

## FLIGHT

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EVENING NEWS

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PC-24 HOURS: PILATUS  
JET FLIES IN FOR A DAY

**P**ilatus's PC-24 business jet touched down in Geneva yesterday evening for its international show debut. The first test aircraft – P01 – is making a brief appearance on the static display - beside the 2016 model PC-12NG single engine-turboprop - before it returns to its Stans, Switzerland base at 18:00 local time.

"I'm delighted we can show off the PC-24 at a trade fair for the first time ever – it's an excellent opportunity to convince more potential customers that our unique super versatile jet

► By KATE SARSFIELD

offers unparalleled performance," says Oscar Schwenk, chairman.

The first public outing for the twinjet (HB-VXA) comes three years after the seven-seat PC-24 was unveiled at EBACE.

The Williams International FJ44-4A-powered superlight twin is the Swiss manufacturer's first jet-powered aircraft.

P01 made its maiden sortie in May 2015 and the second

prototype

joined the flight test fleet in November. "Together, the two prototypes have completed 300 flights and over 500 hours in Switzerland, Spain, Scotland and Iceland," Schwenk continues. "In the past few months we have conducted numerous important tests to explore the flight envelope and observe how the aircraft handles in natural icing conditions. The results are extremely positive and confirm that the PC-24 will be a superb aircraft in line with the high standards of our 'Pilatus Class' – exactly as our customers expect."

A full-scale cabin mock-up of the PC-24, equipped with "a brand-new" BMW Designworks interior, will be on display at Pilatus's stand for the duration of the show.

The PC-24 has a projected range of 1,950nm (3,610km), a take-off distance of 2,690ft (820m) and a landing distance of 2,525ft, enabling it to operate from unpaved runways and grass strips. "This gives the aircraft access to more than 21,000 airports worldwide – "10% more than competing jets," Pilatus says.

The type also features Pilatus's Honeywell-based Advanced Cockpit Environment avionics system. US and European Part/CS 23 certification are scheduled for 2017, leading to service entry soon after. US operator PlaneSense is launch customer for the clean-sheet design.



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twinjet makes  
its short visit  
to the static



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▲ KOUCHNER: Efficient

## Business jets can save lives

Anybody who thinks business aviation is just about champagne and caviar or even high-powered executives should think again – because the world's medical relief charities are increasingly finding that private aircraft are the best way to reach people in need.

Speaking at today's EBACE conference opening general session, Bernard Kouchner – the French medical doctor whose experience helping desperate people during the late 1960s fighting in Biafra led him to found Medecins Sans Frontieres – said he was surprised recently to find that it could be cheaper to charter an aircraft to carry 15 people even short distances than to buy 15 seats on commercial flights.

Kouchner, who went on to serve as a minister in the French government and remains active in medical relief, said that medical non-governmental organisations are relying increasingly on private aircraft to carry out missions to war and disaster zone. NGOs, he said, are increasingly able to show their supporters that private flights are easier, more efficient and not more expensive than other ways of reaching the people who need their help.

## FLIGHT EVENING NEWS

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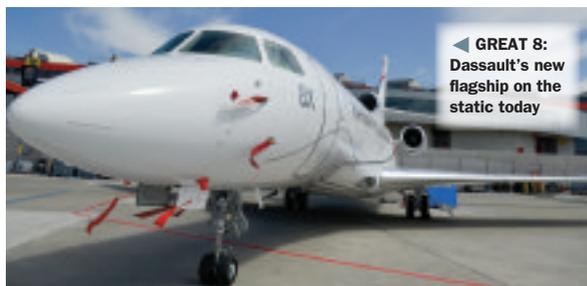
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# 8X-PECTATIONS FOR FALCON FLAGSHIP

► By MURDO MORRISON

**D**assault says certification for its new Falcon 8X flagship – making its debut here on the static display – is “imminent” following completion of flight test. The 6,450 nm (11,900km) trijet is expected to go into service on schedule in “late summer”, says the French airframer.

In late April, 8X serial number 03 completed a global proving tour designed to demonstrate operating capabilities under different conditions with a particular focus on cabin comfort and connectivity. The 65-flight 55,000 nm campaign took the aircraft to 46 destinations, from North, Central and South America to Europe, the Middle East, China and Southeast Asia. Missions varied in length, from 18min to



◀ GREAT 8: Dassault's new flagship on the static today

14h, including ultra-long range flights from Singapore and Sao Paulo to Paris and from New York to Abu Dhabi. The aircraft experienced a full range of flight conditions, from hot

weather and extreme cold (-33°C) to extra high and low humidity environments.

A total of 26 test and operational pilots took part in the tests, along with more than 60 engineers, technicians and flight attendants.

“Feedback from the operational trials

- cabin comfort, air conditioning, and in particular cabin noise - was excellent,” says Olivier Villa, senior vice president, Dassault Aviation Civil Aircraft. “Dassault has incorporated new innovations with the aircraft insulation which will allow us to lower the noise level by 2dB compared to the Falcon 7X, currently the quietest aircraft in the industry.”

The three aircraft used in the flight test programme are now being redeployed following the completion of the flight test and certification campaign, which totaled 833h over 408 flights.

Serial number 01 will be used to certify Dassault's new FalconEye Combined Vision System (CVS) on the 8X and use of the CVS in dual head up display configuration. Dassault says its FalconEye is the first HUD in the industry to blend synthetic and enhanced vision capabilities offering unprecedented situational awareness. Both approvals are anticipated in the third quarter 2016 and late 2017 respectively. Serial numbers 02 and 03 will be used by the company as demo airplanes.

Meanwhile, Dassault says its CVS is approaching certification on the Falcon 2000S and LXS twinjet aircraft.



► DONE IT!: Mottier celebrates certification with Bombardier's David Cole

## GE's Passport to success

GE Aviation has received type certification for the Passport engine selected to power Bombardier's Global 7000 and 8000 business jets, a top executive said at EBACE.

The type certification on 29 April by the US Federal Aviation Administration keeps the Global 7000 on track to enter service in 2018.

“It's a huge step for us and a big step of the programme,” says Brad Mottier, vice-president and general

manager of GE Aviation's Business and General Aviation and Integrated Services division.

Bombardier selected GE to supply what was then-called the “Tech-X” engine for the family of ultra-long-range, large cabin jets in 2010. GE rebranded the programme as the Passport engine at EBACE a year later.

The 16,000lb-thrust engine packs several new features, including a five-

stage fan blisk, super finish surface on the compressor blades, a 23:1 compressor ratio in the engine and oxide-oxide ceramic matrix composites for the mixer.

“This engine and this airplane is just awesome,” Mottier says.

GE has completed 2,400 hours of testing on the engine. By entry-into-service of the Global 7000, GE expects the engine will have flown 4,000 hours, including 8,000 cycles.

## Oil's well for P&WC engine trial

Pratt & Whitney Canada (P&WC) is calling for volunteers to register their turbofan and PT6A-family engines for an oil analysis trial, to help the company develop new technology aimed at accelerating the move towards a predictive maintenance environment.

Business aviation customers that sign up for the trial will be asked to collect oil samples at regular intervals and ship them to P&WC for analysis. All costs will be covered by the engine manufacturer. In return, participants will receive free-of-charge analysis results and technology updates.

P&WC vice-president customer programmes Timothy Swail (*pictured*) says the company is “talking to lots of customers”, but declines to say how many have signed up to the trial. “We have a plan to get a substantial number of customers across each product segment,” says Swail, adding that the aim is to collect “in excess of 10,000 samples” over the next two years. P&WC says the technology is capable of detecting minute particles within engine oil, enabling earlier detection of component deterioration.





▲ TAG TEAM: Sériès (c) with TAG's Graham Williamson and Bromma's Brian Liddle

## Bromma rises to Challenger

Sweden-based Bromma Jet has added a Bombardier Challenger 300 to its fleet of Dassault Falcon 7X aircraft, through a sales agreement with TAG Aviation.

The aircraft will be based in Paris and will operate charter flights.

TAG Aviation's European sales and marketing vice-president, Florent Sériès, says the Challenger 300 "offers exciting new opportunities for us" as TAG renews its collaboration with Bromma Jet.

"The charter market is buoyant right now and, thanks to our long history in this field, we find we have more clients than aircraft for them to charter," says Sériès.

## A LASTING LEGACY

Embraer Executive Jets and German business charter operator Air Hamburg today signed a purchase agreement for another Legacy 650. Delivery is scheduled for the third quarter of 2016 and it brings to nine the total of Embraer business jets in Air Hamburg's fleet, currently comprised of seven Legacy 600/650s and one Phenom 300.



▶ AT YOUR SERVICE: Jet Aviation's Robert Smith and Airbus's Benoit Defforge

## AIRBUS ADDS TO NETWORK

Jet Aviation has joined the Airbus Corporate Jets service centre network. The agreement, which was announced yesterday at the show, will see Jet Aviation's Basel maintenance facility join other network centres across the globe. These include the Airbus Corporate Jet Centre in Toulouse, Comlux America in Indianapolis, HAECO Private Jet Solutions in Xiamen, Sepang Aircraft Engineering in Kuala Lumpur and ST Aerospace in Singapore.

The network supports ACJ operators around the world through the provision of line and heavy maintenance services and cabin upgrades.



▲ FAHMY: Under our wing

## AfBAA's hands free drive

In the way that Africa leapfrogged landline telephone technology and instead embraced mobile communications, the continent could make the same jump in the way it embraces remotely piloted aircraft systems (RPAS).

And it will be helped on its way by the African Business Aviation Association (AfBAA).

Speaking at the show this morning, Rady Fahmy, AfBAA's chief executive, says without the overcrowded and regulated skies of the US or Europe, Africa is proving ideal for operating RPAS. A lack of infrastructure could lead to a wide adoption of RPAS technologies, he said.

Already Zipwire – a US start-up backed by Google Ventures – will be using RPAS launched with compressed air to deliver blood and medical supplies to Rwanda starting from July.

"Many of our operators will be multi-modal," says Fahmy. "Medevac is an important business aviation role. In Africa we would expect the mining companies to be looking at RPAS. That's why we believe we should be taking it under our wing."

AfBAA will demonstrate this when it launches the RPAS Forum alongside its AfBAC conference in Cape Town in November as an education event set to bridge traditional elements of business aviation with the technology of RPAS, Fahmy says.

Cape Town is to become the base for the annual conference, which will always be held in November.

# HONDAJET WAITING FOR ICING ON CAKE

▶ By STEPHEN TRIMBLE

European regulators approved the type certificate for the HondaJet on the eve of the EBACE convention with one major caveat, joining a similar, limited approval by the US Federal Aviation Administration last December.

The European Aviation Safety Agency (EASA) signed the HondaJet type certificate on 23 May after finishing the paperwork only the day before, says Steven Higgins, certification manager for high-performance aircraft and turboprops.

"So I was sweating," jokes Honda Aircraft chief executive and HondaJet designer Michimasa Fujino.

Like the FAA document approved six months ago, the EASA certification lacks approval to operate the HondaJet in known icing conditions, Fujino says. That means HondaJet operators can fly only in visual



▲ HANDOVER: Povey and Fujino

flight conditions.

Honda Aircraft has completed all company testing of the aircraft's wing de-icing system, Fujino says, leaving only type inspection authorisation (TIA) by the FAA and EASA test pilots to wrap up the process.

"Technically we finished all testing and we have submitted documents and we are waiting for FAA to grant us TIA testing," Fujino says. "So TIA certification test by [an] FAA pilot is the remaining item."

Speaking at the handover of the first HondaJet to the UK's Marshall Aerospace, head of sales and marketing Howard Povey said the delay should be very short. The FAA approval is expected as soon as June.

The inability to fly into known icing conditions limits HondaJet operations, but pilots still have flexibility. Marshall pilot Mike Finbow, for example, crossed the Atlantic in the HondaJet. Over the six-leg trip, only one flight was cancelled due to the on flight into known icing conditions, and that was a precautionary decision.

The HondaJet includes several innovative features, including a natural laminar flow wing, which is finely contoured to prevent the airflow from becoming turbulent over the majority of the wing surface. Laminar design imposes a thin leading-edge, leaving no room for pneumatic-powered anti-icing equipment. Honda Aircraft instead deices the wing using bleed air from the engines.



▲ PEN TO PAPER: (l-r) Ken Snodgrass, Mike Beazley, Frank Rott and Gereon Arens ink the deal this morning

## Honeywell signs up HAITEC as dealer for JetWave satcoms

Honeywell Aerospace has appointed German-based HAITEC VIP Maintenance as a dealer and service centre for its JetWave satellite communications system. The two companies signed the deal at the show this morning.

HAITEC says that two Airbus ACJ319s will this autumn become the first business jets to have the system installed at its facility.

tem installed at its facility.

"We are now able to offer our customers solutions beyond classic aircraft maintenance and cabin refurbishment for all types of Airbus Corporate Jets, Boeing business Jets and Gulfstream G550/650 jets at our VIP facility at Erfurt Airport in Germany," says HAITEC chief executive Frank Rott.

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## Jetex grows its FBO network



▲ **MARDINI: Targeting UK**

Dubai-based trip support specialist JetEx is becoming one of the fastest-growing FBO brands in the world, announcing at EBACE new facilities in Greece, Morocco and Spain.

Speaking to *Flight Evening News* last night, chief executive Adel Mardini says the company is now represented in nine countries and is targeting around another 12, including the UK and Germany. "We are tendering at Berlin Brandenburg and Luton in the UK will be one of our next destinations for sure," he says.

The company, founded in 2006 as a trip support company, opened its first FBO, in Paris, in 2009. It was followed by Shannon in Ireland in 2012 and Dubai's Al Maktoum airport in 2014. In 2015, JetEx moved into Latin America with FBOs in Santiago, Chile, and Toluca in Mexico. Its most recent opening was Marseilles, two weeks ago.

The Morocco FBOs – in Casablanca, Rabat, Marrakech, Dakhla – will be established from scratch after JetEx won a government tender, and will be in operation in four months, says Mardini. The FBOs in Greece and Spain are existing facilities that JetEx has taken over, and will re-open around July.



▲ **ALL FOR ONE: Gustavo Barba, Samir Sajet, Munir Khalifa and Ali Alnaqbi**

# ORGANISATIONS GET UNDER ONE UMBRELLA

**A** new umbrella organisation for the world of aviation services was launched in Geneva last night.

The new non-profit organisation, the International Aviation Services Organization (IASO), was unveiled at a special event with representatives from airlines, regulators and governments in attendance.

"It could have been launched at IATA or Farnborough, but EBACE was the right place at the right time," said

► **By ALAN PEAFORD**

Ali Alnaqbi, founding chairman of the Middle East Business Aviation Association (MEBAA) and a member of the IASO board. "The association covers all sectors and for us, it is important that business aviation is involved at the very beginning.

According to the association's vice president operations Roy Barnett, a former FAA manager and general manager of the Pacific Aviation Safety

Office in Port Vanuatu, IASO's mission is to provide a unified voice for aviation services companies at airports around the world that will champion key issues affecting air freight, aviation services and logistics.

"Our goal is to improve safety and facilitate the highest standards in aviation services, working closely with established industry organizations to see how they can benefit in becoming an IASO member," says Munir Khalifa, IASO president and founder. "IASO

provides a direct representative link with other established associations, including IATA, ICAO, AAA and MEBAA."

Also speaking at the launch was Capt Samir Sajet from the UN's World Food Programme, who is also a board member of the fledgling group.

IASO members will be collaborating to support humanitarian operations to eradicate world hunger through aligning with the WFP's 'Helping Hands' initiative.

## Aerion speeds up certification bid

Aerion will apply for type certification for a supersonic business jet in 2017 to stay one step ahead of new noise regulations that threaten to destroy the infant industry, says chief executive Doug Nichols.

The Airbus-supported start-up is designing the AS2 trijet to comply with current ICAO Chapter 4 noise regulations.

More stringent standards take effect after 2017 for aircraft weighing more than 54,431kg (120,000lb).

For aircraft weighing below that threshold, the new standards take effect in 2021.

The AS2 is currently designed with a maximum take-off weight of about 52,200kg, Nichols says. In theory, that gives the

start-up up to five years to apply for a type certificate under Chapter 4 noise standards. However, if the weight of the AS2 grows as the design transitions from computer drawings to manufacturing reality, Aerion will have no options for certifying the aircraft under existing noise standards.

As the more stringent noise

regulations take effect, no aircraft capable of supersonic speed will be able to comply with the standards for take-off noise with existing engine technology, says Richard Tracy, Aerion's chief engineer.

To meet Chapter 4 regulations, Aerion already must accept a range penalty of 500-750nm, adds Tracy.

### IN BRIEF

#### AMAC GLOBAL GETS VENUE INSTALLED

Rockwell Collins has upgraded its CES cabin entertainment system on an AMAC Aerospace Bombardier Global aircraft to its Venue solution. The company says Venue is the "most cost-effective upgrade solution" for its legacy CES system. The newly-upgraded aircraft is now operating in Europe. Rockwell Collins also said at the show it has validated the performance of Inmarsat's upcoming Jet ConneX in-flight broadband connectivity system. The Ka-band satellite-based solution is scheduled to launch later this year.

#### HEMISPHERE: THE RIGHT RANGE

An article in our 23 May edition of *Flight Evening News* issue misstated the range of the Cessna Citation Hemisphere, which can fly missions up to 4,500nm. We are happy to set the record straight.

## QUEST SHARES ITS KODIAK MOMENT

Quest Aircraft has returned to EBACE to promote its VIP configured Kodiak single-engine turboprop, as it awaits European certification of the all-metal type.

The Kodiak – equipped with Quest's executive interior, called Summit – is on display in the static park. The aircraft features club seating with a recline function, folding tables, forward cabinets, enhanced soundproofing and other amenities. The Kodiak model on display also includes an external cargo pod, over-size tyres, air-conditioning and upgraded avionics options.

"We are very pleased to again have a Kodiak here at EBACE," said Steve Zinda, Quest's vice president of sales for Europe, Africa, the Middle East

and China, at the show. "We have continued to expand our international presence and being at key events like EBACE allows us to showcase the Kodiak to a wider audience."

The Kodiak's appearance in Geneva comes off the back of a record year for the company with 32 of the short take-off and landing types delivered during 2015.

"Kodiak deliveries have risen steadily since 2012, as worldwide demand for the aircraft has grown," says the Sandpoint, Idaho-headquartered company. To date the Kodiak has been validated in 32 countries, "and we are working on several additional certifications, including from the European Aviation Safety Agency (EASA)", adds Quest.



▲ **SUMMIT SPECIAL: Aircraft has new interior**



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NEWS P11



# VISION SYSTEMS' WINDOW IS NO DIM IDEA

Picture: BVA

▶ TOUCHING: Floriane Pellet demonstrates the system

At Vision Systems, product manager Floriane Pellet sees the light – along with the route and destination information – thanks to a new electronically dimmable window system combined with a transparent video display.

Showing the system today at EBACE, Pellet says the retrofittable inside window gives passengers touchscreen control of heat and light, and video services like moving maps and travel information.

And, she says, SPD technology – Suspended Particle Device – means the windows go between clear and 99.9% dark with instant response time.

Vision Systems dimmable windows are already or soon to be installed in Dassault Falcon 5X, Epic E1000, Airbus Helicopters H175 and HondaJet HA-420 aircraft.



## Power pairing debut at show

Aero Specialties and PowerVamp are exhibiting jointly for the first time to celebrate a new partnership, under which the former has agreed to market the latter's power solution products in the USA, Mexico and Canada.

PowerVamp's vice-president for North American operations, Brian Clear, expects the agreement will result in "a huge, positive difference" in the UK-based company's sales in these markets.

"This gives us much greater exposure and will improve British exports to that part of the world," says Clear.



## ROOM IN HOTELS FOR MOONJET

Sharjah, UAE-based flight support services provider Moonjet is optimistic that the business aviation market is on the up, and is looking forward to growing its business – particularly in the areas of hotel accommodation and catering.

President and chief executive Michel Jako's brightly-coloured stand is sure to

attract attention and draw in potential new customers to this EBACE regular.

"The market is good and we are hopeful that it is getting better. Clients are getting new aircraft," says Jako.

Moonjet has offices in Sharjah, Amman in Jordan and Biggin Hill in the UK. It offers its services globally.

## Townsend's sunny leather forecast

New York-based Townsend Leather is banking on business jet sales picking up to keep the market strong for its corporate aviation upholstery products, which make up 60-70% of its business.

"We're hoping it's a good market where they sell some planes because things are kind of slow right now," says the company vice president Tim Beckett.

Townsend produces custom-matched leathers in more than 1,000 colours for business aircraft interiors, with an emphasis on durability which Beckett says means that replacements are "usually because of style changes" rather than the result of a weakening of the product.

With each aviation order requiring 10-12 hides, Townsend provides a "really niche" product, says Beckett (pictured right).



## Price is right for Foglizzo

Italian leather and luxury products manufacturer Foglizzo is showcasing its latest flight kit range and hoping to secure the first customer for its leather and silk travel pillow with matching eye mask.

The luxurious in-flight sleep aid has been tested by potential customers but the company has yet to secure an order, says Foglizzo designer Chiara Bertoli (pictured).

In addition to customised aircraft interiors products and flight kits, the Turin-based manufacturer makes leather-bound desk tidies and notebooks for in-flight offices on business jets.

The company's sales division is in an position most other vendors would envy, frequently taking calls from customers who ask, "What is your most expensive product?", says Bertoli.

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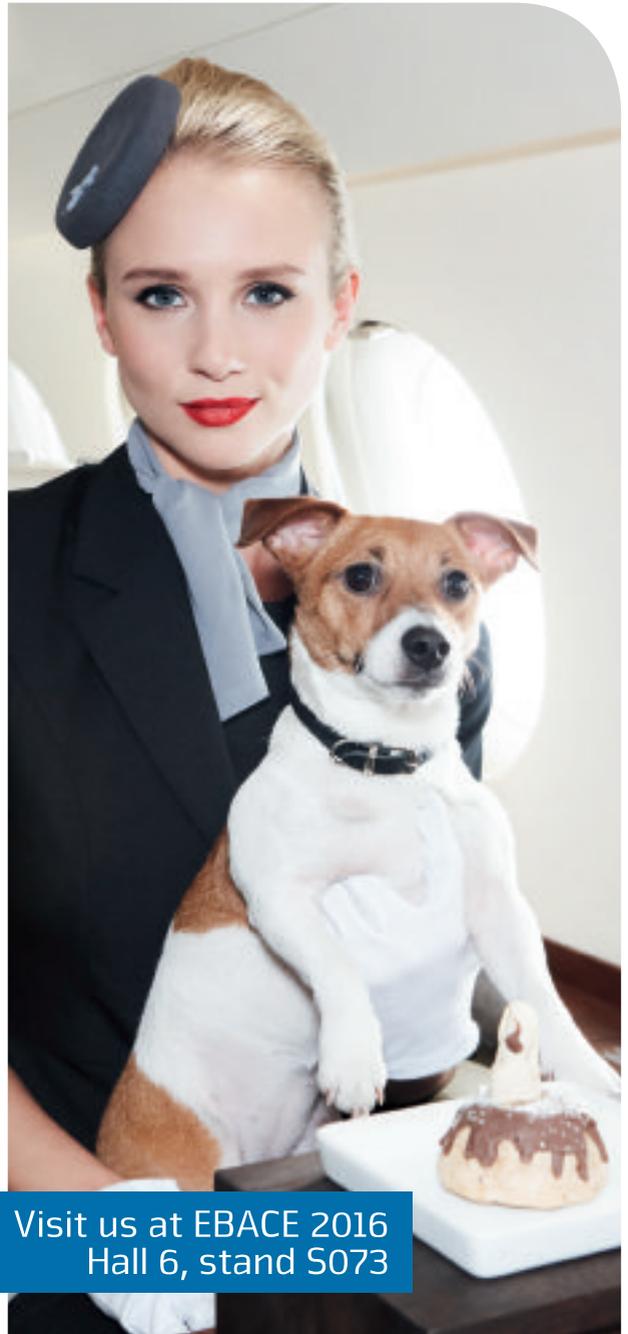
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◀ FIZZING: Bombardier's David Coleal (left) toasts the 100th delivery with Flohr

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# VISTAJET HITS ITS HUNDRED

**F**ast-growing all-Bombardier European charter company VistaJet is at EBACE celebrating a milestone delivery.

At the show yesterday, Canadian airframer handed over the 100th jet to be delivered to VistaJet - a Global 6000. It brings the Malta-based company's current

► **By KATE SANSFIELD**

fleet to 64 aircraft.

Speaking to Flight Evening News, VistaJet founder and chairman Thomas Flohr said: "This is a huge milestone in the history of VistaJet and evidence of just how far our company has come. Over the past 13-years, we have invested billion in modern and efficient Bombardier aircraft and our fleet has grown from just five jets in 2006 to more than 60 today."

Flohr started out in 2003 with a single Learjet 60. "The follow-

ing year I added a Challenger 604 and took the biggest risk of my life in 2005 when placing an order for three more business jets."

The gamble paid off. Last year VistaJet made 15,000 flights to 189 countries. This tally is expected to rise this year to 20,000 flights, says Flohr.

VistaJet's fleet is split roughly half and half between Globals and Challengers. It's orderbook contains Challenger 350s and Global 6000s and the company says it is taking new aircraft at a rate of around 12 a year.

## IN BRIEF

### DASSAULT APPLIES THE FINNISH TOUCH

Dassault Aviation has approved approved Helsinki-based Polar Aviation as an authorised service centre for the Falcon 900, 2000 and 7X. The approval allows the Finnish company to provide line maintenance and dispatch teams to respond to Aircraft On Ground (AOG) situations.

### JET AVIATION ADDS EIGHT AIRCRAFT

Jet Aviation says it is continuing to grow its global managed fleet, adding eight aircraft to its register in the past two months. They comprise two Gulfstream G650s and a G550, as well as an Airbus Corporate Jet in Europe, Middle East and Asia. Meanwhile, two Dassault Falcon 2000s, a Sikorsky S-76 and a Global Express have joined an almost 300 strong fleet.

## Universal Avionics displays optimism

Universal Avionics has its eye set on mid-2016 for certification of its EFI-890H Advanced Flight Display for the Airbus Helicopters Puma AS332L1, and technical standard order (TSO) approval for its UniLink SCN 31.X software upgrade.

The helicopter package includes dual primary flight displays, a dual UNS-1Fw multi-missions management system (MMMS) with 5in flat panel control display units, and a single radio control unit.

"The first helicopter is a transport configuration and the second helicopter with SAR functionality is well into the modification process," says Universal Avionics technical sales director Grady Dees.

Universal Avionics' UniLink SCN 31.X software upgrade, also on track for mid-2016 certification, will enable operators with the Controller-Pilot Data Link Communications (CPDLC) message to meet the requirements of the European Link 2000+ Programme.

"With receipt of this certification, our customers will be able to start realising the efficiencies and time savings associated with communicating via CPDLC," says Universal Avionics vice-president sales and marketing Dan Reid.

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◀ **EMISSION POSSIBLE:**  
Company is driving several environmental initiatives

## AIR BP HELPS BUSINESS AVIATION GO GREEN

Air BP has launched what it calls its carbon-reducing Environmental Solutions initiative at the show. The fuel provider says it already provides a number of services to “customers working towards a lower carbon future”, but this is the first time different elements have been brought to-

gether. The offering includes Air BP’s Biojet alternative aviation fuel that the company says “offers a minimum carbon emission of 35%”. Other measures will help operators “achieve a reduction in carbon emissions that can increase efficiency and enhance their reputation”.

Norbert Kamp, chief commercial officer at Air BP says the business is “committed to the aviation industry’s efforts to achieve its ambitious environmental targets”. He adds: “The launch of the Environmental Solutions offer at EBACE demonstrates that Air BP is focused on supporting

the business aviation sector in meeting the target of a 50% reduction in total emissions by 2050, relative to 2015.”

During the show, delegates visiting the Air BP booth (131) can have their carbon emissions to Geneva calculated and offset for free.

## Bombardier forecasts a healthy decade of deliveries

Bombardier is predicting 8,300 business jet deliveries – in the markets it competes in – over the next decade.

The outlook is upbeat given the current weakness in several parts of the market, including the large-cabin segment which is crucial to the airframer’s fortunes.

In a forecast released this morning, the Canadian manufacturer says the shipments will represent around \$250 billion between 2016 and 2025.

It expects North America and Europe to remain the biggest markets, although it says growth will return in emerging regions, which in the past few years have been the most enthusiastic buyers of large-cabin, long-range types. The airframer predicts 3,930 deliveries in North America, followed by Europe with 1,530 deliveries.

Bombardier’s study only covers areas of the market it has a product offering in, so excludes aircraft smaller than its super-light Learjet models.

The company’s products include its Challenger 350 and 650 super mid-size and large-cabin variants, together with the long-range Global family.

# G500 STAYS HOME AS IT RACES TO ITS GOAL



▲ **BURNS:** Flight testing going better than expected

## Gulfstream going all out for on-time certification

**G**ulfstream ditched a plan to fly the G500 business jet to display at EBACE in order to focus on completing flight test as quickly as possible, with an eye on delivering the first aircraft ahead of schedule, says chief executive Mark Burns.

“If we can get G500 to market a little sooner than we said and G600 to market a little sooner than we said, I think that bodes well for our growth,” Burns says in an interview with *Flight Evening News*.

Gulfstream yesterday announced a plan to accelerate first flight of the G600 from early 2017 to the fourth quarter of this year. The G500, which entered flight testing 12 months ago, remains on schedule to complete certification in 2017 and enter service in 2018, but flight test results so far give Gulfstream executives hope of beating that timeline.

► **By STEPHEN TRIMBLE**

“I think the flight test is going better than we expected, faster than we expected. There’s always some uncertainties when you’re flight-testing an airplane. But right now things are going well. The fact that we believe we can fly the G600 a little early hopefully bodes well for the whole programme,” Burns says.

The G500 and G600 are designed with Gulfstream’s widest cabin, Pratt & Whitney Canada PW800 engines, fly-by-wire controls and an industry-first application of active control sidesticks in a commercial aircraft. Despite the injection of new technology, the programme is running ahead of schedule, with the G500 already compiling more than 1,000 flight hours on 250 flights.

At the same time, Gulfstream is counting on the G500 and G600 to restore eroding demand for the G450 and G550. Last year, Gulfstream ramped up production of the G650, but those gains were offset by sharply lower deliveries of older models. Gulfstream also counts 17 used G650s for sale on the used market, but so far that hasn’t reduced demand for the ultra-long-range jet, Burns says. The outlook is not “doom-and-gloom”, he adds, but there remains much uncertainty. “Being in a cyclical business that’s so tied to the global economy, 2017 is hard to predict,” Burns says. “It’d be hard to even consider what’s going to happen that far out to us.”

## JSSI’s maintenance deal for used business aircraft is just Capital

Jet Support Services Inc (JSSI) will offer a comprehensive maintenance programme for used aircraft sold by Global Jet Capital that lack a coverage policy.

The JSSI “tip-to-tail” unscheduled maintenance programme for used Global Jet Capital aircraft sales also comes with specified pilot training and certain complimentary purchasing and financing services.

“We believe this programme coverage will deliver value to prospective buyers,” says NSSI president and chief executive Neil Book.

The JSSI programme also includes rental engines and components for Global Jet Capital aircraft buyers on six-month or 400-flight-hour terms during unscheduled maintenance events.

“By partnering with JSSI we can provide buyers with complete peace of mind and financial certainty, as well as comprehensive global support, a combination which we know will be compelling to those looking for a pre-owned aircraft,” says Dave Labrozzi, chief operating officer of Global Jet Capital aircraft sales.

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# CUTS KEPT US FLYING

## 'Tough action' saves Bombardier

**B**ombardier says "tough decisive action last year to reduce production rates" has saved it from the worst of the collapse in new orders and residual values of large-cabin jets. "We were the first [manufacturer] to make these reductions," says David Colea, president of Bombardier Business Aircraft. "We have seen a decrease in the pre-owned inventory in the Global category – that was a result of us reducing capacity in time. Others have seen sharp declines [in residual values]."

► **By MURDO MORRISON**

Bombardier made 31 deliveries and took 40 net orders in the first quarter. Although shipments were down from 45 in the same period last year, Colea says the manufacturer's book to bill – the ratio of orders for every delivery – has returned from less than one to 1.3.

The Canadian manufacturer says it remains "focused on first flight" of its Global 7000 this year.

The first three flight test aircraft are in production and the GE Passport engine has been installed on the first, FTV 1. It will fly from Montreal to Wichita to begin the type's test programme, which is expected to last until certification in the second half of 2018. "It's all hands on deck," says Colea.

Bombardier describes the 7,400nm-range Global 7000 as the first "four-zone" large business jet. It has a list price of \$72 million and is some 4m longer than its current flagship, the Global 6000.

The company says it will "define the timeline" of the shorter but 8,000nm-range Global 8000, once its stablemate as flown.

Although Bombardier is not disclosing sales numbers for the two types, it says over 90% of orders have been for the Global 7000.

## JERSEY JAUNT FOR GAMA'S HONDAJET

The English Channel island of Jersey had a treat last week when the HondaJet HA-420 made its maiden flight to the island thanks to Gama Aviation. It came ahead of the recently-certificated type's appearance at EBACE this week.

Gama acquired Jersey-based FBO Aviation Beauport earlier this month and hosted a showcase for the new jet.

"Jersey is an attractive business aviation market with a number of high net worth local

residents, offshore and aircraft owning businesses, leading to 3,368 business aircraft departures from Jersey in 2015, an 8.3% increase on 2014," says Gama chief executive Marwan Khalek.

"With new types such as the HondaJet, the advent of single engine commercial operations and new membership models such as Wheels Up, we see exciting times ahead for our FBO as demand continues to rise."



◀ **MANUAL WORK:** Kurt Edwards and Martin Lidgard

## WEB MANUALS SETS STANDARD

The International Business Aviation Council (IBAC) has selected Swedish digital documentation developer Web Manuals to develop the authoring and publishing tool for its international standards such as the voluntary International Standard for Business Aircraft Operations (IS-BAO) and International Standard for Business Aircraft Handling (IS-BAH).

Kurt Edwards, IBAC director general, says: "Following a review of leading document digitisation systems, IBAC selected Web Manuals for its ease of use, version control, revision management, and approval workflows. We are confident the application will streamline our work and thereby benefit industry safety."

The IS-BAO/IS-BAH standards will now be available to Web Manuals' customers as integrated Compliance Libraries within the Web Manuals application. Like Web Manuals' EASA and FAA Compliance Libraries, this feature will automatically alert subscribing users to the sections of their manuals which require amendments to maintain compliance with IBAC standards.

Martin Lidgard, chief executive and co-founder of Web Manuals, says: "Our operator and ground handling customers derive the same benefits of time-savings and increased reliability in the management of their aviation manuals, and can now keep current with IBAC's standards."

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# LET'S GET CONNECTED

By DOMINIC PERRY

**S**peak to certain executives at the aerospace division of Honeywell and there is one word that dominates conversation: connectivity.

And, as they outline the potential for reliable, high-speed, in-flight broadband, there is an almost evangelical zeal in their delivery.

Carl Esposito, vice-president strategy, marketing and product management at the Phoenix, Arizona-based firm, falls into that category. He says Honeywell is building a strategy around the “connected aircraft”.

That strategy is underpinned by the launch this year of the Inmarsat GX Aviation (known as Jet Connex for business aviation) Ka-band service, for which Honeywell provides its Jet-Wave hardware.

GX promises global, high-speed coverage – other providers make similar claims – and Honeywell is keenly aware of the possibilities it offers above and beyond in-flight wi-fi for passengers.

“We are asking: how does connectivity really enable the rest of the airplane to communicate more effectively and efficiently than it has done before?” says Esposito.

## WEATHER RADAR

He cites the example of a nose-mounted weather radar which is looking some 300nm (555km) in front of the aircraft. If data accumulated by several aircraft can be broadcast to a central location, aggregated and transmitted back, it will provide a richer, more comprehensive and broader “crowd-sourced” weather feed in real-time. This would give “truly revolutionary access to information”, says Esposito.

Clearly the aircraft being connected is not new in itself; Inmarsat boasts that its Classic Aero service has been around for 20 years and the ACARS datalink has been operating since 1978. However, what differs is the amount of data which can now be transmitted.

This will, in theory, allow more detailed information to be broadcast from all the aircraft’s major systems or components. Esposito argues Honeywell, with its nose-to-tail product portfolio, is best placed to understand which information, or combination thereof, is most relevant to be transmitted.

“You are going to see [connectivity] evolve our products. There’s not a product line in our portfolio that doesn’t have a connectivity strategy behind it,” he says.

“We are just scratching the surface of what you are going to see from an operational perspective.”

Mike Edmonds, vice-president for services and connectivity, is using the better links from the aircraft in a slightly different way. Under Honeywell’s GoDirect banner it has tablet-based applications available or in development.

These include: My Maintainer – which offers maintenance crews a wireless link with the aircraft (the ultimate aim is remote access for diagnostics and in-flight reporting); Flight Preview – which gives pilots the opportunity to ‘fly’ an approach before arriving at the airport; an adaptation of



◀ **BRAIN WAVE:** Honeywell is at the cutting edge of aero neuro technology, and (above) senior director Bob Bevans

## Honeywell is exploring radical applications for high-speed, in-flight broadband and pushing back boundaries in fuel cell tech

its Weather Info Service to produce vertical optimisation guidance and avoid storms or turbulence; and Aviaso, a company acquired by Honeywell last year, which brings data analytics software to the aviation market to provide better analysis of fleet fuel use. Although more popular with scheduled airlines than business aviation operators, Edmonds points to its “relevance” to fractional providers as well.

“This approach is enabled by tablets and connectivity,” he says. “We can roll services out much faster and more cheaply into apps rather than the avionics. We can test them in a tablet and if they offer real value today, then tomorrow they will end up back in the cockpit.”

“The old choice was to wait three years before you could get it into the cockpit, but now we can get it out there for people to use and see if it makes sense [to build it into the avionics].”

Although connectivity appears to be flavour of the month at Honeywell, the manufacturer is also pushing ahead with updates to its avionics and cockpit display systems.

It already offers its SmartView synthetic vision system – available on Dassault and Gulfstream business jets as their respective EASY II and Plane View flight decks – and will look to bring a second iteration to market in 2018. In the near term, it is adding a system called Taxi View, which gives pilots a “para-sail” view of the aircraft on the primary flight display, aiding airport navigation.

Elsewhere within the Advanced Technology Avionics Labs at its Deer Valley facility in Arizona, even more high-tech solutions are being developed.

For example, using a modified Beechcraft King Air, Honeywell has proved that with the right equipment the aircraft can be commanded to make turns or level out, solely by measuring and monitoring a pilot’s brain waves.

The company is not suggesting controlling the aircraft would be the eventual application, but the technology could be employed to turn a page in a flight manual or “if you want a different modality when your hands are engaged or you are talking to someone”, says Santosh Mathan, staff scientist.

“We took on the aircraft control challenge because it was a difficult one, but the eventual application is probably something less exciting, like turning a page or entering a particular digit,” he adds.

A few doors down is a laboratory capable of reproducing the ambient noise in a typical cockpit. It is here that speech recognition technology is being worked on, and the tablet-based programme developed so far is sufficiently robust it can take live air traffic control instructions – typically jargon-filled and delivered at rapid-fire speed – and convert them into deciphered text. This serves as both a real-time aid and reference tool.

Meanwhile, over at Honeywell’s factory hard by Phoenix Sky Harbor international airport, it is engines that domi-

nate. The company claims the plant is “one of the highest-volume engine facilities in the world”, although that is driven by the fact all its engines – from turbofans to turboshafts and auxiliary power units – are produced under the same roof, in sharp contrast to other manufacturers.

Sitting at the top of the range is the HTF7000 turbofan, which powers a number of super-midsize business jets including the Embraer Legacy 450 and 500, Gulfstream G280 and the in-development Cessna Citation Longitude.

“It has been the engine of choice for super-medium business jets. It’s been a bit of a home run for us – we own the market segment”

**BOB BEVANS**  
Senior director, technical sales, business and general aviation

“It has been the engine of choice for super-medium business jets. It’s been a bit of a home run for us – we own the market segment,” says Bob Bevans, senior director, technical sales, business and general aviation.

The 7,000lb-thrust (31.5kN) HTF7000 uses a four-stage axial compressor and single-stage centrifugal compressor, featuring a 20:1 overall pressure ratio.

However, there is potential for growth. “We continue to see business aviation move towards a higher thrust-class engine so we are looking to see what the next launches will be from our customers,” says chief technology officer Bob Smith.

“Certainly we have an interest in that [growth]. It’s just going to require

the aircraft to show up that needs it.”

Although the HTF7500E for the Embraer Legacy 450 and 500 is at about 7,500lb-thrust, to expand the engine much beyond that would require a new core, albeit with similar geometry, says Bevans.

“Risk reduction” studies have been carried out for a higher-thrust model, says Bevans. “We have literally been using one of the spare development engines to test the technologies out.”

## 3D PRINTING

Honeywell, in common with any number of manufacturing firms, is also exploring the possibilities offered by 3D printing. Its first production application is a splash guard for an oil tank in the APU, but this year another six or seven components – mostly nozzles and brackets – will go into production, says Don Godfrey, engineering fellow and additive manufacturing lead at the company.

“We see this technology being used for non life-critical – meaning non-rotating – parts for the next few years. What we are doing today is getting the engineering community, our customers and the FAA [US Federal Aviation Administration] comfortable with the technology,” he says.

Fuel cell technology is another area of research, although this appears some distance from making an appearance on aircraft. Smith explains: “We feel the fuel cell capability – the stack itself – is going to have to mature a lot more to get onto the architecture of the aircraft.”

The limitations, he says, are cost, weight and the volume of the fuel cell stack. “Unless the architecture of the aircraft changes, it’s not ready to go into there.

Possible uses, says Smith, include a replacement for the RAM air turbine “but does that really trade in all that wet to replace one of the simplest components with a higher degree of complexity?”, emergency back-up power, or a means of changing the power distribution completely. This would allow less power to be taken from the main engines, instead provided by “distributed fuel cells”.

“It is one of the areas we want to understand but we don’t think any of these are mature enough to go there.” An “aggressive” change to the electrical architecture would be required and then fuel cells “may start to buy their way on”, says Smith. ■

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A former Hawker warehouse has been transformed into a new assembly line, where the first Longitude static test aircraft is taking shape



# TEXTRON BUILDING FOR THE FUTURE

**A** static test aircraft and pieces of the first four of five planned flight test aircraft for the Cessna Citation Longitude are coming together on a makeshift assembly line inside the formerly empty bay of a Textron Aviation building known as Plant III.

As part of the newly-christened "East Campus", Textron Aviation inherited the building when Cessna acquired Hawker Beechcraft in 2014. Half of Plant III contains a composite manufacturing complex, with auto-claves large enough to contain the full wingspan of a midsize business jet. The other half of the plant used to be an empty, roughly 500,000ft<sup>2</sup> (46,000m<sup>2</sup>) bay Hawker Beechcraft used as a parts warehouse.

Following the acquisition, Textron Aviation repainted the grimy ceiling a glossy white, replaced dim overhead bulbs with fluorescent light and installed a modern, slip-resistant floor. Voila: the dingy warehouse was transformed into Textron Aviation's experimental final assembly line with the sole mission of assembling test articles for the company's latest products.

"What we have is a product development machine," says Ron Draper, Textron Aviation's senior vice-presi-

► **By STEPHEN TRIMBLE**

dent for integrated supply chain.

The transformation of Plant III encapsulates Textron Aviation's straightforward product strategy. The company's goal is to deliver new products faster and more efficiently than the competition. That means outsourcing as little production work as possible. Most of the structural assembly work, from tooling to landing gear to wings, is designed, fabricated and tested in Textron Aviation factories.

Last September Plant III was virtually empty, containing a few pieces of tooling and, somehow, the first completed static test article for the Longitude programme, which was trucked to Las Vegas in November to be put on display for the annual NBAA convention.

Plant III looks very different today. An assembly line runs nearly the full length of the bay, with partially completed wings in the right foreground, partially assembled fuselage sections in the left foreground and, further back, a maze of tooling dedicated to other sections of the aircraft.

FTA-1, the first static test article, is in the most advanced assembly position, with the fuselage nearly com-

pleted. The first set of wings is already complete and is undergoing vibration testing at another site. They will be returned to Plant III and joined to the fuselage later on, supporting a first flight planned for this summer.

The first flying prototype, nicknamed "proto" in Textron Aviation nomenclature, is right behind the FTA-1. Pieces of the next three flight test vehicles – P-1, P-2 and P-3 – are also in advanced stages of assembly. The fifth and final test aircraft, P-4, will enter the assembly stream at a later date.

Meanwhile, workers are assembling the wings for the flying prototype. Rigged up in a vertical tooling structure, visitors could count the two-spar, nine-stringer and 14-rib assembly. If the Longitude wing design looks familiar, it is. The 28.6' wingsweep and the loft contours of the similarly sized Hawker 4000 have been repackaged to suit the Longitude, although the high-lift system and manufacturing process are completely different.

A Kuka-branded robot lies near the wing assembly machine, partially unpacked from its shipping container. The machine will be used to drill holes in the wing panels of the Longitude, replicating increasing levels of drilling automation in Cessna-branded jets, says Chet Thorne, Textron Aviation's engineering director for jet aircraft.

Vertical assembly tools are everywhere in Plant III. Tall blue tooling rigs rise high off the floor, with integrated scissor lifts raising and lowering workers to the exact spot they need to work. This is another recent innovation with Textron Aviation. The company used vertical assembly tools in other programmes, such as the Citation Latitude, but dramatically expanded their use with the Longitude programme, Draper says.



▲ **FLIGHTDECK:** The Longitude's electronic systems are under testing

While the wing owes a legacy to the Hawker 4000, the fuselage is all Cessna Citation. Looking at a completed aft fuselage assembly section, Thorne estimated that the only major difference on the Longitude are the attachment fittings for the jet's bespoke engines – Honeywell HTF7700 turbofans.

The development of the fuselage is proceeding on schedule, but not all of the systems are visible yet inside Plant III. At other Textron Aviation sites in Wichita, a series of test rigs is putting the electronic systems through safety of flight checks. An iron bird is commissioned, testing the first application of a fly-by-wire rudder and electronically actuated spoilers in a Citation jet.

Another innovation developed for the Longitude is a unique power transfer control unit (PTCU). Normally a system used to transfer hydraulic power between two lines contains three major components: a pump, motor and controller. Textron Aviation developed an integrated PTCU for the Longitude, which is also installed in a test rig, Thorne says.

The Longitude's home in Plant III is designed to be temporary. Once the flight test articles are complete, some

of the tooling will be transferred to Plant IV, a three-bay structure elsewhere on East Campus that houses production of the Beechcraft King Air, Baron and Bonanza. For the first time in Wichita history, a jet bearing the surname of Clyde Cessna will be assembled in the house built by Walter Beech. The King Air line has already been moved from the central bay of Plant IV to the East Bay, making room for the Longitude.

To accommodate the 5.92m (19ft 5in)-tall Longitude, Textron Aviation is raising the top of the door just beyond the last position of final assembly, allowing the twinjet to roll out to the runway. Textron Aviation will then fly the Longitude to "West Campus", also known as the Cessna factory, for interior installation.

By that time, the Longitude programme will be fully installed inside Plant IV, but Plant III will still not be empty. The next aircraft programme in the Cessna Citation Jet pipeline – the Hemisphere – will probably be its next occupant. Once the Hemisphere moves into rate production, it, too, could be moved to another, still-undesignated site, leaving Plant III open to accept whatever comes next in Textron Aviation's product pipeline. ■



▲ **SPACIOUS:** The Longitude's interior



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Singles show their staying power  
FEATURE P22

► **CONCEPT:**  
Lufthansa Technik will reveal its A350 design at EBACE this week



Photo: Lufthansa Technik

► **By MURDO MORRISON**

**L**ufthansa Technik may be having a torrid time on the completions front – after taking the decision last year to put its Bizjet facility in Tulsa in “dormant mode” – but the German maintenance house is at EBACE in confident mood, promoting a series of cabin innovations from interior concepts to connectivity solutions and even its own seat.

At the show, the Hamburg-based company will unveil a design concept for the Airbus A350 it says is the result of a long-term study of the buying patterns, tastes and backgrounds of the world’s new billionaires. The floorplan switches many of the established rules associated with bizliners by, for example, moving the main bedroom to the front of the cabin, where it is less noisy, and connecting it with sliding doors to a larger lounge to give owners more private time and space with their families.

“This is an airplane for a family. It’s not strictly a business aircraft,” says project manager Christoph Ahrens. “These billionaires are global nomads, who are very family orientated. Time is a precious commodity for them and privacy is rare,” he adds. “Their family is their anchor.”

**SPA**

Other ideas include an aft spa with heated stone couches for massages, and a steam shower. Although the design is only a concept, Lufthansa Technik says Airbus has supported the project and that it could create a very similar interior within two years of an ACJ350 being sold. “The aim of this project was very much to create something real,” says Ahrens.

Lufthansa Technik is also announcing enhancements to its NICE (Networked Interfaced Cabin Equipment) range, introduced in 2010 and standard on eight business aircraft platforms including the Bombardier Learjet 70/75 and the Challenger 350 and 650. They include a fibre backbone that will support multiple 4k video streams, says Dave Crossett, sales and marketing department head for Lufthansa Technik’s product division.

The company is also reintroducing a

# VORSPRUNG DURCH TECHNIK

## Lufthansa’s MRO and completions division wants to be seen as a product innovator

Hollywood content package as part of its NICE offering. The service was briefly withdrawn in November as Lufthansa Technik sought a partner to market the content. “We now have that partner, although we cannot announce who it is yet,” says Crossett. Another NICE innovation is a mobile version of the system’s moving map, which will work on any Apple, Android or Windows device, he says.

A key part of Lufthansa Technik’s strategy in the business aviation industry is to position itself as a designer of original equipment products.

A division that was set up two years ago has devised a range of products for business jet interiors.

These include a concept seat design, designated chair, which is in effect a 16g frame around which a variety of seats can be installed. “The business seat on an aircraft hasn’t changed much in 50 years, and we thought ‘why don’t we try to certificate something that looks different?’ It is a skeleton that can be reapplied to different designs,” says Crossett.

Other products from the division that will be exhibited on the Lufthansa Technik stand at EBACE include a dishwasher and an inductive cooker, which the company says allows cabin crew to

prepare fresh hot meals on board. In addition, the company will be promoting a patient transport unit, a series of modules including a bed and racks for medical equipment. The product can, says Lufthansa Technik, integrate “virtually any medical equipment commonly used in medical care”, and has been installed on two Boeing 747-8 business jets, as well as two of Lufthansa’s commercial Airbus A380s.

The company is also working on a Ka-band compatible version of its TIOS [Two In One System] tail-mounted radome for the Boeing Business Jet that can accommodate satellite TV and satcom antennas. So far, all of the 50 or so TIOS systems have a less capable and previous-generation Ku-band antenna installed.

But while innovation may be rife at Lufthansa Technik, progress is slower for the cabin completion business, admits Walter Heerdt, senior vice president of VIP and special mission aircraft services. The company has two BBJs

and one 747-8 in the works but depressed demand in the US and China has forced it to take the “painful decision” to scale down its Tulsa centre, which specialised in narrowbodies, from the third quarter this year. It will continue to focus on engine overhauls.

Lufthansa Technik is also reducing its widebody lines at Hamburg from three to two, alongside its two narrowbody lines. It opened the third line in 2009 as it foresaw a peak in demand for completions of Boeing 787s and 747-8s as well as Airbus A350s. Although airliner modification work from its sister airline has helped allay some of the loss of business aviation contracts, times are still tough.

**CAPACITY**

“There is a lot of capacity but not so many projects,” he says, with little business coming into the pipeline as slowing growth or recession in previously bullish markets such as China, the Middle East, Brazil and Russia have reduced the appetite for airliner-derived business jets. “We are well set now for 2016 and 2017 is still pretty promising, but for 2018/19, we will have to wait and see.”

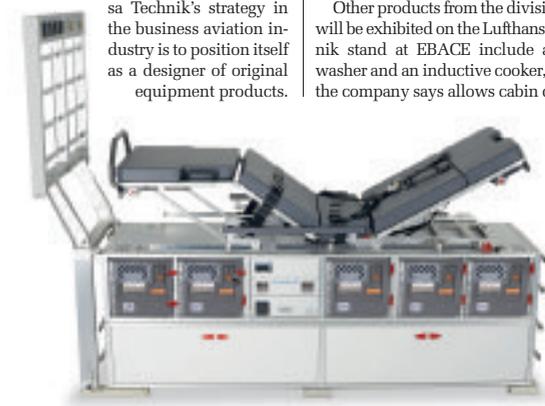
It is hard to see when the market will come back. It’s crystal ball stuff and if I could predict it, I’d be a rich man

**WALTER HEERDT**  
Senior vice president of VIP and special mission aircraft services

Heerdt admits “it is hard to see when the market will come back. It’s crystal ball stuff and if I could predict it, I’d be a rich man.” He says Lufthansa Technik took tough decisions to “scale back capacity to meet demand” and that have “given us the possibility to breathe”.

As an experienced specialist in the 747-8 particularly, Heerdt says there are “still some projects out there and we are working hard to get them”.

However the focus for Lufthansa Technik for now will continue to be on developing new interior products, and on the special mission market – a relatively new field for the company. “It’s an exciting opportunity for us,” says Heerdt. “We can do a lot of things with our engineering team.” ■



► **RECOVERY:** The Hamburg company is promoting a patient transport unit

# SINGLES SHOW THEIR STAYING POWER



► **VERSATILE:** Quest says the Kodiak could be used for ISR missions

SINGLE-ENGINE TURBOPROP MARKETPLACE		
Manufacturer	Type	Price
Cessna	208 Caravan	\$1.95m
Cessna	Grand Caravan EX	\$2.4m
Daher	TBM 900	\$3.8m
Daher	TBM 930	\$4.1m
Diamond	DA50-JP7	c. \$1.1m
Epic	E1000	\$2.95m
Pilatus	PC-12NG	\$4.9m*
Piper	M500	\$2m
Piper	M600	\$2.9m
Quest	Kodiak	\$2m
Mahindra	GA10 Airvan	n/a
Pacific Aerospace	P-750 XSTOL	n/a

NOTES: \*Typically-equipped executive version, excludes agricultural types. SOURCE: Manufacturers

Owen Bennett

## Predictions of the demise of the one-engined turboprop proved wide of the mark after the financial crisis killed off the fledgling VLJ market

**T**he commercial single-engined turboprop (SETP) sector is one of the most enduring yet understated niches of the business aviation market.

Thanks to their reliability and versatility, these aircraft have successfully fended off competition from small jets and silenced the sceptics who, during the frenzy over very light jets – so-called VLJs – a decade ago, were predicting their demise.

Philippe de Segovia – director of sales promotion for Daher's venerable TBM-series – recalls it well: "People said the new wave of high-performance VLJs were going [to] revolutionise private and commercial air travel and nobody will be interested in single-engined turboprops for these missions any more. This didn't happen. The financial crisis hit in 2008 and the VLJ sector almost collapsed."

### ROBUST

By contrast, SETPs weathered the economic storm and the sector is as robust today as it has ever been. In 2008, this segment consisted of five platforms: the Cessna Caravan, Pilatus PC-12, Daher (formerly Socata) TBM, Piper Meridian and Quest Kodiak.

Today there are at least 12 SETP models in service or that are at an advanced stage of development. There is also a clutch of undisclosed designs pending – including a new clean-sheet model from general aviation giant Textron Aviation.

Deliveries have remained relatively robust since the 2008 hiatus, when the industry shipped a record 317 SETPs. According to the General Aviation

► **By KATE SANSFIELD**

Manufacturers Association (GAMA) the sector has seen deliveries increase year-on-year since 2011 and the trend looks set to continue.

"This segment of the market has remained quite solid throughout the post-crisis period," says aerospace consultant Rolland Vincent, who attributes SETP popularity to proven reliability and high performance. "A SETP is a natural step up for owners and operators looking for their next aircraft but not ready or not needing the

capabilities of a light jet," he says. "These are fast, capable aircraft that are known for their safety, comfort and payload range capability."

This view is supported by fellow analyst Brian Foley, who describes SETPs as "utilitarian SUVs of the sky. They are a successful niche of aircraft that have the ability to operate out of unimproved fields and carry heavy, outsized objects.

"On the corporate side, they provide a larger cabin for significantly less money than an entry-level jet for the value-oriented buyer."

The sustained popularity of SETPs, coupled with the huge demand for its 18-month-old TBM 900, were the triggers for French airframer Daher to expand its turboprop offering for the first time. In April the company took the wraps off its flagship \$4.1 million TBM 930 – an enhanced version of the \$3.8 million TBM 900 featuring a revamped interior and Garmin's G3000 touchscreen cockpit. Daher is confident the marketplace is large enough to accommodate both models and downplays suggestions its latest model will cannibalise the market for the TBM

900. "This is not a concern," explains de Segovia. "There are plenty of customers who are happy with the TBM 900 and who won't want to pay the extra money for the latest aircraft."

A key appeal of the TBM series is its signature cruise speed of 320kt (590km/h) – making it the fastest turboprop on the market and a very popular choice for the owner-flyer community. The majority of the nearly 800 TBMs in service are owner-flown, although a growing number are being used for corporate and commercial transport, says Daher.

► **PLUSH:** Daher revealed its TBM 930 in April



### DOMINATE

These missions, however, are traditionally served by the larger-cabin models, such as the 208 Caravan, Grand Caravan EX and PC-12NG; the platforms that dominate the SETP sector. GAMA figures point to a combined in-service inventory of around 3,600 aircraft – 70% of the global fleet.

"There is a market for both ends of the spectrum," says Vincent. "The Caravan is a rugged, unpressurised utility aircraft that holds its residual value well. It has good payload and excellent short field performance but [is] used on short missions because of slow speeds."

Cessna has been manufacturing the Caravan series for more than 30 years and its installed base of more than 2,200 units represents over 40% of the in-service SETP fleet, according to Flightglobal's Fleets Analyzer database. Annual shipments of the high-wing type have remained consistently robust with 93 units – recorded in 2012 – posted as its lowest tally in a decade, GAMA reveals.



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« Pilatus's PC-12 has been a dominant player at the top end of this sector since the first iteration of the pressurised type was introduced in 1994. Today there are nearly 1,400 PC-12s in service worldwide and the desire for the all-metal, versatile type remains undiminished.

"These aircraft are in good demand, with a strong residual value record that is unmatched in business aviation today," says Vincent. "Aircraft 10 years after delivery are still holding about 80% of their original purchase value – excluding the impact of inflation – which is pretty remarkable for what is supposed to be a depreciating asset."

**UPGRADED**

The fact is not lost on Pilatus. When unveiling the latest, upgraded version of its PC-12NG in November, chief executive Markus Bucher said: "Our biggest competitor is pre-owned PC-12s. These aircraft are really holding their value right now."

The Swiss airframer, which is based in Stans, says it is constantly looking at ways to keep the product fresh and innovative. The latest version of the \$4.9 million NG features better take-off and climb performance, more cabin comfort, greater range and speed and a quieter cabin.

Tom Aniello, vice president of marketing for Pilatus North America, attributes the popularity of turboprops such as the PC-12NG to their value and economy. "Operators get a very comfortable cabin, similar to a midsize business jet, at a fraction of the acquisition and operating cost," he says. "Furthermore, it allows them to access more airports closer to their ultimate destination."

This exceptional performance, he argues, has given the PC-12 access to diverse markets. "We are not reliant on just a luxury travel segment to maintain consistent sales," Aniello says. "The PC-12 is appealing to a wide variety of operators, including corporate flight departments, individual owner-pilots, governments, law enforcement, air ambulance, fractional and charter users. Any healthy portfolio should have diversified investments."

Aniello's view is supported by Quest Aircraft's vice president of sales for Europe, the Middle East, Africa and China, Steve Zinda. The Sandpoint, Idaho-based company has been producing the all-metal Kodiak since 2006 mainly for the passenger and cargo transport markets. But, says Zinda: "We are widening our scope. There is certain potential for the Kodiak in the special mission segment, such as ISR [intelligence, surveillance and reconnaissance] and aerial mapping."



◀ **APPEAL:**  
There are almost 1,400 PC-12s in service

As with the established platforms, sales of the unpressurised Kodiak have been "consistently strong," Zinda says. "Production numbers have increased year-on-year and we expect that trend to continue as we expand into new markets." And, he adds, Quest's diversification is also likely to include a new product for untapped niches: "We certainly won't be a one-aircraft family."

"This is an increasingly crowded sector, but there is some blue ocean," he adds. While Zinda will not reveal where these openings are, he hints that any addition to the family is likely to have a pressurised cabin: "This will allow the aircraft to operate at higher altitudes, and this in turn will broaden the range of missions it can fly. Air ambulance, for example."

Quest is not alone in its pursuit of new products. Piper Aircraft launched a flagship turboprop a year ago to broaden its market share and create a fresh top-end offering for customers moving up the product line. The M600 is based on the M500, formerly known as the Meridian, and features a redesigned wing and advanced digital fuel management technologies. Scheduled to enter service at the end of 2016, the \$2.9 million model boasts a maximum range of 1,300nm (2,405km) – nearly 240nm further than the M500 – and a Garmin 3000 touchscreen flightdeck.

"My mission since joining the com-

pany [in 2012] has been to put Piper ahead of the pack with an innovative product strategy," says chief executive Simon Caldecott. "I am well on my way to doing that and I still have a number of other cards up my sleeve."

Similarly Daher – now a two-model airframer since the launch of the TBM 930 – has made no secret of its plans to expand its turboprop family. "We are always looking at new ideas," says airplane business unit senior vice-president Nicolas Chabbert: "There will be a next."

While Daher is keeping its ambitions under wraps, Textron Aviation is getting ready to unveil its new SETP programme – an explicit acknowledgement of the sector's buoyancy.

"Our dialogue with our customers and contact groups has convinced us that the time is right to introduce a new model," says Tom Perry, Textron Aviation's vice president for sales, Europe. "There hasn't been a clean-sheet design [in this sector] for decades. Our product will enable us to take advantage of new engine, material and construction technologies."

Perry is referring to GE Aviation's in-development GE93 engine, that is being made to power the yet-to-named 280kt aircraft.

With its low fuel burn and high performance characteristics, this powerplant is predicted to be a game-changer

for the single-engined turboprop sector. It should also prove a worthy and welcome rival to the Pratt & Whitney Canada PT6, which has been the engine of choice for SETP developers for decades. "The new GE SETP engine is a bold step – and long overdue," says Vincent. "This market has seen little direct challenge to the venerable PT6, which has powered most new OEM production over the past 30 years."

With single-level control, FADEC, and promised longer time between overhaul targets, GE's entry will certainly attract the attention of manufacturers and customers, Vincent suggests. "This type of R&D investment is a critical technology enabler that is very likely to encourage a new wave of investment in eco-friendly, powerful business and utility turboprop aircraft," he adds.

Foley agrees: "If the GE engine is able to provide the promised 20% better fuel burn, it will indeed be a long overdue disruptor in the category." He says P&WC has had little incentive to meaningfully improve the decades-old PT6. "With a reputation of being bullet-proof and reliable, the 'don't fix it if it ain't broke' mantra at Pratt will now have to change. The change in the category could be analogous to what's currently going on with the re-engineing of legacy airliners such as the Boeing 737 Max and Airbus A320neo," he says.

**CONFIDENT**

Textron's Perry is confident its SETP will raise the bar in terms of performance, cabin comfort and operating costs. "This makes investing in the project worthwhile," he says.

Textron was due to release further details of the programme today at

EBACE, and a mock-up will be unwrapped in July at the AirVenture show in Oshkosh, Wisconsin.

While Textron is believed to be the only OEM actively developing an all-new SETP, a trio of sector debutantes are preparing derivative models for certification and service entry over the next two years. Epic Aircraft's E1000 – based on its LT kitplane – is in the latter stages of flight testing and first deliveries are on track for the first quarter of 2017.

**EVOLVED**

Mahindra's Airvan 10 – a 10-seat, Rolls-Royce 250-B17/F2-powered version of the piston-engined Airvan 8 – is in flight testing, with approval anticipated within 12 months, and Diamond Aircraft's DA50-JP7 – evolved from the DA50 piston single – will follow in 2018. The \$1.1 million, Motor Sich AI-450S-powered single is the Austrian airframer's first foray into turboprops.

One Aviation is, meanwhile, continuing to seek funding to complete development of its high-performance Kestrel KA350, which is now in its detailed design phase. "It's a tough environment to get investment right now," admits One Aviation president Alan Klapmeier, who founded Kestrel in 2010. "We are more than three years late on [the] three-year project," he adds, in a tongue-in-cheek swipe at the aircraft's development timetable.

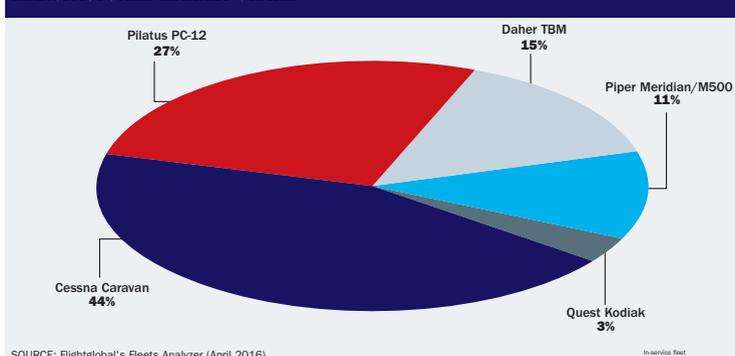
"But I'm confident we can bring this aircraft to market. There is certainly a gap for this all-composite, large, comfortable SUV."

Vincent agrees: "OEMs have been quite successful identifying and carving out market niches and that trend will continue." ■

Production numbers have increased year-on-year and we expect that trend to continue

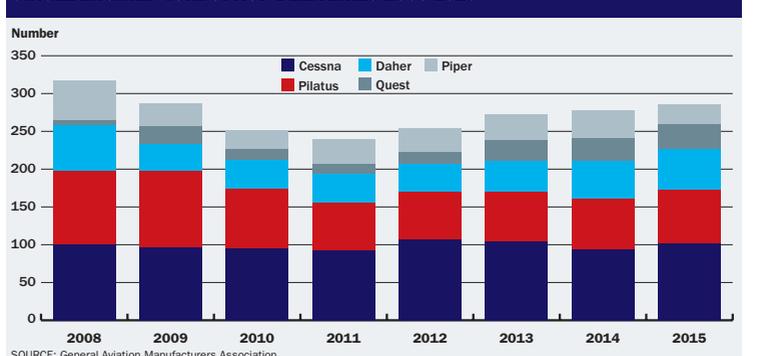
**TOM ANIELLO**  
Vice-president of marketing,  
Pilatus North America

**MANUFACTURER MARKET SHARE**



SOURCE: Flightglobal's Fleets Analyzer (April 2016)

**SINGLE-ENGINE TURBOPROP DELIVERIES 2008-2015**



SOURCE: General Aviation Manufacturers Association



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# ARE WE GOING DOWN FOR THE THIRD TIME?

## EBAA traffic survey raises industry fears over triple-dip

► By **MURDO MORRISON**

Is it third time unlucky for business aviation in Europe? In less than a decade, the sector has experienced two sharp downturns in traffic – once in the midst of the global crisis of 2008 and again in 2011 and 2012 after a short-lived rebound. Now, as the sector arrives for its annual EBACE get-together in Geneva, the fear is business aviation is heading for the dreaded triple dip.

According to a study from the European Business Aviation Association (EBAA) – co-host of EBACE – the most concerning aspect of a 2% fall in business aviation departures from the region's airports in 2015 is a mismatch from European Union GDP: something it traditionally mirrors. GDP over the same period grew 1.8%. "The decoupling is worrying," admits chief executive Fabio Gamba.

While growth in other segments has slowed, it is positive for European cargo, legacy and low-cost carriers, with the latter seeing 5.4% growth from 2014 to 2015. After witnessing annual growth of 10% in 2006, business aviation saw an annual decline during all but two of the past eight years.

### BRIC BOTHER

One reason for business aviation's ills, suggests Gamba, could be the collapse in the economies of Russia and its neighbours. This has hit business travel out of Moscow and Ukraine and also affected the charter and services market in the Baltic and eastern European EU members, such as Poland. Economic problems in China, Nigeria and Brazil are also likely to have affected traffic.

While, 10 years ago, the emerging markets of Russia and Eastern Europe were seen as the great hopes of business aviation, those countries have been by far the worst hit in terms of declining traffic. Departures from Russia plunged 40% between 2014 and 2015, while Ukraine and Belarus – albeit from smaller bases – have dropped 57% and 72%, respectively.

However, while the study finds traffic has fallen across most of the region's key business airports, there appears to be no real pattern. Moscow

► **BENEFITS:** Business aviation creates jobs and contributes to economies, says survey



JASON WEBB/SHUTTERSTOCK

Vnukovo's traffic has, perhaps not surprisingly, tumbled by an average 4.5% over five years but Rome – with a 4.7% decline – and Geneva Ciampino, down 7%, have fared even worse.

By contrast, Paris-Le Bourget, Europe's busiest business aviation airport and the only one which is serving the French capital, has seen traffic fall just 2.6%, while Nice, the region's third biggest, has held almost steady at -0.3%. The UK's main two business aviation hubs – Luton and Farnborough – have seen traffic rise marginally, at 0.7% and 0.6%, respectively.

Virtually all Europe's busiest business airport pairs also saw a decline in traffic between 2014 and 2015, the only exceptions being Luton-Le Bourget, Ibiza-Palma, and Geneva-Milan, plus two domestic UK routes – Broughton to Bristol and Farnborough – that are served by an Airbus staff shuttle service.

The study does find some positives. Business aviation's share of European

flights has remained constant over 10 years, at 7%.

Europe is also seeing more long-haul flights, arguably more profitable for operators. In 2005, intercontinental flights accounted for 5.9% of departures from the region's airports. By 2015, this had grown to 8.1%.

The EBAA study also evaluates the impact of business aviation on Europe's economy, something the organisation is keen to impress on politicians and a public often too ready to associate the sector with fat cats and

wasteful luxury. It concludes the industry supports 371,000 jobs and adds some €27 billion (\$31.3 billion) in gross added value. "The sector

punches above its weight," insists Gamba. The association has released a publication which breaks down the economic impact of the sector by country. While France and Germany represent 53% of the gross added value of the industry – and the UK adds another 10% – business aviation's benefits are felt throughout the region, accounting for more than 1,500 jobs in Finland and contributing €148 million to the Maltese economy, for instance.

EBAA's sister organisation – the USA's National Business Aviation Association – has made great play of its long-running "no 'plane, no gain" campaign, which is emphasising the benefits to companies of using private flights. The European association wants to get the same message across, maintaining business aircraft are "time machines" to help executives get directly to meetings.

Its study finds 20% of business aviation flights are more than 5h shorter than their best commercial alternatives, while the average time saved using business aviation over the fastest commercial alternative is 127min. It also claims there are more than 25,000 airport pairs in Europe served by

business aviation which are not connected by airlines.

However EBAA recognises there are obstacles to overcome – including a lack of satellite-based precision approaches at smaller airports – while at busy hubs business aircraft are often squeezed out by commercial airliners. "There is a problem with slots," admits Gamba. "It means someone is going to say 'Why am I bothering to fly business aviation if I can't leave at the time I want?'"

### SUPPLY SURFEIT

Consolidation in a sector can be either a positive or negative thing – it can be an indication of a surfeit of supply or a trend towards better-financed operators and stronger brands.

The third-party services market for the business aviation sector in Europe has traditionally been highly fragmented, with a series of locally-based charter and management companies that are operating a small number of aircraft.

Gamba does see an "acceleration" of merger and acquisition activity in the sector after a string of takeovers in recent years by Luxaviation – including ExecuJet and London Executive Aviation – and the merger of Gama and Hangar8. These have for the first time created companies in the sector with substantial purchasing power and the scale to be able to operate across several markets.

"Consolidation tends to come in waves," says Gamba. "We are in uncharted territory and what we have seen could give rise to a second wave. The industry is looking at how it will function in three, four or five years, and next time we could see a wave of consolidation that includes FBOs [fixed-base operations] and airports."

Whether that consolidation will be against a backdrop of a prospering or faltering sector remains to be seen. While interest in EBACE appears as strong as ever, falling oil prices, a struggling Russian economy and stuttering Eurozone growth are all factors that could see current patterns repeated when 2016 figures emerge a year from now. Four months in, all signs point that way. ■

► **ENCOURAGING:** Farnborough airport has seen business traffic rise slightly, up 0.6%

Harry Pugh/Rea/SHUTTERSTOCK



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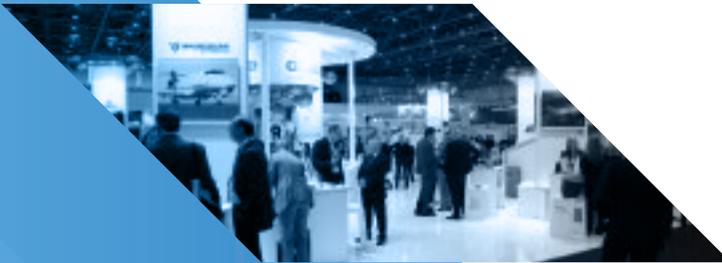


# EBACE

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Dassault extends its X appeal FLIGHT TEST P30

# CABIN FEVER AT COLLINS



**Scott Gunnufson, vice president for sales, marketing and customer support, commercial systems at Rockwell Collins, explains the company's focus at this year's show**

MODERNISING: On offer are cabin upgrade packages for older Gulfstreams equipped with ACMS and Micronet

**Q** What are the big themes for Rockwell Collins at EBACE?

**A** We will be very focused on flight deck and cabin upgrades that deliver long-term value. By that I mean upgrades designed to support future enhancements. The desire to upgrade aircraft flight decks and cabins is strong, but those desires are all different, ranging from just getting the basics to getting the most that money can buy.

Knowing that, we're diversifying our after-market offerings to help address the varying needs and wants of operators and, at the same time, making sure they're set for a long time and keeps aircraft value up.

**Q** What announcements are you making?

**A** We have several announcements this year, both for the flight deck and cabin. In the flight deck, we're unveiling multiple packages and incentives for operators that are equipping their flight deck for ADS-B operations, all of which bring turnkey compliance with mandates and options for enhancements that enable safer and more efficient flying.

One upgrade programme that Rockwell Collins is rolling out for King Air 350 turboprops brings together its award-winning Pro Line Fusion avionics and corporate aviation service programme to give operators essentially zero annual operating costs for a significant amount of time.

In the back of the aircraft, many operators are witnessing their cabin technology get further out of date while watching their personal devices progress at a very rapid rate, and Rockwell Collins' industry-leading Venue cabin management and entertainment system (we've installed more than 850 Venue systems) continues to be the solution that almost all of the market selects to resolve this issue due to its reliability and open-architecture design to enable

future technologies. At EBACE, we're announcing an achievement with Switzerland-based AMAC Aerospace. Working together, we completed the first CES to Venue upgrade on a Global aircraft. Also, we're introducing new cabin upgrade packages for outdated Gulfstream cabins equipped with ACMS and Micronet.

Global Ka-band connectivity is

expected to be live later this year, and our Arinc Direct team just validated its Jet ConneX offering during a series of recent network tests. Rockwell Collins Arinc Direct is a value-added reseller of Inmarsat's Jet ConneX, which will change the connectivity market as we know it.

**Q** Rockwell Collins plays in both the original equipment market and the after-market. How big is the upgrade and modification business becoming?

**A** We see significant opportunity in the after-market, largely due to the pending ADS-B mandates.

Operators know they have to equip and many are also taking the opportunity to add new features in their flight decks to increase safety and situational awareness.

This includes adding LPV, synthetic vision and more. While on the subject of ADS-B, it's worth remembering that the deadline is less than 1,500 days away in Europe and the US.

There are thousands of commercial

aircraft that need updating. I encourage everyone to beat the rush and get set up now. We've developed a range of solutions – from basic, partial upgrades to full flight deck replacements – to get aircraft ready at very cost-effective rates.

**Q** It's now been almost three years since the acquisition of Arinc. How has that business been incorporated into and enhanced the Rockwell Collins offering?

**A** Rockwell Collins' acquisition of Arinc has been quite successful. As each day goes by, we're finding more and more ways to work together to bring solutions to market that customers desire, like having one place to go for all flight-planning, scheduling and trip support, and bundled offerings for our systems and services.

Another example is that we see great opportunity in the cabin to do this with our industry-leading cabin management system and global Ka-band connectivity offering, not to mention our Airshow Moving Map – one of the

most popular applications in commercial aircraft cabins.

The integration of our people has been seamless. The culture that Arinc brought to the table closely aligned to what Rockwell Collins had in place, which centres on creating reliable solutions and providing superior customer support. Today, the goal is to be the most trusted source of aviation and high-integrity solutions in the world is common across the entire company.

**Q** The European business aviation market has been pretty up and down for the past decade or more. How do you assess the region's short- and medium-term prospects?

**A** Aircraft have and always will be a valuable tool for conducting successful business. We do not see any significant market change in Europe over the next few years, but we believe the business aviation market will eventually recover in this region and we'll continue to invest heavily in and are committed to this market. ■



UPGRADES: Pro Line Fusion avionics is on offer for King Air 350 turboprops

By PETER COLLINS

As EBACE begins, certification of Dassault's new flagship business jet, the ultra-long-range Falcon 8X, is likely to be imminent. Its entry into service is planned for the third quarter of 2016.

As a guest of Dassault, and on behalf of Flightglobal, I was invited to test fly and evaluate one of the production-standard 8X test aircraft, from Istres, near Marseille in southern France, in early April.

Dassault describes the 8X as an evolution of its hugely successful Falcon 7X/EASy II cockpit – rather than a revolution – but one with a slew of extra cabin options, a substantial range increase and a raft of further avionic and reliability upgrades. All this while retaining the 7X's outstanding characteristics: fly-by-wire digital flight control system; flexibility in short field (and therefore non-hub) operations, both for landing and take-off; certificated steep-approach capability (to airports such as London City, Lugano, La Mole and St Moritz); a basic empty weight lighter by 25% or more than competitors; and direct operating costs lower by even more significant margins, of up to 35%.

I have flown the 7X four times for Flightglobal (to evaluate the aircraft on the day of its joint EASA/FAA certification in 2007, and then its EASy II cockpit, its head-up display and enhanced vision system and its short field operations), so I was familiar with that aircraft's handling and capabilities. I have also stated on several occasions that, in my opinion, the 7X is by a considerable margin the best of the 30 or so large business jet types I have flown.

My evaluation objectives were therefore simple: does the new 8X improve on the 7X, and are its upgrades enough to warrant a new type designation?

**TECHNICAL BACKGROUND**

The 8X flight test campaign started in early February 2015 with three test aircraft of production standard, and these have since completed over 650h during 300 test flights. Test aircraft #1 and #2 (which I would fly) are still being used for final certification purposes, but aircraft #3 spent almost the whole of April flying an intense set of worldwide proving flights in a full production form with

# DASSAULT EXTENDS ITS X APPEAL

**With the Falcon 8X's ultra-long-range credentials and fighter-like flying characteristics, Dassault looks to have succeeded in improving on its 7X**

a fully optioned customer cabin. These started in France with multiple, daily, short-range European flights, progressing to Northern Canada for cold operations and a long-range single-transit from New Jersey (Teterboro) to Dubai to prove hot operations in the Middle East. There followed a series of demonstration flights around Southeast Asia, including to the ABACE Asian business aviation conference and exhibition, and a maximum-range single flight back to Europe. The proving tour will conclude with flights around South America, including to La Paz, Bolivia, to prove hot and high airport operations.

The reason for this punishing set of proving flights is for Dassault to absorb

lately "customer proof" the 8X before entry into service, so that it equals or exceeds the reliability of the latest 7X production aircraft in all areas – including aircraft and cabin. Dassault also wants to prove "without question" its ultra-long-range credentials.

The first and physically most significant change is a 1.1m (3.6ft) fuselage extension (using both a fore and an aft plug), to 24.5m. The fuselage section is identical to the 7X but the extension has allowed Dassault to increase internal fuel capacity (of the centre-mounted tanks) of the 8X by 1,360kg (3,000lb) to 15,840kg. The extra fuel endows the 8X with a range of 6,450nm (11,900km) with a standard configuration (Mach

0.80, three crew/eight passengers, ISA, sea level departure and arrival, zero wind, NBAA instrument flight rules reserves), adding non-stop city pairings such as Jeddah-New York and Singapore-Paris.

The fuselage extension also allows Dassault to offer three new distinct entryway options (short, middle and long) and more than 30 new cabin layout options, including a full shower. However, the significance of the long entryway option is that, for the first time, an ultra-long-range business jet has a full-length crew rest area for a third pilot (as a mandatory legal requirement for flights of over 13h). This long entryway option also boasts a new massive galley while retaining the 7X's

cabin length, which itself equals close competitors including the Bombardier Global 6000 and Gulfstream 500, 600 and 650. Cabin widows (per side) are increased from 14 to 16. Measured cabin noise levels are claimed to be just 50dB, lower than the 7X and quieter than the expected theoretical values.

The 8X has virtually the same wing span (26.3m), wing area and wing profile as the 7X but now features more curved winglets (to Dassault's own design) and profile optimisation of the wing section in

**For the first time, an ultra-long-range business jet has a full-length crew rest area for a third pilot**

several places. Cleverly, Dassault has redesigned the internal wing structure and the 272kg weight saving equals the weight gain of the fuselage extension, so the basic empty weight of the 7X and the 8X are identical. Consequently, the 8X's maximum take-off weight (MTOW) is exactly 272kg heavier than the

7X, at 33,140kg (but with gear reinforcement) and it retains the ability to land at 85% of its MTOW. Balanced field length take-off (ISA, sea level) at MTOW is 6,000ft. Maximum landing weight remains 28,330kg and maximum zero fuel weight is now 18,600kg. Landing refer-



▲ ISTRES DAWN: Peter Collins flew #2 – being used for final certification purposes – from the southern French base



▲ TUNDRA TESTING: Northern Canada was the setting for cold operations



◀ EVOLUTION: The 8X is 1.1m longer than the 7X but otherwise looks very similar



▲ LOOKALIKE: The 8X's cockpit is almost identical to that of the 7X

ence speed (Vref) when at NBAA IFR reserves is a staggeringly low 106kt (196km/h) indicated air speed (KIAS) coupled with a landing distance of just 2,150ft. Maximum cruise altitude remains 51,000ft; maximum operating speeds are Mmo M0.9 and Vmo 370 KIAS.

The 8X is powered by three Pratt & Whitney Canada enhanced PW307D engines (with higher thrust/lower fuel consumption), rated at 6,700lb (29.9kN) thrust (sea level, ISA) and flat rated up to +32°C. The 2% specific fuel consumption improvement of the PW307D

means the specific air range of the 8X remains the same as the lighter 7X.

After these changes to cabin and engines, the other major change is improved avionics. The first upgrade is the new cockpit (Honeywell Primus Epic platform) built around a new flight

management system (the same as used in the Boeing 787). The new avionics support such features as an advanced 3D colour weather radar; an integrated controller pilot data link communication system; and double wide-angle (40° x 30°) head-up displays (HUD) supporting the all-new Falcon Eye combined vision system (CVS), which brings synthetic and enhanced augmentation into a seamless integrated HUD picture using a forward array of five sensors. Autothrottle now remains operative with one engine inoperative, and completing the EASy III suite are two new generation electronic flight bags hosting Falcon Aircraft Performance, Jeppesen charts, weight and balance, and aircraft manuals and dispatch documentation with master minimum equipment lists

and maintenance procedures.

The 7X and the 8X will share a common type rating and be covered by a two-day differences training course.

My evaluation aircraft was the #2 8X test aircraft, registered F-WWQB. My safety pilot was Dassault's chief test pilot, Philippe Deleume. I would fly the complete evaluation from the left-hand seat with Philippe handling the navigation and radio, taking off and landing from runway 33 at Istres.

**BASICS**

Aircraft basic operating weight was 17,600kg, centre of gravity 31.0% and fuel on board 6,450kg for a ramp weight of 24,050kg. Weather conditions were QNH 1011 hp, +17°C and a mistral of 310/25 gusting 30kt.

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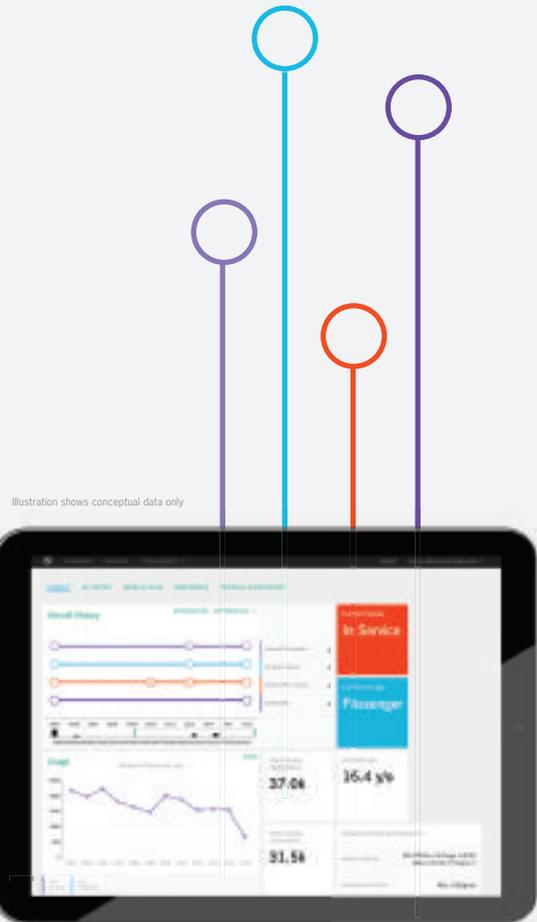


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Dassault Falcon 8X  
CUTAWAY P35

◀ The 8X cockpit and EASy III avionics remain virtually identical to the 7X to a seated pilot. Programming the EASy III remains simple, with a mode-based display taking the pilot diagrammatically through start-up, take-off, climb, cruise and approach phases. I still prefer how it sub-divides into 1/6, 1/3, 2/3 or whole screen, rather than the Rockwell Collins Vision's 1/2 or whole screen options.

For the current conditions, the flight management system was programmed for V1 (decision speed) 106kt, Vr (rotate) 112kt, V2 (one engine inoperative safety speed) 116kt, Vfr (flap retract) 146kt and Vfto (final take-off climb speed) 175kt. The take-off was at slats flaps 2. Engine start was simple with all engines individually stabilised after 40s.

Nosewheel steering is via the rudder pedals and my only comment was that the foot brake sensitivity was slightly "sharp" for very small brake applications. Engine acceleration at engine roll was about 3-4s before the power accelerated quickly. Thereafter, take-off acceleration was brisk with a fixed attitude symbol used to raise the nose to approximately the correct attitude before the flight direct was followed by the flight path vector.

In the climb I marvelled again at the 8X fly-by-wire auto-trim function and also the control mechanical characteristics of the side stick controller; it had perfect centring, minute breakout, zero freeplay and perfectly co-ordinated force and displacements in terms of the pitch and roll axes.

Handling quality assessments in normal laws were made clean at 250 KIAS and also SF1/gear down at V2 +10kt; SF2/gear down V2 and SF3/gear down. All showed similar roll rates of approximately 45°/s at full stick deflection (the fly-by-wire being roll rate laterally and g-command in pitch). Low speed with autopilot engaged showed automatic auto-throttle when the aircraft's speed decayed to the low speed cue in the primary flying display. This was coupled with aural warnings of "increase speed". With the autopilot and autothrottle disengaged, holding the aircraft in a 20-25° nose-up climb with full-back stick invoked a gentle nose drop as the aircraft's speed equalled the low speed cue.

Forcing the fly-by-wire into alternative laws (to simulate a type channel failure and need for redundancy), the



◀ THANKS: Peter Collins (left) with test pilot Philippe Deleume

normal law functions were present, apart from the automatic low speed function with autopilot engaged.

Further forcing the fly-by-wire into direct laws (to simulate a computer failure), the aircraft felt slightly more sensitive in pitch and the roll rate was reduced to approximately 30°/s at full stick deflection.

Restoring the fly-by-wire to normal, the aircraft climbed up to 40,000ft from 15,000ft. Handling at M0.8 was assessed and it was found to be unchanged from the 7X. At a 45° angle of bank turn level, there was just the first hint of wing buffet. A maximum rate descent was then made at Mmo,

hand flown with airbrakes at the AB2 position. The aircraft was held in a tight spiral at Mmo converting to Vmo at approximately 25,000ft and was easy to fly while maintaining the speed limit but still generating over 10,000ft/min rate of descent.

Levelling off at 10,000ft, the aircraft

was set up in the cruise to assess the double fly-by-wire sidestick controller input, given the Dassault philosophy of passive sidesticks (rather than force feedback positioning of the opposite stick to replicate the other stick movement). As well as an audible warning of dual stick input, both sticks vibrated, giving a clear tactile warning to each pilot.

Finally, two very tight visual circuits were flown at Istres, including a final one with a massive lateral offset on short finals. Vref was approximately 116 KIAS, and both could be flown with the ease of a fighter into a very soft but accurate touchdown aiming point.

**CONCLUSION**

While it was difficult to imagine improving the 7X, it would seem Dassault has achieved this with the new avionics of the EASy III cockpit, including the double HUD/CVS Falcon Eye system, an extended range that will virtually connect all worldwide city pairs, take-off and landing performance that exceeds its competitors and the flying characteristics of a fighter that exceed that of the 7X. Its evolutionary upgrades from the 7X easily allow the 8X to earn its classification as a new aircraft type and its Dassault flagship status. Finally, the Falcon 8X is very much an aircraft that rates its title as the best business jet I have flown. ■



▶ APRON MATES: The 8X alongside a Dassault Rafale

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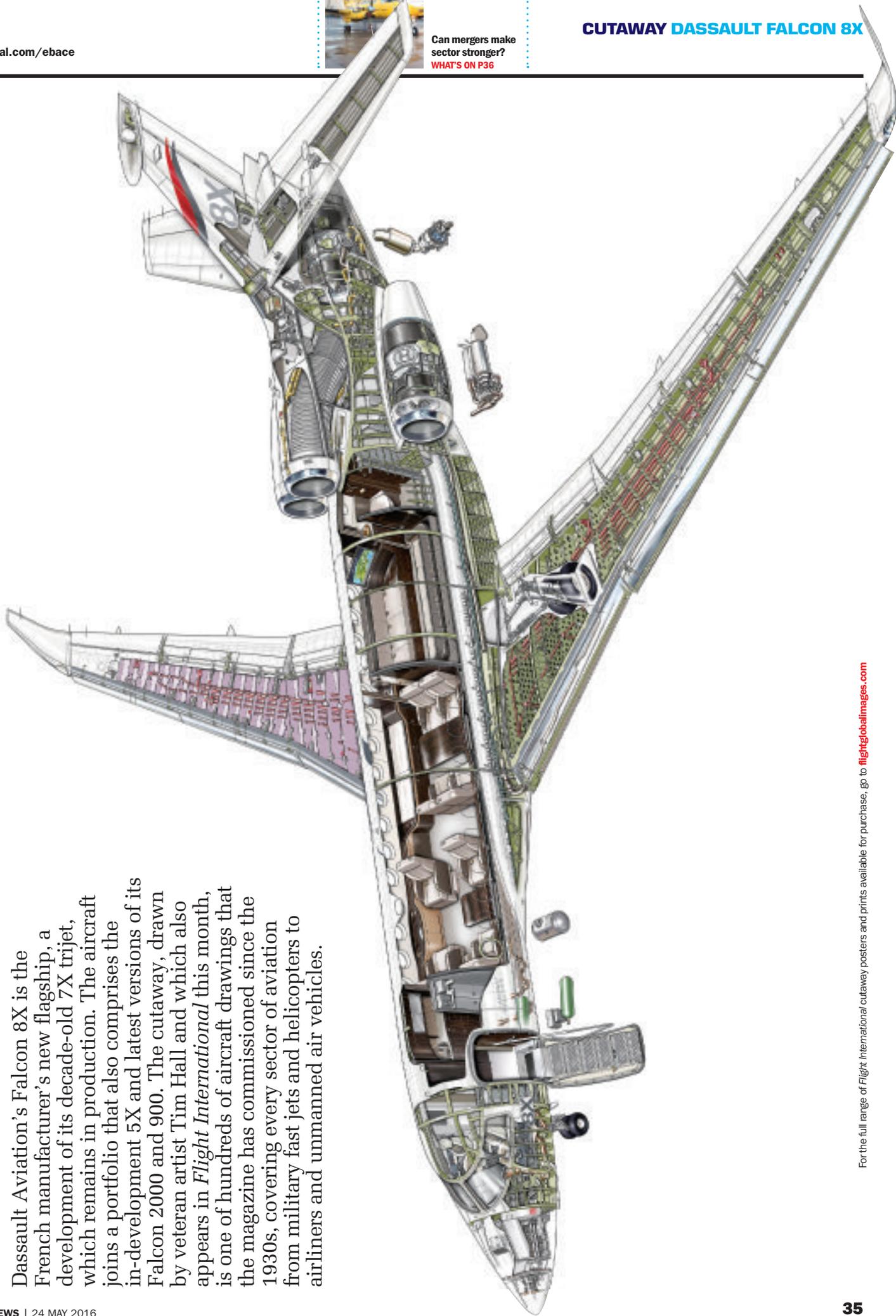
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# DASSAULT FALCON 8X

Dassault Aviation's Falcon 8X is the French manufacturer's new flagship, a development of its decade-old 7X trijet, which remains in production. The aircraft joins a portfolio that also comprises the in-development 5X and latest versions of its Falcon 2000 and 900. The cutaway, drawn by veteran artist Tim Hall and which also appears in *Flight International* this month, is one of hundreds of aircraft drawings that the magazine has commissioned since the 1930s, covering every sector of aviation from military fast jets and helicopters to airliners and unmanned air vehicles.



## Women in the industry have stories to share

From Amelia Earhart and Amy Johnson to today's hundreds of female airline and business aviation pilots, executives and engineers, women have long played a key role in aviation – and increasingly in roles dominated by men.

However, as in many industries, the ratio of women to men in a range of positions is still tiny. The Women in Aviation networking event, held in the Inspiration Zone of Hall 5 from 15.30 to 17.00 tomorrow, gives women in business aviation a chance to meet, mingle and share their experiences with others. Men are welcome to attend the event, where speakers will include Gabriella Somerville, of ConnectJets; Catherine Lang from the US Federal Aviation Administration; and Regula Dettling-Ott, from Lufthansa Group.

Following Women in Aviation, it is the chance of under-35s working in business aviation to mix and talk career opportunities and mentoring. The YoPro Networking Event takes place in the Inspiration Zone from 17.15 to 19.00.

Speakers include Rohan Mark Jayawardene, from Diamonté Jets; David Shannon from law practice Lewis Brisbois; and Diana Zuluaga, of Jet D'Or.



# CAN MERGERS MAKE SECTOR STRONGER?

The last two years have seen an unprecedented flurry of consolidation in what has traditionally been a very fragmented, and locally-focused market for business aviation charter.

Two years ago, the UK's Gama Aviation, one of Europe's fastest-growing business aviation services companies, engineered a reverse takeover by the smaller Oxford-based Hangar8, which saw the merged company publicly listed. Last year, Luxaviation Group continued its expansion with the takeover of Zurich-based Execujet, a charter, fixed-based operations and maintenance, repair and overhaul specialist with bases from South Africa to the Middle East.

A session in Room Q of Hall 3 at 10.00 tomorrow entitled "Big is beautiful" will ask whether "consolidation in business aviation will accelerate, and, if so, with what consequences?"

Will this trend see the emergence of truly multinational services companies alongside the small handful that exist, such as Jet Aviation?

A panel including Patrick



▲ REVERSE GEAR: Gama Aviation went public after its reverse takeover deal with Hangar8

Hansen, from Luxaviation; Greg Thomas of PrivatAir; and Mark Johnstone from BBA Aviation Flight Support, will discuss whether they would deliver synergies and economies of scale, or whether there are hidden obstacles standing in the way of consolidation.

Meanwhile, from SARS to Asian Flu, global health scares and pandemics have long been the scourge of the international travel and transport sectors, devastating the revenues of everyone from commercial airlines to hotels and FBOs.

The outbreak of the Zika virus (pictured left) has led to increased security protocols in several countries. A one-

hour session at 10.00, led by Michael Braida of MedAire, will provide advice on understanding and complying with the new regulations.

## Take a break with NBAA and EBAA

Want to know more about what the European Business Aviation Association or National Business Aviation Association can do for you? The joint organisers of EBACE are hosting a coffee break at stand A029 from 14.00 to 15.00 tomorrow to answer membership questions.

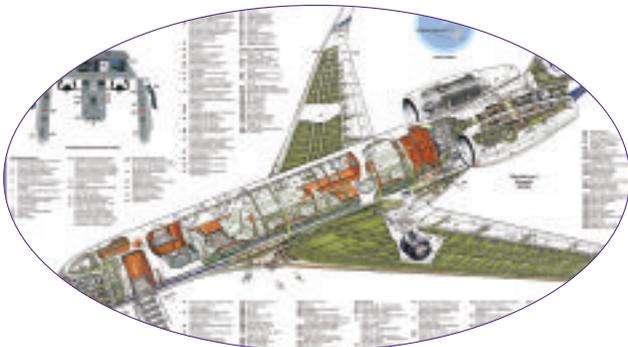


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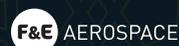
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