley and aft lavatory countertops were replaced to complement the newly fitted vanity wardrobe and cabinet.

Last November, Jet Aviation celebrated the grand opening of its new wide-body hangar in Basel. Known as ‘Hangar 3’, it is capable of housing several wide- and narrow-body projects simultaneously. Its wooden arch structure supports the maximum height to ensure space for a Boeing 747 on jacks, while its extended nosebox permits two wide-body aircraft concurrently.

Anticipating growth for its new PC-24, but also for its PC-12 NG, Pilatus recently opened a brand-new completion center in Broomfield, Colorado. The center is custom-designed to conduct aircraft interior and exterior completions for all Pilatus PC-24 and PC-12 NG aircraft delivered to North and South America (these markets account for upwards of 70% of Pilatus’s business aircraft sales). Typically, around 55 PC-12 NGs are completed in Broomfield each year, and the company plans for an additional 25 to 30 PC-24s to flow through the facility annually.
Gama Aviation, based at West Palm Beach, Florida, purchased the paint and interior completion business previously operated by Lotus Aviation Group at Fort Lauderdale Executive Airport. The facility retains a strong track record in the completions market, serving clients from across the US, Central and South America and is conveniently situated for Gama Aviation’s existing Florida-based heavy maintenance locations at Opa Locka and Palm Beach International. A few months ago, West Star Aviation announced the completion of a new 60,000 sq. ft. (5,575 sq. m) hangar at its East Alton, IL location. The hangar features 40,000 sq. ft (3,715 sq. m) of hangar space and 20,000 sq. ft. (1,858 sq. m) of back shop and office space.

At the end of last year, Gulfstream Aerospace opened a Sales and Design Center in Midtown Manhattan. The nearly 8,500 sq. ft. (790 sq. m) space expands Gulfstream’s portfolio of showrooms and sales offices intended to enhance the customer experience with centralized locations and white-glove sales and design service. Gulfstream’s Manhattan Sales and Design Center serves one of the world’s busiest Business Aviation regions. The space features dynamic digital tools and thousands of material samples that help launch the customization and personalization of every Gulfstream aircraft. Customers have access to real-time seat configurators paired with a physical seating display to see and feel seat architecture and comfort options. The facility also enables an external paint configurator, wireless streaming of Gulfstream-developed mobile applications and leading video conferencing technology.

Duncan Aviation has reopened its newly remodeled Design Center at its Lincoln, Nebraska, facility. The large showroom floor is lined with custom cabinetry and expanded display space to showcase material options and a wide range of aircraft-specific products. It is an open, interactive space where customers are invited to work with designers to select materials and finishes for their interior refurbishment and exterior paint completions. Adjacent to the customer showroom, the design team occupies updated office space and a reconfigured materials library that features additional workspace and fabric sampling. The company also has full design capabilities at its Battle Creek, Michigan, location, and is in the process of hiring design staff for aircraft interior services for its Provo, Utah, facility, which is currently under construction.

At the end of February, Bombardier started work to more than quadruple the size of its Singapore Service Center. The new facility will be operational in 2020. It will include a full-service 37,000 sq. ft. (3,500 m²) paint facility, advanced interior finishing capabilities, and an expanded portfolio of component, repair and overhaul (CR&O) services. It will also offer heavy structural and composite repair capabilities and be able to undertake complex retrofit work, including avionics and Ka-band installations.

Big Designs

The unveiling of new aircraft has encouraged some companies to anticipate customer demand and offer them new VIP cabin concepts. For example, after the recent announcement of Boeing’s new BBJ 777X, Jet Aviation developed a VIP cabin concept specifically for the aircraft. It takes advantage of jet’s size, featuring lounges, a game and cinema area, a stately office, private work spaces, three guest bedrooms and a master suite that includes its own lounge, luxurious bedroom, spacious dressing/bathroom area and a very large shower and hammam. In addition to such features as weight and space optimization through fiber optics and technology-integrated furniture, Jet Aviation has incorporated forward-thinking concepts like intelligent, digital LED lighting throughout the cabin, as well as OLED and Smart Glass technology on all the window panels, which allows the windows to be dimmed and virtual curtains or window shades to be displayed.

Greenpoint Technologies is also supporting the recent Boeing Business Jet BBJ 777X reveal with a new V-VIP Interior Design Concept. Its Lotus interior features hardwood steps leading to an elevated lounge,
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The media lounge features a large, curved monitor, adaptable divan with high-low ottomans, and custom LED lighting. The interior also contains a library, guest suite and master suite. The master suite features a king size bed framed by a custom, artistic canopy headboard and a spacious walk-in dressing room with heated hardwood flooring. The master lavatory also offers heated marble flooring and towel warmers, a black marble vanity with embedded monitors, and an oversized rain shower. Last November, the company delivered the world’s second V-VIP 787-8 interior completion to a confidential customer. The main lounge showcases a metallic glass tile wall, which is the first of its kind to be certified on a 787. The cabin also includes a gym with vaulted ceilings, extensive crew accommodations and large service galleys.

Meanwhile, Comlux’ Completion and Service Center has accomplished its 11th VIP interior outfitting on a BBJ aircraft for a Far East private customer. The luxurious cabin features a spacious executive compartment at the front, with four sets of Club-4. Instead of the traditional hi/lo tables, there are large pull out tables with easily attachable extensions newly designed and installed specifically for this aircraft. In the center section, a private dining/conference room features a massive table surrounded by six executive style seats. Decorated with a grand ceiling dome, the master suite at the rear includes a tranquil master bedroom and a spa-like private master lavatory.

The entire aircraft has an infusion of an Asian-inspired atmosphere. According to Arnaud Martin, COO of Comlux, the interior of this BBJ was engineered to magnify weight performance at a total weight of only 14,400 lbs, and last February, the company received the first ever BBJ Max 8 for completion. Belonging to a US-based owner, this aircraft will be delivered before the end of 2019. An ACJ320 Neo will also arrive later this year, followed by two more Max 8s in 2020.

**New Collaboration Agreements**

Last January, Dassault Aviation and Luxaviation announced Dassault’s acquisition of the worldwide maintenance and MRO activities of ExecuJet, a Luxaviation subsidiary. The integration process will be phased in during 2019.

Collins and Comlux signed a five-year agreement in which Collins will provide Comlux VIP customers with a comprehensive product portfolio, including avionics, cabin management, content and entertainment options, seating, lighting and galley products, as well as ARINCDirect connectivity and flight services. Engineering work on the first two aircraft awarded under this agreement is now underway. Product offerings from the full portfolio were selected for a BBJ retrofit and the first BBJ MAX being delivered. Work will be completed at Comlux’s Indianapolis location.

“Through our agreement and exclusive access to Collins’ extensive product portfolio, we will be able to provide cost-efficient solutions in terms of cabin technology, and ensure our customers enjoy the best VIP cabin experience over the entire life cycle of their aircraft,” says Scott Meyer, CEO of Comlux Completion. “In return, Collins will have the opportunity to provide solutions for all Comlux completions and retrofit projects.”

**HAECO Private Jet Solutions**, a private jet cabin completion specialist based in Hong Kong, has entered into a collaboration agreement on private jet cabin designs with Eight Partnership, also based in Hong Kong and one of Asia’s leading design firms. The scope of the collaboration is to jointly develop conceptual and industrial cabin designs for private jets. HAECO PJS is the first and only Airbus-approved and Boeing-licensed cabin completion center in Asia Pacific. It offers a complete range of solutions from industrial design, engineering design and certification to cabin completion.
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Trust our expert designers, engineers and technicians to create a cabin that reflects your needs and style. With facilities in Canada, USA, and Singapore, decades of experience, and a philosophy with flexibility, integrity and innovation at its core, you can trust us to be your global aircraft services partner. In addition to our interior refurbishment and green completions, we also offer exterior paint, avionics installations, heavy maintenance and special mission expertise.

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Amongst the many exhibitors on the show floor, some of the biggest crowds were drawn in by Bell and its impressive full-scale composite mockup of the Nexus eVTOL/air-taxi concept. Visitors could even take the Nexus for a spin via an innovative virtual reality experience. The concept features a central wing, ‘V’ tail with a horizontal stabilizer and six tilting ducted fans, each powered by separate electric motors. Power will be supplied by the Safran Hybrid-Electric Propulsion System.

“Data from organizations like NASA, Uber and Goldman Sachs all predict the global ride share market will grow to $285 billion by 2030,” says Scott Drennan, Bell VP of Innovation. “With data also showing that urban aerial passenger numbers could reach 750 million during the same timeframe, Bell sees urban mobile development as a positive part of our business plan.”

Bell also signed a number of purchase agreements for helicopters of a more conventional design, including a Bell 412EPI to Japan’s Nagano Prefecture Fire Department, a Bell 505 and one Bell 407GXi to National Airways Corporation for operations in South Africa. Africair also ordered a Bell 505, which will be the first aircraft of its type to be delivered to Ethiopia. The Polish Police signed on for three Bell 407GXIs and will be the first of the type to be operated by a European law enforcement agency.

TRU Simulation & Training, a training provider and simulator manufacturer owned by Textron Inc., is offering its customers mission-related training that it says cannot be found elsewhere. The company developed a full-flight, Level D Bell 429 simulator for its own training center in Valencia, Spain. The simulator impresses not only by offering a high-fidelity visual system, with the industry’s largest standard visual field of view, but also by offering a level of simulation that can only be called an immersive experience. The simulator replicates all necessary dynamics of a helicopter’s flight and features two separate motion systems. According to David Smith, vice president and general manager of TRU’s Business Aviation unit, the software allows for a highly realistic training of missions like long line flights. Future training scenarios...
could include wind farm support, power line inspection and maintenance, and even rescue missions from burning ships.

The Bell 429 simulator is EASA certified. Because it is an all-electric simulator with no hydraulics, the operation and maintenance costs are low. “We’re very excited about this platform, but we’re ready to push it to the next level,” says Smith.

**Airbus Helicopters** closed the show with 43 orders from worldwide customers across the whole Airbus civil product range. Almost half were from longstanding customer Air Medical Group Holdings, who signed a contract for a mix of 21 single-engine H125s and twin-engine H135s.

“At the close of 2018, we had 413 gross orders with 153 customers in 47 countries and delivered 356 aircraft valued at $6734 million, which represents 54% of the global market share,” says Bruno Even, Airbus Helicopters CEO. “We also reported a 72% share of the North American market, predominantly in the para-public sector.”

The main focus at the Airbus stand was the launch of a five bladed version of the H145, designated H145D3, which brings an increase in the useful load of 150kg (330lbs). A new bearing-less lightweight, foldable main rotor design will also ease maintenance operations. Additionally, a reduced rotor diameter, from 11m (36 ft.) to 10.7m (35.4 ft.), will allow the aircraft to operate in more confined areas. The new model will come with the addition of the wireless Airborne Communication System (wACS), which will allow for the secure transmission of real-time in-flight data. The Ukrainian Ministry of Interior will be the launch customer, deciding to change eight of its ten H145s on order to the five-bladed model.

Certification is expected from EASA in the first quarter of 2020. Current operators will be able to retrofit a factory-supplied upgrade kit that will take approximately 200+ man-hours to fit, but the retrofit is not available for the EC145 C1 or C2 variants. The launch customer for the retrofit will be REGA, the Swiss Air Rescue operator, who will upgrade its entire fleet of seven H145s.

**MD Helicopters** CEO Lynn Tilton explained that it has taken a long time to make the company great again, acknowledging that the military business has put them back on the map by enabling new investment in research and development. The company has now moved and integrated all their tooling from Turkey back into Mesa. “Building in house means we can respond very quickly to our customer base in everything we do,” says Tilton.
Tilton also announced the development of a high-speed, 200 knot demonstrator called the Swift, which will have a new NOTAR system and fan design. It will have longer and wider main blades and will be fitted with thrusters that enable a cruise of 160 knots and maximum speed of 180 knots.

On display were two of its most iconic helicopter models, the MD 530F operated by the Tennessee Valley Authority for powerline work, and a combat configured MD 969, an upgraded variant of the MD 902 Explorer series highlighting the future capabilities of the light twin-engine airframe. Both aircraft featured the Genesys Aerosystems’ all-glass Integrated Display Units.

Following the formation in July 2018 of a fully-owned US subsidiary, Kopter North America LLC, Andreas Löwenstein, CEO of the Swiss-based Kopter Group, announced that they will now establish a new production facility for its SH09 helicopter at Lafayette Airport, Louisiana. The 7869 sq. meter (84,700 sq. feet) facility was originally to be the Bell 505 Jet Ranger X production base, but it was later decided to build the model at its Mirabel facility in Canada.

According to Löwenstein, Kopter chose the Lafayette site for several reasons. “Louisiana is a rapidly growing and attractive region, already hosting several key helicopter operators, and offers easy access to a qualified workforce and a high-quality educational environment,” he says. “Furthermore, the facility itself meets the highest standards and allows almost instant operations, and its location on the airport provides an ideal production environment with quick and easy logistics and commercial access.”

The company will begin hiring personnel later this year and prepare operations by mid-2020, with the intention of creating at least 120 new jobs by 2025. Final assembly and customization of the SH09 will ramp up to an anticipated volume of around 100 per year.

The design of Pre-Series 4 (PS4) is being finalized, which, thanks to a new fuel tank system design, will now have an enlarged cabin allowing up to eight passengers, in addition to the pilot. The maximum take-off weight has also been increased to 2850kg (6238lbs) and 3000kg (6614lbs) for external loads. Once completed, PS4 will join the flight test activities of P3, currently in Sicily, to achieve the goal of type certification.

Leonardo Helicopters Managing Director Gian Piero Cutillo said that in 2018 the company was the top helicopter manufacturer in terms of value, achieving a 40% market share in the worldwide civil market – a 7% increase compared to the previous
year. Total aircraft delivered to customers worldwide in all mission sectors was 177 in 2018, significantly higher than the 149 units delivered in 2017. The company now have 450 aircraft operating in the VIP multi-engine sector in North America, representing a 40% market share. As such, Leonardo sees the US as a core ‘home market’ that has generated more revenue from civil helicopter deliveries over the last two years. Their production facility in Philadelphia is now supporting a fleet of over 1000 units with services supplied from North to Latin America.

Just after Heli Expo closed, Leonardo released its official 2018 financial results, which showed a 9.4% return on sales from $7050M in new orders and a backlog of $13.8M.

The company also announced a substantial reinforcement of its helicopter training capabilities in the US with the establishment of a $65M multiyear investment in the establishment of a new 5575 sq. meter (60,000 sq. feet) training academy within its Philadelphia facility. It is expected to be completed in 2020 and will provide training services for pilots, cabin crew and maintenance technicians in North and Latin America.

The AW609 tiltrotor expects to achieve FAA certification in 2019, with the first delivery following in 2020. “We have made a lot of progress and we now see the light at the end of the tunnel,” says Cutillo. “We are getting interest from not only civil, but also the parapublic sector and the military.”

Nakanihon Air Service, one of the largest fixed and rotary wing operators in Japan, and Leonardo signed a memorandum of understanding with the aim of establishing a joint working group to study requirements for introducing the AW609 into commercial service in the EMS role, disaster response and SAR operations in Japan. But the $20 to $30M price per unit may still be a sticking point for some future operations.

Sikorsky announced new plans for its S-92 helicopter line that will re-designate fielded helicopters as the S-92A+ after modification, and newly produced aircraft as the S-92B. The two variants will share a nearly identical configuration, with S-92Bs also featuring enlarged cabin windows and plans for a common cabin door suitable for offshore and SAR configurations. The fleet update will also include the introduction of the MATRX technology, which will bring advanced computing ability to the aircraft and enable the adoption of autonomous landing technology such as Rig Approach 2.0. Both configurations will also include the Phase IV main gearbox, which has demonstrated to the FAA operation in a run-dry
Honeywell forecasts 4,000 new civil helicopter deliveries over the next five years.

The Rotorcraft Outlook

Despite respondents to Honeywell’s 21st annual “Turbine-Powered Civil Helicopter Purchase Outlook” having a slightly less positive view of the global economic outlook than in 2018, new aircraft will still support an expected 3 to 4% annual growth rate in overall deliveries. The forecast says that 4,000 new civilian helicopters will be delivered between 2019 and 2023, marginally down by 200 on the forecast last year, but still on an upward trend.

Outlook

Honeywell forecasts 4,000 new civil helicopter deliveries over the next five years.

The Middle East and Africa had the second highest new purchase rate globally, with 15% of respondents’ fleets expected to get a new replacement or additional aircraft. Purchase plans were 5% higher compared to 2018. Almost 70% of planned new helicopter purchases in this region were medium twin-engine models.

For Asia Pacific, overall buying plans were down 5% over 2018. Close to 13% of respondents said they would either replace or expand their fleet with a new helicopter over the next five years. Light single-engine and medium twin-engine helicopters were the most popular classes at 30% for new buys.

In terms of Europe, the overview indicated that purchase plans were lower in this year’s survey. Nearly 15% of respondents said they would either replace or expand their fleet with a new helicopter over the next five years, compared to 22% a year ago. It also shows that new helicopter purchases would be at 30% in the intermediate and medium twin-engine classes. Meanwhile, 25% of respondents indicated plans to purchase light single-engine helicopters, down 12% from last year.

The data comes from a survey of more than 1,000 chief pilots and flight department managers of companies operating 3,334 turbine and 321 piston helicopters worldwide, and overall the predicted increase in deliveries signals a healthy helicopter market poised for moderate growth.
Flight Analysis by Owner/Operator, Aircraft, Fleet, and Airport

UTILIZATION REPORT:
Owner: Don Fay, 540-765-
Chief Pilot: Tim Lowe, 757-200-
Operator: EZ Fly, 276-336-
Based: IAD/KIAD
Fuel Burn: 72,535 gallons
US Flights: 164
Tech Fuel Stops: KFAR/KGRI
#1 Airport Pair: KBAF/KIAD
European Flights: 12
Tech Fuel Stops: CYQX/EGPK/CYYT
#1 Airport Pair: LIRA/LFPB
Notes: Only drinks Espresso

GULFSTREAM 550 REG #: N107MF
There’s no place like NBAA’s Schedulers & Dispatchers Conference to network and learn about the industry. This year, the event took place for the 30th time, but the attendees did not only look back into a glorious past but took a glimpse in the future, where some challenges wait for the industry. Volker K. Thomalla writes
This year, NBAA’s Schedulers & Dispatchers Conference (SDC) celebrated its 30th anniversary. The annual event took place in San Antonio, Texas, and drew nearly 3,000 participants from all 50 US states and from more than 40 countries. A record-breaking number of nearly 600 exhibit booths filled the floor in San Antonio’s Henry B. Gonzalez Convention Center.

SDC’s path started in 1989 in Montvale, New Jersey, with about 70 attendees and a dozen exhibitors. Over the years, the conference had added educational programs, presentations by keynote speakers as well as a humanitarian component of giving back to the local communities. “The significant growth of the show in past 30 years is a testament to this show’s importance to the industry, and the innovation and enthusiasm surrounding it. It positions SDC for continued future success,” said Tyler Austin, NBAA senior manager, certification and staff liaison to the Schedulers & Dispatchers Committee.

Ed Bolen, NBAA’s President and CEO, addressed the audience during the first day’s general session. He thanked all who have joined NBAA last year to fight privatization of ATC. He said: “A year ago, there were barbarians at the gate. The ATC systems was to be given to the airlines to use it for their own purposes. We knew we had to fight. Thank you for saving our industry. Last year taught us to work together.” He encouraged the attendees to promote the value of Business Aviation to the next genera-

RECOGNITION
Ed Bolen (top).
There were 34 sessions this year (center).
Bizav volunteer Kellie Rittenhouse received Outstanding Achievement Award (below).

...ation of industry professionals. “We have a workforce issue here. There’s a shortage of maintenance technicians and pilots out there. We need to attract and keep the best. Business Aviation has generated over a million jobs in the US alone. We help companies being more efficient and more productive. Business Aviation has a huge humanitarian impact, too by transporting transplants, patients and veterans. America is better off with more airports and more pilots. We need to attract and retain pilots. Compensation matters, but Business Aviation is not just a career, it’s a home. People will leave here better connected and better informed. SDC19 is a magnificent event.”
SDC’s Advisory Council took a very concrete step to attract young people to the industry. The Council brought a group of 22 students to San Antonio’s International Airport to talk with various tenants about career opportunities within Business Aviation, as well as to hear from professionals in the industry about how their careers began.

The conference schedule was packed with 34 educational sessions ranging from topics like the impact of new technologies on Business Aviation, Human factors, flying to India, Africa and the Middle East, new regulations for Air Charter Operators and Dispatch Resource Management, just to name a few. Many of the sessions were approved by the NBAA Certified Aviation Manager (CAM) Governing Board for initial CAM application or recertification, adding value for attending these sessions.

The educational sessions and the presentations form an important part of SDC, but the event wouldn’t be complete without the wide array of exhibitors in the convention hall, presenting their products and services. Unlike NBAA-BACE which is centered around new aircraft models, equipment and hardware, SDC is centered around services.

Fuel companies, FBO’s, service providers and airports were among the exhibitors at SDC19. Avfuel Corporation has put a focus on sustainable alternative jet fuel (SAJF). Only two weeks prior to SDC, Avfuel had participated at a “flying green” day at the Van Nuys, California, airport. This was the first time SAJF became available to operators at a Business Aviation airport and the first time the fuel supplier launched the new SAJF product. During the event, the airport served approximately 250 arrival and departure turbine operations. Keith Sawyer, Avfuel’s manager of alternative fuels, said: “Our team was eager to help facilitate the supply needs for the day and make our new product available to operators for a limited time. We’ve worked extensively on the logistics of procuring SAJF, and how to properly blend it, test it and store it, so to see it put into use was a major milestone.”

The company had set up a dedicated booth at SDC19 to better educate flight departments on sustainable alternative jet fuel. Sawyer said: “Having a committed space to facilitate these important conversations on SAJF is imperative to continuing our progress on this effort.”

According to Avfuel, the main obstacle to the widespread adoption of the product is currently its availability. There isn’t enough SAJF being produced to serve the entire aviation industry. Through commitments, Avfuel is able to more accurately share product demand with producers, helping to encourage increased output of SAJF.

World Fuel Services, the Miami headquartered fuel provider, announced at SDC19 that it has won a five-year contract with London Oxford Airport and London Heliport in the United Kingdom to supply JetA and Avgas. The company will provide the airport with refueling equipment as well as training and maintenance support. London Oxford Airport wants to increase its share of transatlantic flights. World Fuel also announced at SDC that Platinum Business Aviation Centre (YBCG and YMEN), FBO Redwings (MMQT) and Kayan Jet (TKPK) are the four newest members of its Air Elite Network. According to World Fuel Services, the Air Elite brand continues to attract FBOs and ground handlers around the world with its unique programs to deliver service excellence, share member best-practices and earn the business of discerning flight departments.

Valcora, a Switzerland-based fueling service premiered at this year’s Schedulers & Dispatchers Conference. The company took the opportunity to promote its new North American office which expanded Valcora’s global presence. Since its launch in 2017, Valcora has opened bases in Switzerland, Ireland and Singapore. New locations in the US as well as in South Africa are planned to begin operations as early as mid-2019. Nigel Harris has been appointed as Director Americas. He said: “I am delighted to be part of the team. Valcora’s focus on customer service goes above and beyond, which is why we are one of the industry’s fastest growing aviation fueling companies.”

Daniel Coetzee, Valcora’s CEO, added: “Our global sales have risen dramatically over the last twelve months thanks to our excellent team, our easy-to-use online platform, fiscal VAT expertise and our transparent pricing. We know, the North American market is one of the most important Business Aviation sectors and look forward to delivering our service here.”

Satcom Direct took the opportunity to highlight SDC’s visitors the benefits of connectivity. At NBAA-BACE in October 2018, Satcom Direct had launched SD Xperience to improve Business Aviation connectivity and operations. Fast internet connections are not only useful and necessary for Business Aircraft passengers, but also for the operator’s flight department, the maintenance department, but also for schedulers and dispatchers to have real-time access to flight data for better planning and enhancing on-time services for passengers. SD Xperience is a new fully-synchronized, end-to-end solution that combines cabin and cockpit communications services, aircraft connectivity...
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hardware, and flight operations software. According to satcom Direct, SD Xperience will deliver purpose-built technology that satisfies the evolving requirements of Business Aviation, allowing the company to create tailored solutions based on customer requirements. The new service has been undergoing in-flight validation with the company’s own Flight Operations since July 2018, delivering average speeds between 8-10 Mbps. The service has become available in the first quarter of 2019 for STC development with aircraft OEMs for applicable aftermarket airframes.

Collins Aerospace and Stellar Labs, Inc. showed SDC19 visitors in San Antonio their joint endeavor that went public in October last year. Both companies are jointly developing a suite of integrated, cloud-based applications as a successor to Rockwell Collins’ ARINCDirect Flight Operations System (FOS). The next generation FOS has a modern architecture and an intuitive and easy-to-use web interface with new features. The first set of cloud-based modules provides powerful capabilities for quoting, trip planning and reporting. The quoting tool allows charter operators to quickly create and send branded quotes that offer multiple aircraft and itinerary options. The trip planning tool offers trip planners an easy and convenient web-based portal (or alternatively a mobile device portal) to get estimated flight times, view scheduled flights and drill down for details on itinerary, passengers and services. It allows schedulers a continuous and real-time overview of their flight departments’ operations. The new FOS features also a reporting and analytics tool which helps sales and revenue managers understand quoted and scheduled flight volume, conversion rates, revenue and profit margin with preconfigured reports.

Universal Weather and Aviation celebrated not only SDC’s 30th anniversary in San Antonio but highlighted also that Universal Weather and Aviation, Inc. Chairman Greg Evans has been awarded the NBAA’s prestigious Silk Scarf Award for his contributions to the Business Aviation community throughout his career. The Silk Scarf represents diligence, industry, and persistence and was created to honor outstanding business aviation community members and inspire future aviators. The company was founded in 1959 and has today 1,700 employees around the globe. It operates 50+ ground support locations and 21 owned and operated in-flight catering kitchens.

The latest addition to the company network is Universal Aviation Maldives at Velana International Airport. It was officially opened with a ribbon-cutting ceremony in mid-January. Universal Aviation Maldives will support local Business Aviation traffic but just as importantly will be a local advocate for the industry in the Maldives, said Charlie Mularski, Senior Vice President, International, Universal. “Our team will work closely with the Maldivian government to identify opportunities to drive traffic, and improve infrastructure and access while also benefiting the local economy.”

At SDC19, Paragon Network had for the first time ever their own row highlighting select member FBOs. At SDC, Paragon welcomed the Ohio State University Airport’s Executive Terminal at Don Scott Field (KOSU) in Columbus, Ohio, to their network. “We are thrilled to have the opportunity to work with The Paragon Network’s elite group of FBOs,” stated Michael Epplie, the FBO’s General Manager. “Our airport is not only well positioned in the Columbus market, but in addition we offer a premier facility with a competitive price. We work hard to not only meet, but exceed each customer’s expectation every visit. Joining up with these exceptional FBOs will provide us the opportunity to take our great safety and service standards to an even higher level.”

Euro Jet was founded in 2008 and is dedicated to provide ground support services for Business Aviation throughout Europe and Asia. The company has amassed a unique experience in aircraft handling and servicing in Eastern Europe and Asia. They operate a 24/7 Operations Control Center with staff located in over 40 countries. At SDC19 Euro Jet’s team lead by Charlie Bodnar focused on providing information to visitors about their operations in Uzbekistan and other destinations in Central Asia which are located off beaten paths.

ABS Jets of Prague in the Czech Republic and Bratislava in Slovakia announced at SDC19 that it has recently been awarded the second stage of the International Standard for Business Aircraft Handling (IS-BAH) certificate by IBAC (International Business Aviation Council). The company is the first and only holder of this certificate in the Czech Republic. IS-BAH is the global industry standard for handlers and operators around the world and meets the forthcoming SMS requirements of the International Civil Aviation Organization (ICAO). ABS Jets had received IS-BAH stage I only two years ago. In 2018, ABS Jet’s Prague handling achieved two significant milestones: it was ten years on the market and had handled 20,000 aircraft movements.

The next opportunity to take part in Schedulers & Dispatchers Conference will be in March 2020, when SDC is heading to Charlotte, North Carolina.
Join over 23,000 industry professionals for the most important three days of business aviation, with 1,000 exhibitors, 2 static displays of aircraft – one inside the exhibit hall and the other outside at Henderson Executive Airport, and more than 50 education opportunities. Save the date and visit the NBAA-BACE website to learn more.

www.nbaa.org/2019
With 757 exhibitors, AERO 2019 set a new record in the more than 40-year history of the annual General Aviation fair set along the shores of Lake Constance in southern Germany. Many novelties awaited visitors, who had found their way to Friedrichshafen from 10 to 13 April. For those who weren’t able to make it, here’s an overview of some of the highlights.

French manufacturer Daher flew a model year 2019 TBM 910 turboprop aircraft to the event. It was subsequently sold by Rheinland Air Service (RAS), Daher’s authorized distributor for Germany and Austria, to a European customer, who took delivery of his new TBM after AERO. “We are pleased that the latest TBM 910 version is meeting the expectations of European customers, who recognize our commitment to using intelligent functionality to further improve safety and operability,” says Nicolas Chabbert, Senior Vice President of the Daher Airplane Business Unit.

The newest version of the TBM 910 features automatic icing detection. When icing or ice accretion is detected by the sensor – and if the pilot does not take action – the system will activate deicing devices such as the airframe, windshield, propeller and the engine’s particle separator. An amber CAS (Crew Alerting System) message is displayed by the avionics, advising the pilot to clear the automatic activation and revert to the manual control mode.

Daher also had its newest flagship on display in Friedrichshafen, the TBM 940. It has the automatic icing detection, too, but is also equipped with an auto throttle system that reduces pilot workload. The TBM 940 features a Garmin G3000 avionics suite while the TBM 910 comes with a G1000 NXi.

Another first at Friedrichshafen was the HondaJet Elite, which was announced at EBACE last year. The aircraft on display at AERO is the first HondaJet Elite in Europe. The Elite, an upgraded version of the original HondaJet, features several improvements, including more range, less noise from the engines, a lighter structure and a revolutionary cabin sound system. Some of the features of the Elite are retrofittable to existing HondaJets.
**Pilatus** is a loyal exhibitor at AERO. This year, the Swiss manufacturer not only had two PC-12 single engine turboprop aircraft on display, but also its PC-24 Versatile Jet. Last year Pilatus delivered 18 of this light jet to customers. One of the customers for the PC-24 this year is the Swiss Government, which intends to use the aircraft for intra-European flights. Pilatus is expected to open the order book for the aircraft again soon, which was closed after selling 80 aircraft within 36 hours at EBACE 2014. It hasn’t been opened since.

**Quest Aircraft** from Sandpoint, Idaho, brought two aircraft to Friedrichshafen. The Quest Kodiak 100 and the newest addition to the manufacturer’s product line, the Kodiak 100 Series II, which features the Garmin G1000 NXi avionics suite and other improvements to the aircraft's equipment. The Kodiak Series II was shown for the first time in Europe.

The smallest business jet on display was a **Cirrus** SF50 Vision. Cirrus has just presented the type’s newest G2 version, which can climb to 31,000 feet and has a range of 1,275 nm with two people on board. Pat Waddick, president of innovation and operations at Cirrus Aircraft, said that over 200 pilots have now been type rated on the SF50.

**Meeting Pilots and Operators**

AERO is a trade show where aircraft manufacturer and suppliers meet individual pilots and aircraft operators who mostly fly their aircraft themselves. Suppliers like **Garmin International**, **Blackhawk Modifications**, **Jeppesen**, **MT Propeller**, **Bose Aviation**, amongst others, were satisfied with the number of customer contacts they had during the show. **Textron Aviation** used to be an exhibitor at AERO for years, but decided not to exhibit this year. Their King Air and Citation line-up was definitely missed!

**A Focus on Business Aviation**

The German Business Aviation Association (GBAA), in cooperation with the show organizers and Atlas Air Service of Bremen, Germany, organized a Business Aviation Conference. The event addressed topics like Business Aviation – a time machine; ADS-B for Business Aircraft; ambulance flights and humanitarian missions with Business Aircraft; and the value of Business Aviation for society. The organizers expressed their intent to continue with such a conference next year.

ADS-B was a hot topic at the show as operators are becoming aware of the approaching ADS-B mandate – which is January 1st 2020 in the US and June 7th in Europe. Laurent Gauthier, owner and CEO of **Air Plus Maintenance** reported that his company was approached by several fleet operators to retrofit their aircraft with new avionics. **Atlas Air Service** only has 45 slots left for ADS-B modification this year. Both warn that there will be no extension to the ADS-B compliance deadline, as has been stated by both the FAA and EASA.

**Introducing AeroVue Touch**

**BendixKing** introduced a new, fully integrated avionics suite at AERO. AeroVue touch is targeting Class III aircraft and is complementing the AeroVue avionics suite, which is already available for larger turboprop and jet aircraft as a retrofit. The new avionics suite is exceptionally lightweight (weighing only 57 pounds including autopilot). BendixKing was able to reduce weight by using smart displays that are connected by WiFi and Bluetooth and thus don’t need wires between the units. The only wire necessary is the connection to the aircraft’s power supply.

**A Push Towards SAJF**

Pete Bunce, GAMA president and CEO, reported at AERO that 2018 was a good year for the industry with deliveries in all segments beating previous year’s numbers. He reported also that an industry-wide initiative is under way to bring as many aircraft as possible from the OEM’s on sustainable alternative jet fuel (SAJF) to EBACE in Geneva in May. There will be several airports where the participants can fuel their aircraft on their way to Geneva. There will be upload locations on the US East Coast, in Norway, France and the UK, said Bunce. The industry wants to promote the use of this fuel to reduce carbon emissions and become more sustainable.

“There’s no additional testing necessary. It meets all the specifications. It’s jet fuel”, said Bunce.
With multiple countries, languages and jurisdictions, Europe is complicated. This is particularly true for the Business Aviation industry, which often finds itself struggling to navigate across this multifaceted landscape. Attorney and co-author of the new EBAA Guide to Business Aviation Law in Europe Giulia Mauri explains
Anyone who has ever bought or sold an aircraft in Europe knows all too well that European harmonization is still a long way away. Even though Europe has done wonders in terms of harmonizing safety requirements and facilitating intra-European leasing, national laws and regulations still apply to registering and deregistering an aircraft, security interests like pledges and mortgages, and of course taxation.

What this means for aircraft owners, financiers and operators is that, overall, the current European landscape makes it quite cumbersome to finance, import, export, register and deregister an aircraft.

So in the spirit of EBACE, we figured this was the perfect opportunity to try to bring some clarity to this complicated landscape.

The Peculiarities of Buying a Private Jet

Financing and leasing of commercial airlines is quite different from the financing of private jets and aircraft used in Business Aviation. Because commercial airlines have been working with operating leases for many decades, they can easily predict their fleet’s needs and plan ahead by leasing the best suited types of aircraft available on the market. Professional lessors have been present in this market for a very long time, and through the years they have shaped the market in such a way that makes it quite predictable. Contractually, very complex operating lease agreements are usually negotiated that typically include clauses forbidding the airline to deregister the aircraft from the original country.

Moreover, lessors in the airline sector can predict relatively well what the residual value of their aircraft will be at the end of the lease. This allows lessors to partially take a risk on the value of the asset and the evolution of the leasing market. And as was mentioned above, aircraft are usually leased for long periods of time and they do not change the country of their registration very often. This all means that the leasing conditions of a commercial airliner are much more predictable than those of a private jet.

To say that the process for buying a business jet is very different would be a bit of an understatement. Until recently, the financing of business jets has been mainly done through loans coupled with a security on the aircraft, most often in the form of a mortgage. However, some years ago, new types of financing options started to become available – a result of the business jet lessors having a bigger presence in the market.

Furthermore, the mobility of a business aircraft is higher than in the commercial airline sector due to the purchase and sale of new aircraft models, change of operators, or change of country of registration and use of the aircraft. This high rate of mobility means that aircraft financiers, owners and operators must be familiar with the laws applicable in different countries in relation to aircraft registration, security and taxation.

Moreover, business jets can be used under private or commercial aviation rules. As a result, lessors must inquire as to the use of the aircraft and verify how private or commercial aviation is regulated in different countries. But this is easier said than done. As I mentioned in one of my previous articles in BART International, there is no general European definition for what constitutes private aviation. Therefore, each Member State of the European Union has developed its own rules which, needless to say, differ greatly from one country to another. This means determining what laws will govern the registration or an aircraft, its operation and the security taken on it will not always be an easy task – a task that will only get even more complicated when the aircraft changes country of registration.

The EBAA Business Aviation Law Booklet

Perhaps surprisingly, there aren’t many references, books or articles that one can use to navigate this complex industry. Thus, after having worked in the Business Aviation sector for many years, Frédérique Jos of BRJ Avocats and myself realized that the market needed an instrument that could serve as a first point of reference, something that provided users with basic information when considering buying, selling or financing a business jet.
Together with a strong network of expert lawyers working in the Business Aviation sector, and with the fundamental support of the European Business Aviation Association, in 2016 we launched the first edition of the EBAA's Business Aviation Law Booklet. This booklet offers readers the information we would have loved to have had when we started our career in Business Aviation: a basic reference guidebook on Business Aviation law organized by jurisdiction.

After the success of the first edition, we decided to add new jurisdictions to the booklet. We also decided to add several new sections, including one completely dedicated to taxation and one all about business aircraft registration in Europe. This new edition, also supported and published by the EBAA, was launched during the EBAA's Associate Members Advisory Council Convention in March of this year. It can be downloaded for free via the EBAA website (www.ebaa.org/publications/ebaa-business-aviation-law-in-europe-2019/), and paper copies will be available at the EBAA booth during EBACE.

Providing Information and Raising Awareness

What this guidebook makes clear is that each and every European country has its own peculiarities. This point is made driven home in the book's country specific questionnaire, which, for example, outlines how each country has its own rules pertaining to security. In some countries, a mortgage may be taken and must be indicated on the registration certificate of the aircraft. However, in other countries, although mortgages do not exist, a pledge can be taken. These pledges must in turn be recorded in national security registries separated from the registration one.

The last part of the booklet comprises of a comparison table showing the different documents and procedures needed to register an aircraft in different European countries. As every operator knows, these procedures vary tremendously. For example, not all countries accept English as a working language, some countries require notarized documents, and others have very complex procedure to de-register aircraft. This chart lays out what is required – and what is not – in an easy to understand manner.

Originally, we saw this booklet as a working tool geared towards helping practitioners and to make owners (and future owners alike) aware of the complexity of the Business Aviation industry and of the need to always work with professional advisors with experience in this sector. With this second edition, we take this idea another step further. Now, this booklet is positioned to make civil aviation authorities and institutions aware of the fragmentation of the current regulations applicable in this sector and the important differences that exist when it comes to aircraft registration and de-registration.

It is a contradiction to think that such a mobile and international asset is subject to so many different national constraints. But unfortunately, that is the reality of the situation. We hope this booklet helps raise awareness in that respect and maybe even help launch a debate about what could be done to harmonize certain aspects of aircraft financing, including aircraft registration and deregistration.

Attorney Giulia Mauri is a partner at Pierstone Brussels. She has more than 20 years’ experience in advising national and international clients on all aspects of aviation and transport-related transactions, including asset-finance and leasing, regulatory issues, carrier’s liability and litigation matters. She also acts as a mediator and is the co-founder of Mediation4Aviation, a mediation platform dedicated to the aviation industry. Giulia co-chairs the European and Legal Affairs Committee of the European Business Aviation Association and is an active member of the Industry Affairs Group of the European Regions Airline Association.

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ORGANIZED BY Vnukovo-3
Shannon Airport has the westernmost US Customs and Border Protection (CBP) facility in Europe. By taking passengers through this Irish airport, Business Aircraft operators can avoid long queues at the Immigration in the US. Quick turn-around times are another point that speaks for Shannon.

Volker K. Thomalla writes

Shannon Airport in Western Ireland has a track record of firsts: It was Ireland’s first transatlantic airport, is home to the world’s first Duty Free Shop (opened in 1947), has Europe’s first U.S. Immigration Pre-Inspection facility (since 1986) and became the first airport in Europe offering full US Customs and Border Protection preclearance.

While its relevance as fuel stop destination for airliners has diminished, its importance for Business Aircraft operators has increased over the years. Shannon has handled over 4,000 Business Aviation movements in 2018, most of which were for fuel stops, say Joe Buckley, Business Relations Manager of Shannon Airport. There are four FBO’s at the airport offering their services. Signature Flight Support, Universal Aviation, Westair Aviation and QA FBO Services are competing for customers. Buckley said to BART International: “We have a choice of really great FBO’s which offer very competitive pricing for handling and excellent customer service with very fast turnarounds.”

When Shannon Airport became the first airport in the world to introduce Preclearance for Business Aviation in 2010 nobody would have thought that the airport would still be the only airport with the unique feature in either Europe or the Middle East ten years later. But it still is the only airport in the region with this unique service. The revised US - Ireland preclearance agreement will allow Shannon to offer an “out of hours” preclearance service which a lot of Business Jet operators are looking for. The availability of preclearance in Shannon during evening hours will be of particular benefit to Business Jet operators flying from Europe to the US. From Shannon, Business Aircraft are allowed to fly directly to well over 200 airports in the United States. If passengers would decide to stay overnight, the region offers some of the best hotels in Ireland such as Dromoland Castle, Adare Manor or the Trump Hotel Doonbeg, all located within a short distance of Shannon.

Shannon Airport has a 24/7/365 operation. There are no curfew, slots or noise restrictions. It features a 10,500 ft (3,200 m) long 06/24 runway – the longest in Ireland. The famous Irish weather is beneficial for aircraft operators. Low maximum temperatures result in high payload capabilities. The mean maximum temperature in July is 68 °F (20 °C). On average, there are only eight days per year with snow, so de-icing is rarely required when flying out of Shannon. The airport’s fuel farm is supplied directly by ship. All aircraft stands are equipped for hydrant fuelling which guarantees minimum time on the ground. There are no uplift volume restrictions for fuel.

The airport reports that a number of large American and European corporations are starting to hold board meetings in the region which is easily accessible by Business Aircraft from both sides of the Atlantic and offers a very relaxed environment for doing business.
Shannon Airport is Europe’s #1 tech stop. It has a long runway, 24/7/365 operating hours, no curfews, slots, or noise restrictions, and some of the best fuel prices in Europe when you’re using your UVair® Fuelling Card. And it’s about to get even more convenient with extended U.S. pre-clearance hours.

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Speak with us at EBACE 2019 Exhibit #J75.

Ground support division of Universal Weather and Aviation, Inc.
2018 was a record-setting year for TAG Farnborough Airport. The strategy to convert the former military airfield into a pure Business Aviation airport has clearly paid off, not only for TAG Aviation, but also for the surrounding communities.

Volker K. Thomalla reports

Located some 35 miles west of London, TAG Aviation acquired the former military airfield that is now TAG Farnborough Airport from the British Ministry of Defense in the late 1990s. Since then, it has invested around £200M in developing it into one of Europe’s only dedicated Business Aviation airports.

In the sales agreement, TAG assured the British Aerospace Industry Association that it would continue to host the Farnborough International Airshow on the field every two years – an agreement that’s still paying dividends. “It’s just wonderful to welcome the global aerospace industry here as a guest every two years,” says TAG Farnborough Airport General Manager Brandon O’Reilly. “It’s great marketing for us, and many air show visitors come to us by plane.”

On average, three passengers per flight use the airport. This guarantees fast handling, meaning passengers get to their final destination as quickly as possible. However, the demand for travel from larger groups such as sports teams, music groups and company delegations are growing. To meet this demand, the airport set up a new, separate lounge area in its award-winning, futuristic terminal.

The airfield is also in regular contact with the surrounding communities in order to identify and quickly resolve any possible conflicts. For example, management is currently working with various agencies to set up an airspace D to optimize arrival and departure routes for all concerned – pilots, air traffic control and local residents. Once the planned Standard Instrument Departures (SIDs) and Standard Arrival Routes (STARs) are finalized, departing aircraft may be able to ascend to their desired cruising altitude more quickly, rather than having to remain at lower altitudes until given clearance to climb to cruising altitude.

A Very Good Year

2018 was a very good year for TAG Farnborough Airport. The airport saw a record-breaking 30,720 aircraft movements during the course of the year, up 13.8% from 2017 and 8.2% over the previous record from 2007. And despite the doom and gloom of Brexit, the forecast for 2019 remains positive.

“2018 was an important year full of milestones, including being selected by Gulfstream for its new, state-of-the-art, purpose-built Service Center,” says O’Reilly. “We are delighted about achieving carbon neutral status, the first Business Aviation airport to have done so.”

Even with this year’s record movements, TAG Farnborough Airport still has capacity to grow, both on the ground and in the air. In 2018, the hangars were 70% occupied, so even aircraft that spontaneously need a hangar for just one or two days will likely find space. The airport is limited to 50,000 aircraft movements per year, a number which, despite continuously increasing movements, is still some years away. In 2020, O’Reilly estimates the airport will break the 32,000 mark, while the opening of the Gulfstream Service Center at the end of 2020 could add another 3,000 movements per year.
A REFLECTION OF EXCELLENCE

TAG Farnborough Airport
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tagfarnborough.com
Marc Grangier sets his sight on the features that make the Paris-Le Bourget Airport an important center of the aviation industry.

On October 9, 1914, Captain Lucca made the first landing on Le Bourget soil while looking for a suitable place to defend Paris against the enemy. Le Bourget Airport was officially opened five years later in 1919, and on May 21st 1927, Charles Lindbergh landed there in his Spirit of Saint Louis after having flown across the Atlantic Ocean in 33 hours and 30 minutes. He was greeted by a huge crowd of enthusiastic people jostling their way to the edge of the runway to see him. Most recently, on March 12, 2019, two TBM 930 pilots who successfully reiterated the New York to Paris transoceanic crossing landed at Le Bourget after an 8-hour 38 minutes flight, setting a new world speed record for turboprop aircraft under 13,200 lb (6,000 kg).

Located 8 miles (13 km) north-east of Paris, Paris Le Bourget Airport has been exclusively devoted to Business Aviation since 1981. As Europe’s first Business Aviation airport, with some 55,000 movements last year, it is open 24/7 every day, although night-time flight restrictions are imposed for jets and aircraft over 12,500 lb (5,700 kg) between 10:15 p.m. and 6:00 a.m. Air ambulance and medical emergency flights have no restrictions. Furthermore, to reduce noise pollution for local residents, takeoffs of jet aircraft, the use of thrust reversers and the use of runway 2 by planes of more than 5.7 tons are prohibited between 210:15 and 6:00.

Covering 1,366 acres (553 hectares), Le Bourget airport operates with three runways in different lengths (07/25 - 9,843 ft / 3,000 m, 03/21 - 8,743 ft / 2,665 m and 09/27 - 6,053 ft / 1,845 m). All airplanes with a max take-off weight exceeding 12,500 lb (5,700 kg) must be fitted with a TCAS II ch 7.1 in order to fly into European airspace in accordance with EEU regulation 1332/2011.

The airport’s strategy is built around an offering of high-end services to business travelers to accommodate a significant growth in business traffic and stimulate local economic activity. Awareness of the Paris-Le Bourget Exhibition Park, which every two years hosts the International Paris Air Show (SIAE), is enhanced by its proximity to the airport. The airport is also a major focus of the Group’s property business and a large proportion of Paris-Le Bourget Airport’s property income is closely linked to Business Aviation. In 2024, the Grand Express Line will serve Le Bourget, simplifying passenger access.

The Paris Le Bourget airport is an important center of the aviation industry: Some 30 buildings accommodate more than 100 maintenance firms, aircraft equipment and facilities and airport services. It has eight Business Aviation terminals and a number of FBOs, among which are Advanced Air Support, Dassault Falcon Service, Jetex, Landmark Aviation, Signature Flight Support, Unijet - Abelag, Universal Aviation France. Companies providing specialist maintenance services include: Airbus Helicopters, Cessna, Daher Socata, Dassault, Embraer, Aérodesign, Aérostock, Aertec, Mauras, Satori.

And we can’t forget to mention the dozen Business Aviation companies that call the airport home, the likes of which include AB Corporate Aviation, Griffon Aéro SAS, IXAIR Business Jets, Masterjet, Skyfirst, TAG, Unijet, and Ziegler Aerospace.

JET A1 AVGAS is available from Shell, Esso, Elf and Air BP. Aircraft catering is provided by Air Culinaire Worldwide Paris, Culinary Jet Concorier, Newrest Private Paris Le Bourget, Premier Catering and UpperSky Gourmet.
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Having your company’s airplane adequately prepared for its next trip requires more than simply replacing the soda cans and running the vacuum cleaner over the carpet. We need to put some thought into where we’re going and what might be needed to handle any difficulties arising from the journey. Business aircraft are amazingly capable machines in the absence of vital system failures. Planning for these unforeseen eventualities is called “preparedness.”

It would be foolish, for instance, to attempt an ocean crossing without carrying a life raft and personal flotation gear, even in the best equipped and maintained airplane. The ultimate emergency, a ditching at sea, is not to be entirely ignored, but to be prepared for. Such preparedness involves not just adding emergency equipment, but obtaining training in its use and establishing procedures for successful employment.

Taking precautions does not have to involve extensive over-water operations. There are a lot of regions spanned by our business airplanes that might leave us in compromising situations if we’re not prepared. A diversion to something less than a welcoming location can require adapting, hopefully doing so by using equipment carried for just such eventualities. A warm parka and boots, even carried in the storage compartment with the engine covers, can literally be life savers if you wind up in Bergen or Oslo during a winter event.

Could You Walk Out?

One of my wisest older instructors told me “Never fly over country you aren’t prepared to walk out of.” He had noted my stylish Jodhpur boots and light jacket as I boarded the aircraft for a training trip in snowshoe season. While we don’t expect to have to put an airplane full of executives down in the bush, his point is well taken. Preparedness is simply part of piloting.

Such simple attention to detail also means you should make sure that all is in readiness for the passengers. A friend of mine was a captain for a major airline that was suffering from penny-pinching management during tough economic times. He was about to depart on a trans-Atlantic flight.
and, in checking the aircraft, he found that there were only three blankets in the overhead bins; the provisioning list called for ten, so obviously someone had taken the rest for another airplane. Exercising his command authority, he refused to accept the Boeing until more blankets were rounded up; he knew the aircraft would become cold-soaked on the night flight across the ocean, and service to the customers was still one of his priorities.

Going beyond mere comfort, of course, safety is the goal of preparedness. Safety, comfort and efficiency should always be ranked in that order. Making the schedule at the cost of a rough ride won’t impress most of our passengers, and descending below the minimum approach altitude in an attempt to get to the destination is a sign of poor safety management. Being prepared for a timely change in altitude or diversion to an alternate should start well in advance.

**Backing Up the EFB**

Electronic Flight Bags are a convenient means of having all the charts, checklists and manuals in the cockpit, ready for reference at a touch. However, what’s your plan for a backup in the event of an EFB failure? Do you have enough hard-copy equivalents within reach to keep the flight under safe control? Do you have a second EFB, charged up and ready for use, in case your primary one goes on the blink? Having access to the material needed to load changes into the FMS is important enough that you need to be prepared with a backup.

Have you ever considered having a stand-alone attitude/heading reference system (AHRS) linked to an EFB tablet? Such devices are now available for mounting on the glareshield, the ultimate redundancy if the PFD goes irreversibly blank in IMC. You will have to hand-fly the crude iPad presentation, but it would beat winding up as a contribution to the Loss-Of-Control-Inflight statistics.

**Onboard Spares**

There is a limit to the parts and tools it’s possible to carry in the aircraft’s storage locker, but when you’re in a remote spot of the world and an engine igniter box or starter/generator goes bad, you would be glad to have given up baggage space for such an item. True, pilots are not engineers, but having a little training in swapping out a faulty component is just good preparedness.

Having a good relationship with your Director of Maintenance can help you select just what items need to be kept on the aircraft, perhaps with additional spares added when flying to particularly distant locations. An extra crew member, in the person of a flight engineer/mechanic, is an even better idea if there is a seat available.

**Survival**

Communication is perhaps the tool we will most desire when caught in a crisis situation, even an unplanned deviation with no immediate risk. There are many options we can avail ourselves of, given today’s satellite-based technology; Bendix/King has a stand-alone Inmarsat-based AeroWave text-and-track locator that’s available for only US$449. A number of these subscription-based satellite messengers are available, some with two-way texting capability. A simple EPIRB rescue beacon or a personal locator beacon are excellent additions to an onboard survival kit.

If you want to develop a true survival kit, consider the Ten Essentials that mountaineering groups suggest:

- Navigation: map, compass, altimeter, GPS device, personal locator beacon or satellite messenger
- Headlamp: plus extra batteries
- Sun protection: sunglasses, sun-protective clothes and sunscreen
- First aid: including foot care and insect repellent
- Knife: perhaps part of a multi-tool
- Fire: matches, lighter, tinder and/or stove
- Shelter (can be a light emergency tent)
- Extra food
- Extra water
- Extra clothes

These items are obviously for extreme emergency situations, but are food for thought.

Preparedness is a state of mind, something to be reflected on when doing our trip planning. We should always play the what-if game as we study the upcoming route and take adequate precautions for unplanned eventualities.

**GEAR**

Life rafts and GPS devices are among the survival equipment pilots should always have during flight.
The serious incident emerged from the aircraft’s descent below the stipulated min. altitude.

Michael R. Grüninger and Capt. Carl C. Norgren take a close look at the probable causes of a near-disaster in Denmark, where an incoming SAAB 2000 aircraft descended below minimum safe height.

The First Approach
On 10 December 2015, the Saab 2000 turboprop commuter aircraft was established on the CAT I ILS approach to runway 27 into Billund (EKBI), Denmark, when the commander of flight AB 8054 noticed fluctuations on the glide slope indicator. The aircraft was descending to the final approach fix altitude of 2,000 ft AMSL. The autopilot was engaged and the localizer and the glideslope were captured.

The glide slope indicator fluctuated between ‘centered’ and full-scale ‘fly up’ indications. The autopilot attempted to follow the erratic movements of the glide slope. The commander disconnected the autopilot and attempted to follow a stabilized descent profile. The erratic indications persisted. The ATC confirmed that the ILS ground equipment was fully operational.

The commander continued the approach. The approach was flown in IMC with a strong and gusty crosswind around 50 Kts on approach causing moderate turbulence. The fluctuations of the glide slope indication continued. At 1,050 ft AMSL (approximately 800 ft AAE) the commander, who was pilot flying on this short sector from Berlin-Tegel (EDDT), initiated a go-around.

The Second Approach
After analyzing the situation, the crew concluded that the erratic glide slope indication was caused by a failure in the on-board equipment. They requested a non-precision localizer only approach. During the subsequent approach briefing the co-pilot, who was pilot monitoring, added that the target rate of descent to achieve a continuous descent approach along the localizer would be 750 ft/minute based on a ground speed of 140 Kts.

ATC provided radar vectors and the aircraft was established on the localizer at 3,000 ft AMSL around 6 miles before the calculated descent point. The aircraft was fully configured and initiated descent shortly before the calculated descent point. The commander selected a rate of descent of 800 ft/min.

The final approach fix was at 2,000 ft at DME 5.6. At this point, the aircraft was passing an altitude of around 1,300 ft. Shortly after the auto-callout ‘one thousand’ and ‘five hundred’ sounded. Seven seconds later, the EGPWS ‘terrain ahead, pull up’ warning sounded. The commander initiated a ‘go-around’.

The crew analyzed the situation and concluded that the safest course of action is a return to the departure airport where a VMC approach could be made. The subsequent landing was uneventful.

The Value of EGPWS
A non-precision approach in gusty conditions after a go-around due to an equipment malfunction is demanding. But how could this sequence of events lead to such a close call? When the EGPWS sounded the aircraft initiated a go-around. The lowest altitude recorded was 700 ft AMSL (346 ft AGL). The EGPWS warning acted as a last line of defense and played a vital...
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Decision Making

The stabilized approach criteria of the operator require that the aircraft achieve a tracking tolerance of +/- 1 dot deviation after passing 1,000 AAE. With an erratic glide slope indication fluctuating between up to full scale deflection (2.5 dot) the aircraft was not stabilized on the first approach.

Indeed, proceeding past the final approach fix with an unreliable glide-slope indication and attempting to perform an ILS approach without a reliable glide slope indication is not an acceptable practice. The flight crew should not have attempted to fly the ILS approach in the first place.

Lack of Monitoring of Vertical Profile

During the second approach, the vertical profile was flown with a ‘continuous descent final approach’ (CDFA) flight technique. The principle of this method is to maintain a stable, continuous descent rate from the final approach fix to the minimum descent altitude / missed approach point. The goal is to avoid to destabilize the vertical profile with level-offs at each step.

When using the CDFA flight technique the crew must monitor the vertical profile of the aircraft and manually ensure that any altitude steps are complied with. The localizer approach at Billund only has one step that needs to be observed: The outer marker shall be crossed at or above 1,380 ft.

The aircraft descended below this altitude approximately 2.5 nm before the outer marker. Neither pilot flying nor pilot monitoring called for a level-off.

The commander, who was pilot flying, realized that the approach chart did not have a ‘recommended altitude descent table’ when he initiated the descent. He, therefore, asked the pilot monitoring to ‘monitor the vertical profile’.

The pilot monitoring was not able to calculate any reference altitudes based on the ILS DME reading. However, he did not mention this to the commander. In the end, neither pilot was monitoring the vertical profile during the descent.

Controlling the vertical descent profile during a non-precision approach is one of the prime tasks of the pilot flying. By delegating this to the pilot monitoring, the commander effectively changed the work-split on the flight deck. The duties of the pilot flying and the pilot monitoring became blurred and the system of checks and balances between the pilots broke down completely.

The pilot flying no longer performed his prime duties and the pilot monitoring also did not perform his prime duty of monitoring the situation. As a result, nobody was effectively monitoring the aircraft in its vertical profile.

Instead of descending on a 3 degree approach profile, the aircraft descended on a 4.2 degree profile. This was due to the incorrect vertical speed applied. Due to the strong winds the ground speed used for the rate of descent calculation was incorrect. Instead of 140 Kts the aircraft was flying close to 100 Kts ground speed. At this slower ground speed the vertical speed required for a 3 degree profile would have been around 550 ft/min instead of 800 ft/min.

Decision Fatigue

How could such deficient decision making and brake-up of crew resource management happen? The most likely answer lies in the events of the preceding days to the flight.

The airline rescheduled the commander’s roster. On the day before the serious incident flight, the commander was originally planned to spend a day off-duty in Berlin. But at the end, he was repositioned to Prague. Given the original crew roster, the commander had already agreed on meeting with some personal acquaintances of his in Berlin. When he learned that he would not be in Berlin as scheduled, he flew from Prague to Berlin and back on the same day as a passenger.

The commander, thus, did not properly rest and did not sleep more than probably 4 to 5 hours prior to the flight of the incident day. The serious incident occurred on the fourth of five planned flights that day. The accident report thus concludes that reduced performance of the pilot flying, probably due to tiredness, was a factor directly contributing to the serious incident.

The report does not mention a reason for the reduced performance of the pilot monitoring for whom the incident flight was the first flight that day after sufficient rest.

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