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GULFSTREAM

The G600, under the watchful eye of the first production G500 flying chase, lands on its first flight.

Gulfstream G600 takes flight, ahead of original schedule

by Charles Alcock

The Gulfstream G600 logged its first flight on December 17, beginning a flight-test program that is set to lead to type certification and first deliveries next year. The OEM has delivered two other G600s to the flight-test center, and they are expected to fly soon, after being fitted with test equipment.

The first test aircraft took off from Gulfstream's headquarters at Savannah-Hilton Head International Airport at 1:50 p.m. and flew for 2 hours and 53 minutes. Experimental test pilots Scott Martin and Todd Abler, accompanied by flight-test engineer Nathaniel Rutland, flew the aircraft.

The first G600 is now being used for envelope expansion and flutter testing. Gulfstream expects the G600's flight-test program to follow a pattern similar to that of its smaller G500 sister ship, with which it shares a high degree of commonality. Gulfstream has completed 57,000 hours of ground laboratory testing for the two new models.

"Launching the G600's flight-test program is a milestone for us and our customers, who have guided the vision for this aircraft from the beginning," said Gulfstream president Mark Burns. "We look forward to delivering this aircraft to them

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Part 23 rule ushers in 'new era'

by Kerry Lynch

After a decade in the making, the U.S. FAA issued its comprehensive rewrite of Part 23 last month, setting in motion an entirely new approach to certifying small airplanes and products. FAA Administrator Michael Huerta, flanked by the heads of three general aviation manufacturers, announced the release of the new rule during a press conference at the U.S. Department of Transportation in Washington, D.C., saying it will "usher in a new era of safety and a new era of innovation in general aviation in the U.S."

The rule, which takes effect in eight months, moves the FAA away from its long history of establishing detailed prescriptive standards for new products to a performance-based approach under which the agency establishes the performance objectives for new products and gives the manufacturer flexibility on how it meets those objectives.

"There's a simple idea at the heart of our new airworthiness standards: we don't want to tell manufacturers how to build things," Huerta said. "Instead of requiring certain technologies or designs, we're defining the performance objectives we want to achieve."

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FAA OKs 'no natural vision' landings

by Matt Thurber

The FAA issued a final rule last month outlining new processes that will allow pilots flying airplanes equipped with enhanced flight vision systems (EFVS) to fly certain IFR approaches all the way to landing "in lieu of natural vision" from the previously allowed elevation of 100 feet above touchdown zone. The rule gives EFVS-equipped airplanes greatly improved utility.

Current rules allow descent to 100 feet on some approaches when using a head-up display (HUD) and enhanced vision system (EVS, generally infrared imaging). Under the new rule, which becomes effective March 13, pilots flying with EFVS will be able to continue those approaches to landing using only the images displayed by the EVS on the HUD.

The new rules are quite flexible and don't specify that a HUD is even required for the pilot flying. This is to pave the way for future technologies that might not be HUD-based, such as wearable displays or other methods for delivering flight symbology and EVS imagery to the pilot flying, who must still be able to look forward through the windshield. The rule does require, in aircraft with more than one pilot, that the pilot monitoring have a display showing EFVS imagery, but this does not have to be a HUD. "The FAA is not adopting the requirement for the pilot-monitoring display to be

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NEWSMAKERS 2016

AIN editors look back on the news that shaped the past 12 months and make some predictions about what 2017 holds for the industry. As expected, manufacturers of both business aircraft and airliners brought some programs to the finish line as they look to the future. The regulatory environment continues to undergo significant change as airworthiness authorities seek harmonization among nations. Page 20

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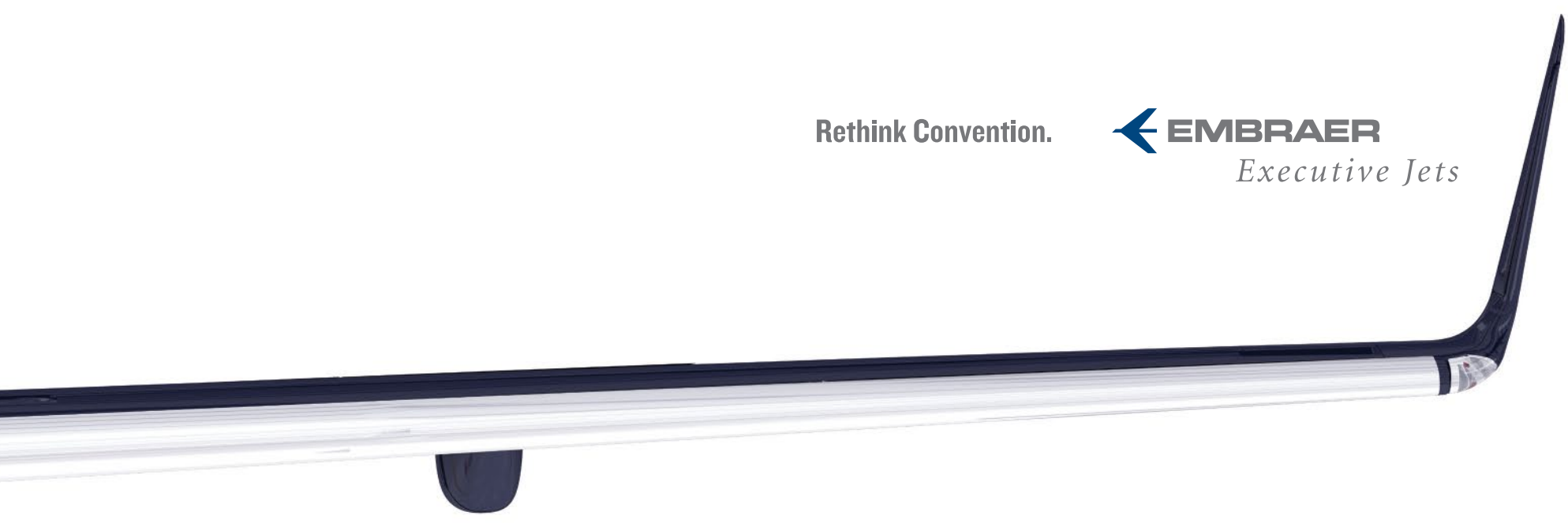

Rethink Convention.

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COCKPIT avionics

Part I: ADS-B action required

Pardon our persistence, but time is running out for you to equip your aircraft for NextGen ATC. Miss the deadline (now just 35 months away) and you'll be grounded. **Page 52**

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As we go to press

CIRRUS DELIVERS FIRST SF50 VISION JET

Cirrus delivered the first SF50 Vision Jet on December 19, simultaneously taking the wraps off a 68,000-sq-ft "finishing center" in Duluth, Minn. Customer Joe Whisenhunt, a commercial real-estate developer from Arkansas, pocketed the keys to the single-engine personal jet in a ceremony attended by 800 Cirrus employees and local dignitaries. Cirrus reported orders for some 600 Vision jets. In 18 months, employment at Cirrus in Duluth has risen to almost 800 from 600. Plans call for adding 70 more in the coming months. Cirrus's manufacturing facility in Grand Forks, N.D., has 200 workers and is growing. Delivery of the first Vision Jet follows U.S. FAA certification in October.

TRANSPORT CANADA APPROVES BELL 505

Bell Helicopter has received type certificate approval from Transport Canada for the five-seat 505 Jet Ranger X light single, the company announced on December 21. Unveiled in 2013, the helicopter is powered by a 504-shp Safran Arrius 2R turboshaft with dual-channel Fadec (3,000-hour TBO) and has Garmin G1000H avionics. The 505 will cruise at up to 125 ktas and has a maximum range of 340 nm, useful load of 1,470 pounds, a wide-opening double door and an open layout with flat cabin floor and 61 cu ft of rear cabin volume for passengers or cargo. The base aircraft starts at "around $1 million." Bell expects FAA certification and first customer deliveries this year.

CHINESE FIRM INVESTS IN DIAMOND CANADA

Wanfeng Aviation, the Canada-based division of a Chinese conglomerate, acquired a 60-percent controlling stake in Diamond Aircraft Industries Inc (a k a Diamond Canada). As part of the deal, Diamond Canada has acquired all rights to the seven-passenger DA62 recip twin and four-passenger DA40 single from Austrian parent company Diamond Aircraft Industries (Diamond Austria). Production and type-design responsibility for these aircraft will transfer from Austria to Diamond's site in London, Ontario by year-end. Wanfeng's investment might ultimately rekindle plans for the D-Jet single-engine jet program, which was put on hold in 2013. "The scope of the investment in the Canadian Diamond companies also includes D-Jet Corp. The future of the D-Jet and/or possible derivative aircraft is subject to ongoing review," Diamond said.

UBS BIZJET INDEX SEES POST-ELECTION SURGE

UBS Global Research's latest Business Jet Market Index report shows a decidedly more optimistic outlook for the industry following the U.S. Presidential election. According to the report, released last month, the index came in at 45, a 32-percent jump from UBS's prior survey, "representing one of the largest sequential increases in its 13-year history." However, the index has yet to surpass 50, which would denote improving market conditions. By cabin size, the light jet index is the healthiest at 49, a 14-percent rise sequentially, followed by midsize jets at 45 (up 44 percent) and large-cabin jets at 42 (up 49 percent). Of the market professionals who provided data for the report, 47 percent indicated that customer interest had improved after the election; 5 percent deemed it to have deteriorated. The remaining 48 percent indicated no change in interest.

CHINESE AC352 FLIES

The Avicopter AC352, powered by the Chinese-built WZ16, logged its first flight on December 20 in Harbin, China. The AC352 is the Chinese-manufactured version of the Airbus Helicopters H175. Certification of the AC352 has been delayed while the new engine is developed. EASA certification of the engine is now expected by the end of this year and CAAC approval next year, Safran said. The H175 was jointly developed by Airbus Helicopters and Avicopter, with the latter responsible for manufacturing the fuselage and certain subassemblies. The H175 is powered by a pair of Pratt & Whitney Canada PT6C-67Es and was certified in 2014. The WZ16 is the Chinese variant of the Safran Ardiden 3C.

EMBRAER LEGACY 500 GETS ENHANCED VISION

Embraer Executive Jets completed the first retrofit of the recently certified Embraer Enhanced Vision System (E2VS) on a Legacy 500. E2VS received FAA, European Aviation Safety Agency and Brazilian ANAC approvals in October for both the Legacy 450 and 500. Offered as an option, the E2VS consists of a head-up display that incorporates Rockwell Collins's head-up guidance and multi-spectral enhanced vision system. Embraer developed a service bulletin for retrofit of the system on existing aircraft. The installation was completed at the OEM's service center in Sorocaba during 12-month scheduled maintenance on a Brazilian customer's aircraft.

JET AVIATION UPDATES BRANDING

Jet Aviation is marking its 50th anniversary with a new corporate identity. The business aviation services group unveiled a logo and emblem that replaces the deer-head symbol in use since the company, now a General Dynamics subsidiary, was founded by Swiss entrepreneur Carl Hirschmann in 1967.

NBAA eyes future of security

by Kerry Lynch

NBAA is hopeful a recent meeting with TSA Administrator Peter Neffenger will lay the groundwork for key business aviation initiatives as the agency undergoes another turnover under a new White House. NBAA president and CEO Ed Bolen met with Neffenger shortly after the association's annual convention to discuss access to Ronald Reagan Washington National Airport (DCA), as well as a potential path to continued general aviation operations should a major security event occur.

The TSA has been working with the industry on various means to improve access to DCA, among them the addition of gateway airports and facilities. By the end of September, the number of facilities that can serve as a direct gateway to DCA was approaching 125.

The industry hopes to vault the key stumbling block: the requirement for an armed security officer on board. But any change to that requirement requires signoff by the nation's security chiefs, along with the TSA. Those chiefs in the past have been reluctant to adopt such changes, and it is unclear what difference, if any, the new Trump Administration might make in this area.

In addition, NBAA discussed the need for an effective program that would enable general aviation to return to the skies in the aftermath of a security event, noted Doug Carr, NBAA's v-p of regulatory and international affairs, who also attended the meeting. "Today that doesn't exist," he said.

"We are well aware of the likely reaction to a significant security incident," said Bolen. "Unless we have a plan in place that assures our government partners and the public that general aviation operations can safely continue, we'd likely see another mandatory grounding of all general aviation."

Neffenger was receptive to these discussions, and the association leaders committed to cooperating with the TSA to determine reasonable measures. "I was encouraged by the Administrator's reception at this meeting and look forward to continuing to work with him and the agency," said Bolen.

Administrative Turnover

These discussions come as the agency is likely facing another turnover with the new White House. Neffenger started the job in June 2015 as the sixth administrator of an agency that has been in existence only since 2001. The administrator serves at the discretion of the President, so Neffenger's future with the agency might be at the discretion of the next administration.

In addition, general aviation leadership at the TSA has been in constant turnover. But the agency recently appointed Paul Wysniewski as general aviation engagement manager, providing a bridge for collaboration. Wysniewski is among the longest-serving TSA officials, joining the agency not long after its inception to help federalize airport security.

NBAA is hopeful that by continuing to collaborate with the agency, business aviation priorities will make progress through the next turnover.

For the TSA's part, the agency said it "is actively preparing for the upcoming change in administration, but will continue the priorities the current administration has set on behalf of the American people, specifically ensuring the security of America's transportation systems."

As those changes occur, NBAA also is working to ensure its members are properly prepared for security in both domestic and international operations. The association is planning its first Security Conference to help Part 91 and 135 operators "raise the bar" on security measures and preparedness. The inaugural NBAA Security Conference will be held January 24 to 25, just before the 2017 NBAA Regional Forum in West Palm Beach, Fla.

"This conference will complement other security educational opportunities NBAA provides," said Mike Nichols, NBAA's v-p of operational excellence and professional development.

The conference will focus on a range of topics aimed at business aviation executives with experience in security practices. Drawing on member surveys, the conference will cover the security landscape and "deep-dive" into international operations, cybersecurity threats and the security of personnel away from home base.

There will be an Introduction to Business Aviation Security Workshop on January 24. The workshop will cover the basics for developing and implementing security measures.

NBAA is also planning a pre-conference roundtable on the DCA Access Standard Security Program (DASSP). To cover possible improvements and changes, the roundtable is open to TSA-approved DASSP operators only.

"The conference will be interactive and scenario-based, presenting tools and practices operators can take back to their organizations and implement immediately to raise the bar for security in their flight department and company overall," Nichols said. ❑

BOMBARDIER CS300 ENTERS SERVICE WITH AIR BALTIC

The first Bombardier CS300 entered service with Latvia's Air Baltic on December 14, flying 120 people from Riga to Amsterdam. Hours after the completion of the flight, Bombardier announced the larger of the two C Series models won type validation from the U.S. Federal Aviation Administration. The FAA also determined that the CS300 will share the same pilot type rating as its smaller sibling, the CS100.

On November 23 Transport Canada and the European Aviation Safety Agency granted the CS100 and CS300 Same Type Rating status. According to the manufacturer, the approval will save operators "significant" costs and reflects the 99 percent parts commonality that the two aircraft share. —*G.P.*

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NEWS BRIEFS Compiled by Chad Trautvetter

U.S. Bizav Activity Climbs 4.9 Percent

North American business aircraft flying was up by 4.9 percent year-over-year in November, according to data from Argus International. By operational category, Part 135 activity climbed by 7.6 percent, followed by Part 91 with a 4.1-percent improvement and a "modest" 1.2 gain in fractional activity. Large-cabin jet flying jumped 7.6 percent over the same period in 2015, while turboprops were up 5.6 percent. Light and midsize jets followed at 4.2 percent and 3.5 percent, respectively. Only two individual categories saw double-digit increases: Part 135 and fractional large-cabin-jet flying, which rose 16.1 percent and 12 percent, respectively, year-over-year. The sole loss in an individual category was fractional midsize-jet activity, which shrank 2.3 percent from a year ago.

Piper M600 Gets Aussie Nod

Piper recently obtained approval from Australia's Civil Aviation Safety Authority (CASA) for the M600 turboprop single. This paves the way for the aircraft to enter service in the region. "This is a significant milestone for the M600," said Piper Aircraft CEO Simon Caldecott. The six-seat, $2.853 million turboprop single is equipped with the Garmin G3000 touchscreen-controlled flight deck and is powered by a 600-shp (flat rated) Pratt & Whitney Canada PT6A-42A.

Subjects Added To SM4 Safety Program

Aviation insurer Global Aerospace has added partners and a refreshed line-up of direct services for the SM4 Aviation Safety Program. Now entering its eighth year, SM4 provides targeted aviation safety subject matter experts and financial support to clients. The new SM4 partners and subject matter experts are Prevailance Aerospace, aircraft upset-recovery training; Pulsar Informatics, fatigue-risk management; Satcom Direct, cybersecurity; Southern AeroMedical Institute, hypoxia training; and Unmanned Safety Institute, UAS safety and training. Returning partners and subject matter experts are Aviation & Marine Safety Solutions International, safety, security and regulatory compliance for commercial aircraft operators; Baldwin Aviation, aviation safety management; Convergent Performance, human factors; Gray Stone Advisors, operational assessments; Fireside Partners, emergency response; and MedAire, medical, security and travel assistance.

Sam Hill To Retire from Quest Aircraft

Quest Aircraft CEO and longtime business aircraft executive Sam Hill is retiring at the beginning of this month. Hill, a 50-year aviation industry executive, will remain as an advisor to the company and a member of the board of directors, the company said, adding that the move "has been long planned as part of Quest's overall strategic plan." A successor has not yet been announced. Hill joined the Sandpoint, Idaho-based manufacturer of the Kodiak turboprop single in late 2012 after retiring from Honda Aircraft. He initially planned only a short-term stint with Quest, but stayed at the request of the board.

Leonardo Signs Chinese HEMS Deal

Leonardo announced the sale of 30 more EMS helicopters to China on December 14. The order for a mix of AW139 and AW169 medium twins was placed by Sino-US Intercontinental Helicopter Investment, and deliveries are slated for this year. Some 180 Leonardo helicopters are now operating in China, with a record 20 delivered into the country last year. The Sino-US helicopters will be operated by Kingwing General Aviation, parent company of Sino-US. Sino-US has ordered 80 Leonardo helicopters: the AW119Kx, AW109 GrandNew, AW169, AW139 and AW189. Kingwing operates the largest helicopter fleet in China.

PROJECT WING

Shown is the Project Wing prototype drone developed by the X laboratory of Alphabet, formerly Google.

IG faults FAA oversight of drone exemptions

by Bill Carey

The FAA did not confirm that the recipients of some 5,500 exemptions it issued for the commercial use of unmanned aircraft systems (UAS) understood or followed the conditions of those approvals, the Department of Transportation inspector general found in an audit report released last month. Fines for improper drone operations have been limited, the IG said, in part because the FAA has emphasized education over enforcement of the rules.

Released on December 1, the IG report focused on commercial exemptions the FAA granted under Section 333 of the FAA Modernization Act of 2012—before the agency released its Part 107 regulation for commercial drones weighing less than 55 pounds in June. That rule became effective on August 29.

After the small-UAS regulation became effective, Section 333 exemption holders had the option of continuing to fly under the conditions of their exemption or of reapplying under Part 107, which is "generally more permissive," the IG said. The exemption process still applies to applicants seeking to fly drones weighing more than 55 pounds, the office noted.

As of December 2, the FAA had processed 22,048 applications for remote pilot certificates to fly drones for business purposes under Part 107, the agency said in response to an **AIN** inquiry. It also reported that 571,192 people had registered through an online site to operate one or more small drones for recreation.

When Congress granted the FAA authority to issue exemptions in the 2012 legislation, the agency "initially adopted a conservative, time-sensitive approach to reviewing applications that took as long as 215 days," the IG said. But as the number of applications proliferated, the FAA expedited its approval process using contractor support. It issued the first Section 333 exemptions to six Hollywood-affiliated film and production companies in September 2014; the following April it announced a "summary grant" process of approving batches of exemptions in cases that were similar to previous approvals.

According to the IG: "At the time of our review, the FAA…did not verify that the 5,500 approved operators thoroughly understood the conditions for operating UAS technology within the limitations of their exemption, such as by conducting knowledge tests," which is a requirement of Part 107. "While FAA employees and contractors review the information within the exemption, we identified examples of operators who claimed they did not understand certain exemption provisions, such as prohibited night operations, or flying too close to people not participating in the operation."

Emphasis on Education

Once applicants received a commercial exemption, they also received a blanket certificate of authorization allowing them to fly anywhere within the U.S. at or below 400 feet, except near airports. The FAA did not track exemption holders by their operating locations, the IG said. "This is problematic because exemption applicants often use attorneys to prepare and file their exemption requests. In that case, the FAA has only the address of the attorney who filed the request, not the UAS operator's address," the office stated. "[A]s a result, the agency has limited knowledge of where UAS operate, and limited means to oversee those operators following a granted exemption."

The number of incident reports of rogue drones has risen dramatically, most likely involving other-than-commercial aircraft. Seventy-one percent of reported sightings occurred at altitudes at or above 400 feet, according to an IG analysis of 1,411 incidents reported between November 2014 and January 2016. But as of this April, the FAA had initiated just 30 enforcement actions against violators, of which 12 remained open, the IG said. It had collected $22,805 in fines.

The IG attributed the limited number of enforcement actions to the FAA's "current oversight philosophy," which prioritizes operator education over enforcement. In contrast to the 30 enforcement actions the FAA had initiated as of April, the agency had issued 625 education letters, the office said.

In the audit report, the IG recommends that the FAA adopt a more proactive, "risk-based" approach to overseeing drones that includes improved training of aviation safety inspectors, better use of data sources to facilitate data mining and safety analysis and periodic inspections of UAS operators to ensure their compliance with the rules.

The "FAA is currently restricted to a reactive approach to UAS oversight, rather than proactively identifying and mitigating risks with a rapidly advancing technology," the office stated. "Unless the FAA can adopt a more proactive approach to civil UAS oversight, the agency cannot ensure that approved UAS are operating safely in our airspace." ❑

CURRENCY SWAP AFFECTS INDIAN BIZAV

India's replacement of all Rs500 and Rs1,000 notes in an attempt to curb counterfeit and "black" illicit money is negatively affecting business aviation in the country. A shortage of the new currency since November's announcement by Prime Minister Narendra Modi is creating problems for business aircraft operators, who have traditionally conducted certain aviation service transactions in cash in India.

"With some 80 percent of the old notes withdrawn, the country is facing a cash crunch that is being amplified by cash withdrawal limitations.

Jayant Nadkarni, president of India's Business Aircraft Operators Association, told **AIN** that some flights had to be cancelled, as cash was unavailable to pay charges for landing, takeoff, parking and ground handling at smaller airports. With not enough cash in circulation, more flights might have to be refused, he said. ■

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NEWS BRIEFS Compiled by Chad Trautvetter

Deer Jet Completes UAS Deal

Deer Jet, a wholly owned subsidiary of China's HNA Group that operates and manages 90 business aircraft and bizliners, has completed the majority share acquisition of flight support provider UAS International Trip Support. The acquisition makes UAS the flight support partner for those 90 aircraft, and the company will also be able to serve HNA Group's 21 airlines. One result of the share acquisition is that UAS will provide flight support services for delivering new aircraft for HNA's airlines, an operation that will involve about 150 aircraft in the next few years. UAS has continental headquarters in Houston, Texas; Johannesburg, South Africa; Hong Kong; and Dubai, as well as regional offices in Africa, China and India and ground presence at 23 locations.

Jets Buoy European Bizav Flying

Business aircraft flying in Europe rose 0.8 percent year-over-year in November, thanks to a 3-percent gain in jet activity that outweighed declines in the turboprop and piston segments, according to data from WingX Advance. Business jet flights in Europe now have a positive 12-month rolling average, with light jet activity propelling most of this growth. Flights from Western Europe were up in November, bolstered by growth in the UK, France and Italy, compensating for losses in Germany, Switzerland and Spain. Activity in Southern Europe was flat, while that in Eastern Europe fell slightly. Declines in Turkey and Russia have bottomed and are down 3 percent and 1 percent, respectively. WingX said there was "substantial growth" during November in the Nordics, Portugal and the Czech Republic.

Argos Building European FBO Chain

Argos VIP plans to build a network of European FBOs beyond its native Italy. The Rome-based group recently opened its first operation outside the country—a base in Lugano, Switzerland—and has set its sights on further expansion in France and possibly Spain. The company had targeted the UK for its expansion project, but put this decision on hold following the country's June 23 vote to leave the European Union. In addition to its main facility at Rome Ciampino Airport, the company has bases at Milan Malpensa and Linate airports, as well as in Venice, Verona, Pisa, Naples and Cagliari.

Spire Touts Lower-cost ADS-B

Spire has announced a new space-based global aircraft tracking service for ADS-B-equipped aircraft. Dubbed Spire AirSafe, the service will be ready ahead of the Nov. 8, 2018 ICAO requirement for most international flights to provide updated flight information every 15 minutes. The company will launch 25 ADS-B equipped satellites this year and another 50 next year. These 75 satellites—each about the size of a loaf of bread—will be put into a diverse set of orbits to provide coverage over oceanic areas, polar regions and other remote places where ground-based tracking is ineffective or impossible. "Spire AirSafe will offer a compelling alternative," said Spire CEO Peter Platzer. "Most customers don't need up-to-the-second aircraft information; for many of them, the standard set forth by ICAO of 15 minutes will do just fine."

TAG Sees Rise in AOG Mx Demand

Since its launch a year ago, the maintenance services mobile repair team (MRT) at TAG Aviation has seen a rise in demand for critical response. According to the aviation services provider, MRT experts from its eight European service centers responded to 150 AOG events last year. The company is an authorized service center for Bombardier and Dassault Falcon.

U.S. stopgap bill pushes ATC debate to this year

by Kerry Lynch

The U.S. Congress has once again pushed off passage of a full Fiscal Year 2017 government-wide funding bill, opting instead for another short-term stopgap measure. That sets up a possible budget showdown early this year as the industry renews debate over the funding of the ATC system.

The measure, passed last month just an hour before federal funding was set to expire under a previous stopgap bill, will fund the federal government through April 28. Aerospace Industries Association (AIA) president and CEO David Melcher expressed hope that the 115th Congress will "choose the harder right and pass budget bills instead of the easier wrong of a long-term continuing resolution."

Passage of full appropriations bills, instead of stopgap measures, "can eliminate much inefficiency in government contracting," Melcher said, adding, "This is really not a heavy lift, folks, and it is about time this happens."

AIA and 70 CEOs of aerospace companies had urged Congress in November to pass a full bill rather than a stopgap measure, saying, "Few things could provide a greater sense of stability for our industry than completing final FY2017 appropriations bills."

The four-month extension came as the aviation industry returned its attention to long-term FAA priorities and the possibility of reorganization of the ATC system. ATC reform advocates have pointed to the fits and starts of the appropriations process as an underlying reason for a need to create a user-funded, independent air traffic control organization removed from the annual congressional appropriations process.

Airlines for America (A4A) CEO Nick Calio in the fall had noted the specter of a government shutdown, saying, "There is the exhausting potential for it to happen again. This cycle of dysfunction in funding perfectly underscores the critical flaws in the current system and why A4A is advocating for ATC modernization."

National Air Traffic Controllers Association president Paul Rinaldi and executive v-p Trish Gilbert also last fall had urged Congress to work through its issues to pass a funding bill to support the National Airspace System (NAS). "For the last three years, we've been asking Congress to establish a stable, predictable funding mechanism to fund the NAS."

Since the measure primarily was a simple funding extension for most agencies, it did not address other legislative initiatives. The House and Senate versions of FY2017 funding bills included various measures to address certification reform and inspector staffing, as well as continuation of the mandate for the agency to honor requests to block access to registration information on real-time flight-tracking programs.

The AIA had also urged the lawmakers to "restore full functionality" of the U.S. Export-Import Bank by providing means for the bank to authorize transactions greater than $10 million. The stopgap measure, however, did not address Ex-Im funding, leaving that issue to continue into this year. ❑

Boeing Business Jets lands BBJ Max 7 order

by Kerry Lynch

A month after Boeing Business Jets unveiled the 7,000-nm (12,965-km) BBJ Max 7, the company has announced the first order for the variant. BBJ president David Longridge revealed the order—from Orient Global Aviation—last month at the MEBAA show alongside Edan Ostreich, director of operations for the Singapore-based company, which currently flies an earlier BBJ.

The order pushes the tally for the BBJ Max series to 12, with 10 for the BBJ Max 8 and one for the BBJ Max 9. BBJ unveiled the Max 7 in November during the NBAA Convention in Orlando, Fla., bringing to market the longest-range member of the Max line. "The 7,000-nautical-mile range will connect key city pairings that were previously not possible in a BBJ, and increased cabin and cargo space make this an unbeatable business jet," said Longridge.

Powered by more fuel-efficient Leap-1B engines, the Max 7 is longer than the original BBJ and offers more cargo volume, yet still delivers lower operating costs.

Longridge believes the availability of the Max 7 will boost sales, which have slowed in the past year. He stressed the importance of range to the market, pointing to the success of Gulfstream with the ultra-long-range G650ER. ❑

DAVID McINTOSH

BBJ president David Longridge, left, and Orient Global Aviation director of operations Edan Ostreich reveal the first order for the BBJ Max 7

BBJ TO NAME NEW PRESIDENT

Last month's Middle East Business Aviation Association show was the last for Boeing Business Jets president David Longridge, who announced his plans to take another position within Boeing. On December 12, the 23-year Boeing veteran assumed the new post of vice president of sales for commercial aviation service. His departure comes near his two-year anniversary as president of BBJ.

"I am sad to say this will be my last MEBAA," he said. "I genuinely believe this is the most exciting part of aviation there is. I have had more fun doing this job and developing these products…than I probably will ever have in the rest of my career. It has been a real privilege working with the BBJ team, customers and suppliers."

At press time BBJ had not yet named a successor. —*K.L.*

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NEWS BRIEFS Compiled by Chad Trautvetter

Safran Opens Automated Blade Plant

Safran Helicopter Engines opened an automated production line dedicated to turbine blade manufacturing last month at its plant in Bordes, France. With this first automated line, the company can manufacture blades in half the time it previously took. Part of a "factory of the future" strategy, the new production line has several robots and automated cells capable of performing every process—milling, polishing, etching, 3D control and surface finishing—involved in creating finished, ready-to-assemble turbine airfoils from raw materials. The new production line can produce 100,000 airfoils a year to tolerances measured in microns. Between now and 2020, other "lines of the future" will be introduced at Safran Helicopter Engines' production facilities.

ExecuJet Africa Adds Helo Charter

ExecuJet Africa has launched charter helicopter service from its Cape Town FBO, using a newly acquired Bell 407 with a cabin configurable for an array of missions and payloads. It will offer helicopter charters for scenic flights to surrounding vineyards and other tourist attractions. The Bell 407 will also be available to the company's existing clients for business and leisure trips, ExecuJet said.

TAG Farnborough Pushes for Carbon Neutrality by 2019

TAG Farnborough Airport has passed a milestone in its efforts to achieve carbon neutrality by 2019. The business aviation gateway received the silver Green Apple Award at the British Parliament as part of the Green Apple Environment Awards, which recognize positive environmental practice—in this case, efforts of TAG's employees to adopt low- to zero-carbon travel to and from the workplace by cycling, using public transportation and sharing cars. UK Civil Aviation Authority statistics show that Farnborough accounts for about a third of all business aircraft movements into the London area.

Coptersafety Buying TRU Sims

Textron's TRU Simulation & Training has signed a deal with training provider Coptersafety to provide five level-D full-motion simulators for various models of rotorcraft beginning this year. The simulators will be installed at Coptersafety's new training center in Helsinki, Finland, and represent the Airbus Helicopters H125 and H145 and Leonardo AW139, AW169 and AW189. All will be EASA and FAA certified and be reconfigurable for various types of mission training.

Lawyer: Dismiss 'Operating while Intoxicated' Charges

A lawyer for Sean Michael Fitzgerald is asking a judge to dismiss federal charges of "operating" a Talon Air Challenger 604 while intoxicated on August 25 at Cherry Capital Airport in Traverse City, Mich. The motion claims that Fitzgerald—whose blood alcohol content at the time was determined to be 0.343—did not "operate" the aircraft since its engines were not started; no passengers were on board; the boarding door was not closed; no clearance to move the aircraft was attempted or given, nor was the aircraft moved; and the captain and defendant were "never seated together in the cabin [sic]." However, according to the motion, Fitzgerald was arrested while wearing headphones and seated in the cockpit with the auxiliary power on. Further, he "had spoken to the tower for the routing information and the tape of the conversation shows that defendant had difficulty following/repeating the information."

Unstabilized approach led to crash of Phenom at London-area airport

by Amy Laboda

The pilot's decision to continue a high-speed steep visual approach to London-area Blackbushe Airport in the UK resulted in the July 4, 2015 fatal crash of an Embraer Phenom 300 operated by the Bin Laden family-owned Salem Aviation, the UK Air Accidents Investigation Branch (AAIB) determined in its December 8 final report. Mitigating circumstances included excessive stimulation from aural warnings distracting the single pilot and a locked gate that delayed fire and rescue crews. All four aboard—the pilot and three passengers—were killed in the accident.

The Jordanian pilot held a Saudi Arabian ATP certificate and had flown into Blackbushe Airport several times. According to the AAIB report, there was no evidence of any mechanical problem. VMC prevailed and the predicted aircraft performance at a calculated 105 kias touchdown speed was a landing distance of 2,400 feet and ground roll of 1,302 feet on Runway 25, which measures 4,380 feet long.

After the handoff from Farnborough Approach, Blackbushe Airport Flight Information told the pilot about a microlight in the landing pattern. The pilot said he would extend downwind to let the microlight land first. He then crossed the microlight's path, generating the first of several TCAS warnings—a Cessna on a cross-country flight triggered another. The Phenom accelerated and climbed to resolve the traffic alerts and lined up with the runway well above the normal glideslope with landing flaps extended. The pilot initiated a 3,000-fpm descent and selected speed brakes, but they are inhibited with flaps deployed and did not activate.

With an airspeed of 153 knots and pitch attitude of 13 degrees nose down at 1,125 feet agl, the Taws "pull up" excessive-descent-rate warning triggered. At 675 feet agl the pilot again selected speed brakes and again they did not activate. Descending through 500 feet agl the Phenom's airspeed was 156 knots and the rate of descent was 2,500 fpm. At 200 feet agl and 155 knots, the rate of descent was 2,000 fpm. The advisory controller called the runway clear for landing; the pilot did not respond.

Unfamiliar Approach

The Phenom crossed the runway threshold on the glideslope but 43 knots above target speed, touching down 2,330 feet beyond the threshold and braking heavily. The aircraft left the paved surface at a groundspeed of 83 knots, hitting an earth embankment, and then bounced into cars parked in a lot beyond it, shedding a wing and catching fire.

Investigators concluded that the occupants survived the crash but were unable to open the exit quickly enough and died in the fire. The Blackbushe Airport fire and rescue squad was delayed by a locked gate and had to wait for it to be unlocked before proceeding to the accident site to extinguish the fire.

Although the aircraft regularly operated to Blackbushe, most of the destinations to which Salem's Phenom 300 flew were large international airports in Europe and the Middle East. Analysis of FDR data showed that visual approaches were rare and seldom flown at airports other than Blackbushe.

Investigators reviewed data from 46 flights of the accident aircraft and 55 flights of the company's other Phenom 300, focusing on approaches. The pilot of the accident flight flew 20 of the examined flights. Evidence showed that the Phenoms had experienced several steep, high-speed "slam dunk" final approaches.

Accident data showed that the pilot heard no fewer than 36 aural prompts, transmissions or warnings in the cockpit in the last two minutes and 19 seconds of flight. The AAIB report listed the high workload for the single pilot and particularly audio overload and its invoked mental stressors as reasons why he fixated on continuing the approach toward the short runway. The fact that he had successfully performed such approaches before might have contributed to his mindset, the AAIB suggested. In addition, flight department manuals only mandated that final approaches be stabilized on glideslope by 200 feet agl.

The accident pilot was operating the Phenom 300 single-pilot, for which the company held certification. Now, the company's Phenom 300s are crewed by two pilots, and final approaches must be stabilized on normal glideslope by 500 feet agl or the crew must initiate a go-around. Single-pilot operations are allowed only on short flights in low-workload environments. The flight department also adopted a Flight Operations Quality Assurance (FOQA) program and enhanced recurrent training requirements with a focus on short-runway operations. Its approach brief now emphasizes go-arounds in VMC. Mandatory pilot and team meetings have also been introduced.

Blackbushe Airport's operator now has crash gate keys aboard each rescue and fire vehicle, and its operational and training documentation shows the locked gates and how to open them. ❑

EMBRAER DELIVERS FIRST LEGACY 450 ASSEMBLED IN FLORIDA

Embraer Executive Jets delivered the first Legacy 450 assembled at its plant in Melbourne, Fla., on December 14. The fly-by-wire midsize jet was delivered to an undisclosed U.S. customer, who traded up from a Phenom 300. Assembly of the 450 began with the inauguration of the Melbourne plant expansion in June. A second 450 is already on the Melbourne assembly line and is scheduled for delivery in this year's first quarter. The company will start assembling the first Legacy 500 at the Florida facility early this year, soon after the arrival of the fuselage from Botucatu, Brazil, and the wings from Évora, Portugal. The Legacy 450 and Legacy 500 are also produced at Embraer's plant in São José dos Campos, Brazil. —*C.T.*

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NEWS BRIEFS Compiled by Chad Trautvetter

Le Bourget Passengers Robbed

French police are continuing their investigation into the November 21 robbery of two private jet passengers en route to the center of Paris from Le Bourget Airport. Two women from Qatar and the driver of their limousine were attacked with tear gas after their car was forced to stop on the A1 highway at around 9:30 p.m. Property worth an estimated $5.3 million was stolen. The victims' aircraft was handled by the Jetex FBO at Le Bourget, but a spokesperson for the Dubai-based flight support group told **AIN** that the company was not asked to arrange ground transportation and was not informed about the passengers' destination after leaving the facility. FBOs at the Paris airport have implemented a security measure that requires limousine drivers to produce paperwork confirming that they are booked to transport passengers associated with a specific aircraft and flight.

Stevens To Expand Nashville Bizav MRO

Stevens Aviation has signed a letter of intent with Atlantic Aviation to build a new business aircraft MRO facility at Tennessee's Nashville International Airport. Plans for the facility include a 40,000-sq-ft hangar with a door opening height of 28 feet, which will accommodate the "full line of Gulfstreams, Challengers and Legacys." The hangar will also have enough floor space to support Stevens's anticipated growth in the area. Stevens Mobile Services vice president Randy Smith said the company "will soon outgrow its current facility in Nashville, so we are partnering with Atlantic Aviation to construct a new hangar specifically designed for our future needs."

Polish Government Orders G550s

The Polish Ministry of National Defense recently signed an agreement with Gulfstream Aerospace to purchase a pair of G550s for VIP transport. The ultra-long-range twinjets will be delivered this year, according to the Savannah, Ga.-based aircraft manufacturer. At list prices the deal is worth $108 million. The G550 is the most widely used production Gulfstream for special missions and government applications.

EASA OKs Helionix Panel in H135

Airbus Helicopters has received EASA type certificate approval for the Helionix cockpit in the H135 light twin. The night vision goggle-compatible Helionix system is already available on the larger H145 and H175 twins and has three large electronic displays, a four-axis autopilot, first limit indicator, two touchscreen Garmin GTN 750 GPS navcoms and the Avidyne ADS-B-capable TAS620A traffic advisory system. The Avidyne system displays 30 targets, tracks 50, and has a range of 21 nm, an ADS-B range of 40 nm and a vertical range of +/-10,000 feet. Deliveries of H135s equipped with Helionix are scheduled to begin this year with helicopter EMS provider Norsk Luftambulanse and Ascent Flight Training as the launch customers.

UBS: Global Deliveries Drop in Q3

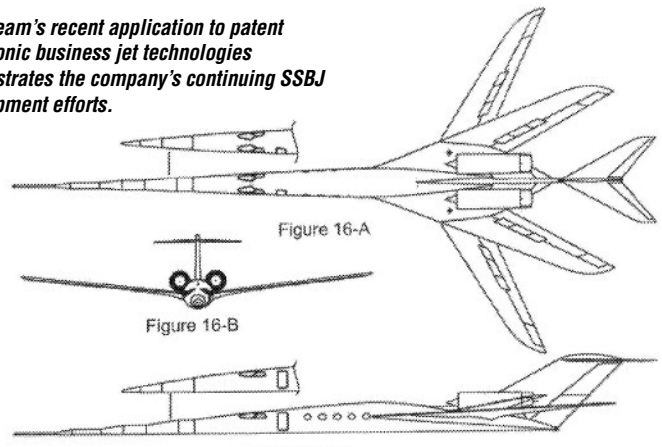
The North American and Western European markets helped buffer declining business jet deliveries in other global regions, keeping the third-quarter drop to 5 percent globally, according to the latest UBS business jet delivery report. Shipments to North America were up by 9 percent, while the market in Western Europe rebounded to a 13-percent improvement, the market analyst said. Deliveries to China plunged 83 percent in the third quarter. The Latin American market suffered similar contraction, with deliveries falling 50 percent, while the emerging Europe, Middle East and Asia (EMEA) market was off 13 percent. On a rolling 12 months, global business jet deliveries are down 4 percent.

Gulfstream continues supersonic research

by Chad Trautvetter

Gulfstream Aerospace continues to pursue technologies that would enable development of a supersonic business jet (SSBJ), logging two new U.S. patents for such technologies in the past several months. Asked about these latest patent awards, a company spokeswoman told **AIN**, "Gulfstream has a small team committed to researching sonic-boom mitigation."

Gulfstream's recent application to patent supersonic business jet technologies demonstrates the company's continuing SSBJ development efforts.



The Savannah, Ga.-based aircraft manufacturer's most prominent research in this field is the Quiet Spike, a telescoping nose designed to reduce greatly or even eliminate the sonic boom. It has previously tested the Quiet Spike on a NASA F-15 and has even built an acoustic simulator, the "Gulfstream Whisper," to demonstrate the spike's effectiveness.

However, the company has noted that the engine inlet is also a major factor in reducing sonic boom noise. A patent issued to Gulfstream on November 1 is for an "isentropic compression inlet for supersonic aircraft [which shapes] the compression surface of the inlet to defocus the resulting shocklets away from the cowl lip." This improves inlet drag characteristics and interference drag characteristics, according to the patent.

Gulfstream has also developed a way to use fuel loading to mitigate the sonic boom. In a patent issued on September 20, Gulfstream engineers outline a computerized fuel redistribution "to adjust an amount of fuel stored within a wing to minimize a twist in the wing caused by the deviation." Such redistribution will reduce the magnitude of the sonic boom caused by the deviation, the patent notes.

While Concorde also employed fuel load shifting, it did so for moving the center of gravity for the supersonic realm and was a manual process, using a series of toggle switches controlled by the flight engineer on the flight deck. The Gulfstream application is different—not just because it will be used to twist the wings to minimize the sonic boom, but also because it employs a system with processors and sensors to automatically and instantly adjust fuel loads. This computing and sensor technology is the underlying basis of the patent.

SSBJ Clues

The patents also give some clues about what a Gulfstream supersonic business jet might look like *(at left)*, should the company decide to undertake such an ambitious project. According to information and drawings in these patents, the design would likely employ a swing wing, like that used for the F-111 (built by Gulfstream parent company General Dynamics in the 1960s), and be powered by two engines.

Configuration drawings also show a T tail and the telescoping Quiet Spike, in addition to isentropic compression engine inlets and the fuel-load shifting system. In addition, the patents suggest a top speed of Mach 1.9 for a would-be Gulfstream SSBJ.

As Gulfstream and Bombardier Aerospace already offer subsonic large-cabin business jets with ranges approaching 8,000 nm—enough to fly halfway around the globe nonstop—speed would seem to be the next frontier. In fact, an aviation consultancy specializing in this issue published a study in late 2015 that concluded that an SSBJ now makes economic sense.

"We've done the study in two ways—on the airline side and with the corporate aviation side," said InterFlight Global CEO Oscar Garcia. "On the airline side, the price premium cannot exceed 30 percent. On the corporate side, the price premium can reach up to 70 percent. The corporate and special-mission government side is much less price sensitive."

He also thinks that the time is ripe for the U.S. Congress to revisit the national ban on supersonic flight over land. "Congress is looking at this issue again, maybe more closely than ever before. It is starting to look at the fact that we need speed, we need the ability for rapid reaction," Garcia noted.

"With good research results from Gulfstream and NASA, if that sonic boom gets reduced to a certain level, I wouldn't be surprised if the ban is lifted." That could happen as early as 2020, Garcia believes. ❑

STRATOS VLJ MAKES SHORT MAIDEN FLIGHT

Eight years after it was introduced, the four-seat Stratos 714 single-engine very light jet flew for the first time on November 21 from its base in Redmond, Ore., Stratos Aircraft announced on November 30. During the 10-minute flight, the all-composite airplane reached a speed of 128 knots and an altitude of 3,700 feet with the flaps set at 24 degrees and the gear extended. Dave Morss was at the controls.

Stratos plans to continue a "vigorous" flight-test program to expand the 714's envelope to the stated performance goals of 415 knots at 30,000 feet, 1,500-nm range and a 41,000-foot ceiling. When the aircraft was unveiled, plans called for it to be powered by a Williams FJ44-3AP turbofan; however, the test aircraft was equipped with a 2,900-pound-thrust Pratt & Whitney Canada JT15D-5. According to Stratos, with the Pratt engine the time to climb to 37,000 feet is expected to be 17 minutes.

Stratos plans to reintroduce the aircraft at EAA AirVenture. —*M.H.*

NASA drives vision of ATM control of drones

by Bill Carey

Quite apart from the drone the neighborhood kid sails over the hedgerow, the FAA and industry observers expect that hundreds of thousands of small, commercial unmanned aircraft systems (UAS) will eventually seek access to the nation's airspace. For some four years now, the NASA-led UAS Traffic Management (UTM) research effort has worked to shape the rules and capabilities of this coming low-altitude ecosystem.

Spearheaded by NASA senior engineer for air transportation systems Parimal Kopardekar, the UTM concept of a low-altitude airspace management system for drones dates to 2012. The space agency provided seed money for the effort initially, then established it as a program with $15.6 million in funding in Fiscal Year 2015. Some 120 UAS manufacturers, software system developers, communications companies and other entities answered a NASA solicitation to collaborate on the system development; a number have formalized their participation through Space Act Agreements. NASA listed 65 "UTM Partners" as of September.

The space agency and the FAA have formed a joint research transition team, and plans call for transferring UTM technology to the FAA by 2019.

In October, testers demonstrated UTM Technical Capability Level 2 (TCL2), focused on beyond visual line-of-sight operations in sparsely populated areas. Operators flew scenarios with multiple fixed- and rotary-wing drones from Reno-Stead Airport near Reno, Nev., exercising the ability of the UTM software platform to safely separate drones interacting with the system and each other via common data-exchange protocols.

NASA

A graphic depicts how NASA envisions unmanned aircraft safely sharing the National Airspace System with manned aircraft.

The platform ingested real-time aircraft tracking and both real and simulated weather data, alerted operators to potential conflicts with other drones and manned aircraft and warned them of a drone's nonconformance with its flight plan.

For the first time, the system demonstrated the capability to dynamically re-route flights when drone operators sought to amend their flight plans to adapt to changing airspace conditions or mission requirements.

TCL3, scheduled for January next year, will test technologies for safely separating "cooperative" unmanned aircraft—those that have transponders to signal their position—and "non-cooperative" drones that do not, over moderately populated areas. TCL4 will test the UTM construct for higher-density urban areas.

Ultimately, NASA envisions two types of UTM systems: a portable system that would move between geographical locations to support "precision agriculture," disaster relief and other missions for drones; and a "persistent" system that would support low-altitude drone operations in a fixed geographical area.

NASA hosted a first UTM conference at Moffett Field, Calif., the site of Ames Research Center, in July 2015; the second annual conference took place in November in Syracuse, N.Y. Co-located at Syracuse's airport is Hancock Field Air National Guard Base, where the 174th Attack Wing operates the General Atomics MQ-9 Reaper. Griffiss International Airport in Rome, some 50 miles to the east, is home to an FAA-designated UAS test site managed by the Northeast UAS Airspace Integration Research Alliance.

With those and other resources at its disposal, the central New York region is positioning itself as an unmanned aircraft industry hub. In December 2015, the state awarded the region $500 million in economic development funding, half of which was earmarked for infrastructure spending on the UAS industry over five years. Under that program, Syracuse University is leading the establishment of the National Unmanned Aerial Standardized Performance Testing and Rating facility, described as the

Continues on page 34 ▶

MATT THURBER

HondaJet sales demonstration pilot Mike Finbow pauses in front of his ride.

HondaJet makes MEBAA debut

Flying the HondaJet to Dubai for its MEBAA show debut naturally involved a few extra stops for Mike Finbow, sales demonstration pilot for HondaJet Northern Europe. But overall, the weather was nearly perfect and the tailwinds strong. Finbow departed from Chester, UK, on December 2 in HondaJet M-HNDA (Serial Number 18, Isle of Man registration) and landed in Dubai on December 3.

The HondaJet's maximum range while carrying four passengers and reserve fuel is 1,223 nm, so Finbow made three stops on the way to Dubai. On the first day, he flew 1,075 nm from Chester to Bari Palese Airport on southern Italy's Adriatic coastline in two hours, 52 minutes. After refueling, he continued another 527 nm and 1.5 hours to Heraklion on the Greek island Crete, where he spent the night.

The following day, the first leg was 653 nm to Hurghada Airport in eastern Egypt. The final leg was the longest at 1,168 nm (as the crow flies) but 1,280 nm as routed over the width of Saudi Arabia then Bahrain and into Dubai. That leg took 2 hours, 56 minutes and 2,300 pounds of fuel, leaving plenty of fuel (550 pounds) in reserve. He believes the last leg might have set an unofficial speed record for the HondaJet, which can cruise at up to 422 knots and as high as 43,000 feet.

European Market Expanding

Before adding the HondaJet type rating in May, Finbow had been flying a Cessna Citation Bravo for about seven years and more recently a Citation Mustang, both of which he flies for Birmingham-based Marshall Aircraft Sales. That company holds the HondaJet Northern Europe dealership covering the UK north of London and the Channel Islands, Scandinavia and the Benelux countries.

He is one of two European pilots currently type rated in the HondaJet, although that number will grow as more HondaJets are delivered in Europe. The HA-420 HondaJet received EASA certification in May, and on November 23 the FAA issued the HondaJet's flight-into-known-icing certification.

The HondaJet on display in Dubai is the first delivered in the UK and the second in Europe. Finbow flew it to Birmingham from the Honda Aircraft factory in Greensboro, N.C., starting on May 13, immediately after receiving his type rating, along with a Honda factory pilot. That flight went from Greensboro to Bangor, Maine; Iqaluit, Canada; Kangerlussuaq, Greenland; Reykjavik, Iceland; then Birmingham for a total flight time of about 12 hours. —*M.T.*

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Could pilot pride play a role in some loss-of-control accidents?

We all know the expression "pride comes before a fall." Pride in this old Biblical proverb can mean overconfidence in our abilities. But I think it could also mean insecurity about our abilities and fear of embarrassing ourselves by appearing foolish or incompetent. Or maybe even appearing not "macho" enough, a trait that can apply to women as well as men.

I was thinking of this expression recently as I read the NTSB's 2017 to 2018 Most Wanted safety recommendations. Topping the NTSB's list again for GA is loss of control in flight. While GA accidents have been trending down—and this can be attributed to a lot of factors, not least the government partnership with a number of GA organizations such as AOPA focused on this issue—the number of accidents remains unacceptably high.

For the third year, the NTSB has highlighted the importance of preventing this type of accident, citing data that shows nearly half of all general aviation accidents are caused by loss of control. From 2008 to 2014, the NTSB data shows 1,194 fatalities from these crashes. According to the most recent FAA data, 384 people died in 238 GA accidents last year, with loss of control the number-one reason. This data shows one fatal accident every four days involving loss of control. Think about it. One fatal accident every few days.

Go-Around for Safety

Many new pilots are taught "don't be too proud to go around," but how well does that lesson stay with them throughout their flying years? I got to thinking about the role pride might play in some of our safety decisions. More specifically, does pride play into safety decisions general aviation pilots make? Can pride or fear of looking incompetent be a factor in the most common type of general aviation accident—loss-of-control crashes—especially in the decision not to go around when landing?

The NTSB report calls for more pilot training and better awareness of technologies that can help prevent these accidents. The report cites recommendations the NTSB formulated after its October 2015 public forum on loss-of-control accidents. These goals are worth repeating in full:

- Understand stall characteristics and warning signs, and be able to apply appropriate recovery techniques before the stall onset.
- Realize that stall characteristics can vary with aircraft loading and are usually worse at aft cg positions.
- Be aware that stall can occur at lower AOA in icing conditions.
- Use effective aeronautical decision-making techniques and flight risk assessment tools during both pre-flight planning and in-flight operations.
- Manage distractions so that they do not interfere with situational awareness.
- Obtain training in emergency response skills so it is more natural to apply those skills in an emergency.
- Understand and maintain currency in the equipment and airplanes being operated.
- Take advantage of available commercial trainer, type club and transition training opportunities.
- Consider installing new technology, such as an AOA indicator, which when coupled with pilot understanding and training in its best use can assist pilots during critical or high-workload phases of flight.

FAA Guidance

Coincidentally or not, a couple of days after the NTSB issued its Most Wanted list, the FAA disseminated its latest in a series highlighting loss-of-control prevention techniques. I really hope GA pilots are taking advantage of this excellent series. I spend a fair amount of time criticizing the FAA (which it deserves, of course), but I have to give credit where it's due. Here, the FAA focuses on when a pilot should go around for safety. The FAA's message does a particularly helpful job of breaking down how a loss-of-control accident can be prevented on landing and when the decision to go around should be considered.

Here is the entire section since I do believe it bears repeating anywhere that it might be read by GA pilots:

What is a Stabilized Approach?

A stabilized approach is one in which the pilot establishes and maintains a constant-angle glidepath toward a predetermined point on the landing runway. However, the pilot must also:

- Maintain a specified airspeed.
- Complete all briefings and checklists.
- Configure the aircraft for landing (gear, flaps and so on)
- Maintain the correct altitude levels (such as 500 feet for a VMC approach or 1,000 feet for an IMC approach).
- Ensure only small changes in heading/pitch are necessary to maintain the correct flight path.

If a pilot does not meet these conditions, the approach becomes "unstabilized" and the pilot should consider a go-around to make a second attempt to land safely.

If you choose to continue with an unstabilized approach, you risk landing too high, too fast or out of alignment with the runway centerline, and may be unprepared for landing. These situations can result in damage to the aircraft or, worse, to you and your passengers!

Important Clues

How you see the runway on your approach is an important factor in maintaining your safety. Pay attention to the shape of the runway. We all know that a runway is an elongated rectangle. However, from the air, the runway can appear to be a trapezoid, with the far end looking narrower than the approach end.

If your approach is too shallow, the runway will appear to shorten and become wider. If it is too steep, the runway will appear to become longer and narrower. These are signs that you may want to consider a go-around.

Reading these suggestions—all of which, as I noted, are excellent—I didn't see any relating specifically to social or psychological pressure that might push a pilot to continue an approach, even when he or she knows it's an unstable approach. The one thing I would like to see both the government and the GA alphabet groups tackle head on is the notion that going around is embarrassing or makes you look bad to your passengers, ATC or your fellow pilots. It isn't just GA pilots who have "ego" problems doing go-arounds. I've seen a number of airline accidents where an approach was clearly unstable and the decision to go around would have been the most prudent and avoided an accident or runway excursion. Yet the crew did not initiate a go-around. (And, yes, I realize that for airline pilots there can be the added factor of company pressure to make on-time performance and manage fuel.)

So I would like to add my own safety recommendation: to regularly remind pilots it's OK to do a go-around if your approach is unstable or you believe, for whatever reason, a go-around would be prudent. Just like it's OK to cancel a flight if the weather looks iffy. Or to turn back if a situation develops that makes continued flight unsafe. It might not just be new pilots who need to be told not to let pride be their downfall.

And while I'm talking about developing a safety culture that makes it OK for GA pilots to go around when it's appropriate, the rest of us in the industry need to be supportive of pilots who make prudent safety choices even if those choices cause delays. Aviation banter, teasing or pressure that can seem harmless can make it difficult for some pilots to make prudent safety choices for fear of appearing foolish or inadequate before their aviation peers.

In the end, it's always ultimately the pilot flying's responsibility to ensure a safe flight for him/herself and passengers. I would just ask that you consider whether any decisions you've made when flying were influenced by what others would think of you. And if they were, what can you do to stop that influence from affecting the safety of your future flights?

The opinions expressed in this column are those of the author and not necessarily endorsed by **AIN**.

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AOPA, UND STUDY WAYS TO COMBAT LOC-I

AOPA's Air Safety Institute (ASI) is working with the University of North Dakota to study continuous turning approaches as an alternative to the traditional rectangular landing pattern. The associations are studying the patterns as they explore possible means to help mitigate in-flight loss of control events (LOC-I).

The study comes as the National Transportation Safety Board retained LOC-I on its list of "Most Wanted" safety improvements for the third consecutive year. NTSB noted that LOC-I was involved in 47 percent of fatal fixed-wing general aviation accidents in the U.S. between 2008 and 2014. These accidents resulted in 1,210 fatalities.

UND and AOPA decided to collaborate on the study of the potential alternative pattern after working with senior NTSB officials at a recent loss-of-control panel.

The organizations are exploring whether simple changes in procedure or training for landing patterns could enhance safety and reduce LOC-I, AOPA said. "The hypothesis to be studied is that in contrast with a rectangular pattern, a continuous turn from downwind to final might provide for greater stability, reduced pilot workload and a constant bank angle throughout the maneuver, helping pilots better manage angle-of-attack variance," the association said.

AOPA and UND also believe the continuous turning approach could reduce the potential for overshooting the runway during the base-to-final turn. The organizations noted that such overshoots have led to multiple stall and/or spin accidents from "aggressive corrective maneuvering."

The study will include a review of flight data to evaluate the differences between the circular and rectangular patterns, including an analysis of bank angle, airspeed and runway overshoot. "Depending on the results of the study, this procedure may serve as a mitigating technique to reduce the likelihood of loss-of-control accidents during the landing phase of flight," AOPA said.

"It's too early to say for sure if the continuous turn to final method will be a safer, more stabilized way to land," said George Perry, senior v-p of the AOPA ASI. "The U.S. military, airlines and many airline ab initio programs already use the continuous approach turn as the standard to support safe landing pattern operations. We should determine which is safer for general aviation, and this study will help us find the answer."

"Although the study is in its early phases, and it's far too soon to draw any definitive conclusions, the new procedure has already been studied and practiced by a select group of UND instructor pilots, and initial data collection has been going quite well," added Lewis Archer from UND's aviation department.

The organizations hope to make initial results available early this year.—*K.L.*

Surf Air will operate PC-12 turboprop singles and light jets—likely either the Cessna Citation CJ4 or Embraer Phenom 300—on European flights.

Surf Air eyes light jet for Europe ops

by Kerry Lynch

California-based Surf Air has been in discussions with Cessna and Embraer over a light-jet fleet order as the company lays the groundwork to launch its membership-based all-you-can-fly charter service in Europe early this year. Surf Air, which announced plans this past summer to expand to Europe, has established an office in London, begun to build its staff there and partnered with TAG Aviation (UK), which will operate its aircraft in the region.

"We plan to bring the success that we experienced with Surf Air in California to Europe," said Simon Talling-Smith, CEO of Surf Air's European operation. "Europe is a wonderful opportunity because Surf Air does really well in markets where there are a large number of people traveling frequently between relatively close points and commercial service is frustrating."

The company is planning two tiers of service—one involving PC-12 single-turboprop operations between closer niche markets and another involving light-jet operations between longer-haul markets, Talling-Smith said.

Surf Air has begun offering the services at introductory tiered pricing ranging from £1,450 ($1,800) per month for the turboprop flights and £2,950 ($3,680) per month for the jets.

At press time, Surf Air was not yet ready to provide detail on which jet aircraft or how many it plans to take. But it does expect the jet service will start between London Luton and Zurich International Airports. Talling-Smith confirmed that the company is engaged in talks with Cessna and Embraer for a "substantial" fleet order that would span five years. Reportedly, the company is considering either the CJ4 or Embraer Phenom 300. Surf Air already has a long-term agreement in place for delivery of the PC-12s, which it also uses in California, he noted.

Target launch will be in the first quarter of this year, Talling-Smith said. Initial service will provide a couple of regular flights daily, building as the service becomes more established. Following launch of London and Zurich, Surf Air plans to add routes "very quickly" to Cannes Mandelieu and Geneva International, and other yet-to-be-disclosed locations, he said.

Further Expansion Planned

As it builds its jet routes, Surf Air hopes to capitalize on changing regulations in Europe to facilitate commercial single-engine turbine operations in IMC, Talling-Smith said, adding that he believes the single-turbine PC-12 is well suited for the niche markets that are not well served by commercial carriers. "We are expecting dramatic growth over the next four years," he said.

For Surf Air, Europe is only the beginning of the expansion. "We see Europe as the next step in the Surf Air journey," Talling Smith said. "But we believe the model can work in many markets of the world," citing the Middle East, South Africa, Mexico, Brazil and Southeast Asia.

Surf Air also expects to build on existing partnerships to expand its service, as it has with the North American operation. The company most recently struck an agreement to offer Lufthansa Miles & More members the option of redeeming their miles on either a round-trip or month-long, all-you-can-fly subscription to Surf Air's network in the U.S.

Under the cooperative effort with the Lufthansa program, Miles & More members will be able to redeem miles through the end of March for the Surf Air travel options.

While the program is initially limited to California and Nevada operations, Talling-Smith said he could see future collaborations in Europe as well. ❑

NEWSMAKERS 2016

AIN staff report

In our annual New Year review of the past 12 months, we have singled out ATC reform as Newsmaker of the Year. It is not a new issue, but with the election of Donald Trump to the White House and the appointment of new players in his entourage, it stands as one of U.S. business aviation's biggest unknowns as 2017 dawns. The New Year also opens with business aviation acknowledging that there is too little gold chasing too much aluminum, used and factory-new. Time will tell whether 2017 turns out to be yet another year in which optimism outweighs real gains in the health of the market.

A short-term FAA bill resets the ATC debate

by Kerry Lynch

When the 115th U.S. Congress convenes this month, it will face another FAA reauthorization deadline. The House and Senate will have until September 30 to come up with another comprehensive reauthorization bill, providing a new opportunity to finish unresolved issues such as certification reform, taxation of aircraft management fees and possibly even the so-called fuel fraud measure. But it also will provide a venue to reopen the unresolved debate surrounding air traffic reform.

Rep. Bill Shuster (R-Pa.), who is returning as the chairman of the House Transportation and Infrastructure (T&I) Committee, has left little doubt this is high on his agenda, and he is encouraged that he may have a new potential ally in the White House. The lawmaker had spoken to president-elect Donald Trump about ATC reform "in broad terms and… thought he was open to the concept," the committee confirmed.

General aviation advocates, who have strongly opposed the concept of an independent ATC organization, have noted that the "wild card" in the ATC debate might be the position of the next administration. The Obama Administration has remained neutral on the concept.

Shuster also could receive backing from Trump's selection for the next secretary of transportation, Elaine Chao, who has spent the past seven years as a fellow at the conservative think tank and ATC privatization advocate, the Heritage Foundation.

At the same time, though, opponents remain firmly entrenched, including Sen. Bill Nelson (D-Fla.), who reiterated his position in late fall in a letter opposing a failed proposal regarding Defense Department acceptance of ATC reform.

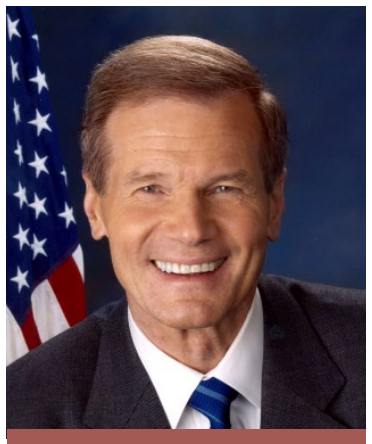
Democratic leaders on the House T&I Committee also restated their opposition to the proposal. "The results of [the] election may have given proponents of ATC privatization hope that their proposal will have more success in the next Congress, but those same proponents have failed to answer the many serious questions regarding their plan," said Rep. Pete DeFazio (D-Ore.), the ranking Democrat on the committee.

While the new Congress will be little changed from the previous one, the margins between Republicans and Democrats have narrowed, providing an ever-so-slightly steeper climb for Shuster's independent ATC vision.

Airlines for America spent the fall campaigning for the proposed ATC changes, printing ads in Capitol Hill publications suggesting ATC reform could be an early win for the new administration. As currently envisioned, the leadership of the organization

Rep. Bill Shuster

DOT secretary nominee Elaine Chao



Sen. Bill Nelson

2016 TIMELINE

AIN's editors take a look back at the events that shaped the aviation industry in the past year. The highlights: a number of in-development programs cross the finish line, and the industry faces some uncertainty as the international regulatory landscape changes. Aviation also lost some legends in 2016. *–A.Y.*

JANUARY

6

Cessna Drops Citation CJ2+ from Product Lineup

(See article on page 24).

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Boeing 737 Max Flies

The first flight of the 737 Max 8 proved that there's plenty of life left in the most popular airliner ever designed. The new version has CFM Leap-1B engines and other refinements to deliver better fuel efficiency.

FEBRUARY

9

Airbus A321neo Flies for the First Time

The first Airbus A321neo equipped with CFM International Leap-1A engines completed its maiden flight from Hamburg, Germany. During the five hour, 29 minute flight the crew performed tests on engine speed variation, systems behavior and flight envelope evaluation.

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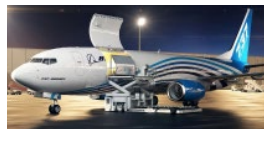


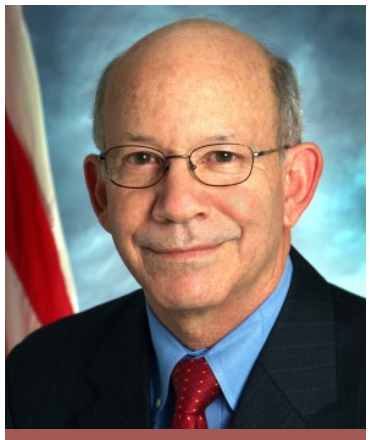
Boeing Launches 737 Freighter Conversion

Boeing has launched a 737-800NG freighter conversion program on the basis of orders and commitments for up to 55 conversions.

26

Republic Airways Declares Bankruptcy

Indianapolis-based Republic Airways filed for Chapter 11 bankruptcy protection, leaving lease deals on several regional jets subject to restructuring and imperiling an order for 40 Bombardier C Series narrowbodies.



Rep. Pete DeFazio

Commerce Committee chairman John Thune

would give airlines a degree of influence that business and general aviation find disturbing.

A4A chairman and American Airlines president and CEO Doug Parker in September plainly stated the association's position: "There is little debate that we need to advance from World War II processes and technology," he noted, pointing to the support that ATC reform has received from past FAA administrators, controllers and administrations. "The question is…how quickly can we get there?"

At the same time the business and general aviation organizations have not wavered in their opposition and plans to fight such proposals.

"The question on the table is what's going to be different this time around. Every time you go into a new battle, you have to recognize it's not the old war. There will be evolutions," NBAA president Ed Bolen said during the association's annual convention in November.

The stage was reset for the ATC battle in July, when Congress opted for an 18-month reauthorization bill rather than a longer-term bill. In early February, Shuster had introduced and hoped for a six-year bill that included his proposal to create a user-funded, independent organization to run the nation's ATC.

That bill was comprehensive, addressing everything from certification reform to drones to aeromedical reform. Shuster was able to push the bill through the committee over the objections of the Democrats. But the bill's progress ended there.

Alongside Democrats, leaders of the House and Senate Appropriations Committee voiced opposition because the proposal would remove ATC from the traditional appropriations process. Also, some corners of conservative Republicans voiced opposition, and House Ways and Means Committee leaders expressed reservations.

In the face of such opposition, the House leadership refused to bring up the Shuster bill.

In the Senate, Commerce Committee chairman John Thune (R-S.D.) suggested an openness to the concept, but stopped short of fully embracing it. He saw similar opposition in the Senate, and decided against taking on that battle. Working with Nelson, he instead suggested the 18-month bill. After negotiating with House leaders, the lawmakers in July reached a compromise that led to passage of the FAA Extension, Safety and Security Act of 2016, which ensured the continuity of the FAA's operations through the end of this September.

That bill addressed myriad other issues, among them third-class pilot medical reform, unmanned aircraft systems operation and airport security. But it left out one of the centerpieces of the Shuster bill: certification and regulatory reform.

The bill's inclusion of third-class medical reform was a landmark victory for general aviation advocates. "This is the most significant legislative victory for general aviation in decades," said AOPA president Mark Baker. "These reforms will provide relief to hundreds of thousands of pilots from an outdated, costly and unnecessarily burdensome system."The bill also drew praise for a measure calling on the FAA to require marking of towers between 50 and 200 feet tall to make them more visible to low-flying aircraft.

But the omission of certification and regulatory reform left a key issue to serve as a potential anchor for the next reauthorization bill. The shorter-term bill also leaves open the possibility for other issues supported by the business aviation community.

Legislation that would clarify aircraft management fee taxation advanced in the House last year, and an FAA reauthorization bill could host that issue. Also, a new study by a government watchdog highlighted the fact that as much as $2 billion in fuel taxes from business aircraft might have been permanently diverted to the Highway Trust Fund as a result of the "fuel-fraud" law. While that is politically a more difficult issue, given the fact that the Highway Trust Fund has struggled to remain solvent, an FAA reauthorization bill might also serve as a venue to fix that revenue diversion.

Reform advocates will regard a long-term bill as their next best chance to reorganize the ATC system. "There will absolutely be another proposal to separate the ATC system," Bolen said. ❑

Tracing the ATC Privatization Debate

Rep. Bill Shuster unveiled his plan for privatized ATC in early February, and the issue made news all year long. Visit www.ainonline.com/aviation-news/atc-privatization to follow **AIN**'s coverage from before the formal proposal through the end of the year. ❑

International collaboration led on regulatory front

International collaboration moved to the forefront in 2016 through a landmark agreement at the International Civil Aviation Organization (ICAO) for a global aviation carbon dioxide standard and associated market-based measure *(see* **AIN** *November 2016, page 1)*, as well as through significant progress in both U.S. and European regulations governing small aircraft certification.

The ICAO Committee on Aviation Environmental Protection (CAEP) set the stage in early February with an agreement to establish the first-ever standard for aircraft carbon-dioxide emissions. That agreement, which paved the way for adoption by the full ICAO General Assembly later in the year, included the application of the standard to airliners as well as new-production business jets with an mtow of more than 5.7 metric tons/12,566 pounds and most new-production large turboprops with an mtow of more than 8.6 metric tons/18,959 pounds.

ICAO followed that with the approval of the standard and an agreement on a global market-based measure (MBM) to control the industry's CO_2 footprint at the 39th meeting of its assembly in October. To the approval of the business aviation community, the MBM program has a carve-out for small emitters, a category that includes most business aircraft operators.

While eyes focused on the international stage, the U.S. Environmental Protection Agency continued to lay the groundwork for adopting the standard with a notice of proposed rulemaking

Continues on page 28 ▶
Report continues on next page ▶

MARCH APRIL

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Pratt-powered A321neo Flies

The first Airbus A321neo powered by Pratt & Whitney engines completed its maiden flight, marking the PW1135G turbofan's entry into flight test on Airbus's largest narrowbody.

5

De Juniac To Leave Air France-KLM To Lead IATA

Air France-KLM chairman and chief executive Alexandre de Juniac will replace Tony Tyler as the next director and CEO of the International Air Transport Association. De Juniac indicated to the Air France-KLM board of directors that he would accept IATA's offer to lead that organization.

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Daher Introduces Upgraded TBM with Garmin G3000

(See article on page 24)

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GE9X Begins Ground Tests

GE Aviation has started ground testing the first full GE9X development engine at its Peebles Test Operation in Ohio.

26

First U.S.-built Embraer Legacy To Roll Down Line in May

(See article on page 24).

27

Flight Options/Flexjet Pilot Union Asks Court for Help

The International Brotherhood of Teamsters (IBT) has filed a temporary restraining order to compel Flexjet and Flight Options to accept the union's pilot seniority list and negotiate a collective bargaining agreement as a unified carrier, known as OneSky.

Programs come to fruition as airframers shape their future

by Gregory Polek

Last year's milestones in the air transport arena climaxed with the first flight of the Airbus A350-1000 on November 24 over southwestern France. The event marked the start of an intensive campaign of testing involving three prototypes scheduled to fly 1,600 hours over an estimated 10-month period before expected certification in the second half of this year.

The largest of the new three-member series of composite-bodied airliners, the A350-1000 measures some 240 feet long and carries 366 passengers in a typical three-class configuration. Powered by 97,000-pound-thrust Rolls-Royce Trent XWB 97 turbofans, the A350-1000 carries some 40 more passengers than the baseline A350-900, which entered service with launch customer Qatar Airways on Jan. 15, 2015.

The first A350-1000, MSN059, now assesses flight envelope limits, handling qualities, loads and braking. The second aircraft to fly, MSN071, will also evaluate performance, specifically braking, powerplant, systems and autopilot. Airbus plans to equip the third and final aircraft to fly, MSN065, with a passenger interior to evaluate cabin and air systems. MSN065 will also perform the "early long flights" and route proving.

On the opposite end of the Airbus size range, the first Pratt & Whitney PW1100G-powered A320neo went into service on Jan. 25, 2016, with Lufthansa Airlines. The model entered service despite certain engine operating restrictions—namely extended start time intervals—that prompted original launch customer Qatar Airways to cancel the first four of its deliveries.

Roughly six months later the CFM Leap-1A-powered A320neo received type certification from the EASA and FAA, allowing for first delivery to Turkey's Pegasus Airlines in mid-2016. As of the end of November, Airbus had delivered 32 A320neos.

The A320neo's big brother, the A321neo, flew for the first time powered by CFM Leap-1As on February 9 from Hamburg, Germany. Originally planning to fly the first A321neo with its PW1100G geared turbofans, Airbus switched the flight-test sequence as Pratt worked on a machining problem and software adjustments related to the aforementioned operating restrictions on the smaller A320neo. The first A321neo powered by Pratt & Whitney engines completed its maiden flight exactly a month later, marking the start of PW1135 flight-testing on Airbus's largest narrowbody. Despite the switch in first-flight sequence, Airbus planned to deliver the Pratt-powered A321neo around the new year, just ahead of the Leap-powered version in the first quarter.

Boeing's answer to the A320neo—the 737 Max—began its flight-test program on January 29 last year in Renton, Wash., with first flight of the three-member series' baseline model, the 737 Max 8. Boeing expects a four-airplane flight-test campaign to culminate in FAA certification and delivery to a still unnamed launch customer—widely expected to be Southwest Airlines—in the third quarter of this year.

Apart from the newly designed CFM Leap-1B engines and major avionics upgrades, several aerodynamic changes including the addition of a pair of "dual feather" winglets are expected to deliver up to a 1.8-percent fuel efficiency improvement over the current "in line" design.

Having now collected orders for some 3,300 Max jets, Boeing will build the first airplanes exclusively on a new production line at its factory in Renton, Wash. The new line will allow the team to isolate assembly of the first 737 Max from the rest of production to help it learn and perfect the new construction process while

Boeing 737 Max 8

Irkut MC-21

Airbus A350-1000

Airbus A320neo

APRIL (cont.) MAY

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Ka-62 Medium Twin Helo Takes Flight after Years of Delays

(See article on page 24)

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CFM Leap-1B Wins Dual FAA-EASA Approval

CFM International's Leap-1B engine won type certificates from both the European Aviation Safety Agency (EASA) and the U.S. Federal Aviation Administration (FAA), paving the way for entry into commercial service on the Boeing 737 Max 8 in 2017.

9

First Production Vision Jet Flies

PI, the first production version of the Cirrus Vision SF50 single-engine jet, took off from Duluth (Minn.) International Airport.

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With FAA Papers in Hand, R44 Cadet Ready for Duty

(See article on page 24).

24

Textron Aviation Firms Up Plans for New Turboprop

Textron Aviation unveiled the cabin mockup for its single-engine turboprop (SETP) and released some more refined specifications and other details. The company has been showing the mockup to potential customers for months and gathering feedback on the clean-sheet design.

31

Leap-powered A320Neo Wins EASA/FAA Certification

The CFM Leap-1A-powered Airbus A320neo received type certification from the European Aviation Safety Agency (EASA) and Federal Aviation Administration (FAA), allowing for first delivery to Turkey's Pegasus Airlines in mid-2016.

the Renton factory continues to turn out 42 airplanes a month. Once mechanics validate the production process, the company will extend Max production to the other two final assembly lines in Renton.

Using the reworked floor plan, Boeing plans to accelerate production three times by 2019, when the rate reaches 57 airplanes a month.

Occupying roughly the same seating category, Russia's answer to the Max 8 and A320neo—the Irkut MC-21—rolled out of its assembly hall in the Siberian city of Irkutsk on June 8 last year. The milestone, passed roughly six months later than previously scheduled, nevertheless marked what the Russian company considers a vindication of sorts for a program some in the West have disparaged as an overly ambitious attempt to compete with the likes of the Boeing and Airbus narrowbodies.

The grand unveiling re-established a project timeline for the Irkut MC-21 that by December 2015 appeared less than completely firm, given the failure to roll out an assembled airframe as promised by that time. During the rollout Russian Prime Minister Dmitry Medvedev referenced plans for first flight "within a year," and UAC officials acknowledged that a previously quoted target for the end of 2016 might prove optimistic unless all goes exactly to plan.

In fact, few manufacturers, even in the West, can claim total fidelity of their respective program plans. In Bombardier's case, the C Series CS100 entered service last year with launch customer Swiss International Airlines on July 15 following at least two years' worth of delays and cost overruns totaling some $2 billion. The 110- to 125-seat narrowbody received validation of its Canadian type certification from the U.S. FAA and EASA on June 16, during the same week the program's five flying test aircraft surpassed 5,000 hours in the air.

Of course, Bombardier believes Swiss will find the Pratt & Whitney PW1500G-powered CS100 worth the wait. By the end of October the three airplanes that had entered revenue service had flown 1,100 hours that Bombardier characterized as "trouble-free."

The Canadian airframer expects no less of the 130- to 150-seat CS300, the first of which it delivered to Latvia's Air Baltic on November 28. The aircraft entered service on a route between Riga and Amsterdam on December 14. On November 23 Transport Canada and the European Aviation Safety Agency granted the CS100 and CS300 Same Type Rating (STR) status. According to the manufacturer, the approval will save operators "significant" costs and reflects the 99 percent parts commonality that the two aircraft share.

For Bombardier's long-time regional jet competitor from Brazil, commonality benefits among the Embraer E2 E-Jets will manifest themselves more profoundly in operation than on the production line. While the three airplanes—namely the E175-E2, the E190-E2 and E195-E2—will use three different wing designs to maximize aerodynamic efficiency, they'll all react identically to their predecessors in flight thanks to the new fly-by-wire flight controls. The first 100-seat E190-E2 rolled out of the factory in São Jose dos Campos, Brazil, on February 25 and took off on its maiden test mission on May 23. The flight came at least five weeks earlier than the second-half 2016 time frame Embraer had last reported.

The program calls for the use of four flight-test airplanes, the first three of which Embraer had flown by August 29. It plans to fly the fourth—equipped with a full interior—early this year. While Embraer outfitted the first three airplanes identically to aid in schedule flexibility, plans called for the airplane it flew in May to perform mainly low-speed testing and flight quality and the second airplane primarily high-speed testing. By the end of the campaign the first two airplanes will participate in takeoff and landing performance testing, while the third concentrates on systems.

Embraer CEO Paulo Cesar Silva told **AIN** that the early first flight won't likely translate into delivery to the E190-E2's launch customer—the identity of which remains undecided—earlier than the quoted mid-2018 target. "I wish, but my engineers here are saying they would like to use the full time to get an even more mature aircraft at EIS," said Silva.

Meanwhile, the competing Mitsubishi MRJ-90 continues on its path to maturity following four years' worth of delays. After 10 months of testing in Japan, the MRJ-90's first flight-test article landed in Moses Lake, Wash., to start U.S.-based trials. The trip marked MRJ FTA 1's third attempt to fly to the U.S. to begin a planned regimen of testing out of Moses Lake, where Mitsubishi has established a new engineering facility from which to base flight-testing of the first four prototypes.

As of November 22 four prototypes participated in the certification program, following first flight of FTA-3 from Nagoya. The flight took place three days after Mitsubishi MRJ FTA-4 arrived at Moses Lake to join FTA-1 for its U.S.-based flight-tests.

The milestones show progress by a flight-test program that has struggled to meet targeted schedules since FTA-1 flew for the first time in November 2015. In October Mitsubishi confirmed press reports out of Japan that it had communicated with MRJ launch customer All Nippon Airways about another possible delay in first deliveries in response to "technical reasons." If the manufacturer fails to deliver the first airplane by mid-2018, it would mark the fifth major delay for the program.

Embraer E190-E2

Bombardier CS300

Outlook for 2017

For most of the world's major airframe OEMs, this year will provide no respite in terms of preparations for more program milestones, ranging from first flight of the Embraer E195-E2, Airbus A330-900neo and Boeing 787-10 to start of production of the Boeing 777X.

By then the Chinese expect to have entered the mix, flying the Comac C919 for the first time, while the Irkut MC-21 enters flight-test, along with the Boeing 737 Max 9. Meanwhile, Boeing expects the 737 Max 8 to enter revenue service while both the Pratt & Whitney- and CFM-powered versions of the biggest member of the A320neo series, the A321neo, starts airline operations early in the year. ❑

Report continues on next page ▶

JUNE

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Embraer To Close Legacy 650 Assembly Facility in China
(See article on page 24).

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FAA OKs Williams FJ33-5A Turbofan
(See article on page 26).

8

Russia's MC-21 Rolls Out
United Aircraft Corporation subsidiary Irkut rolled out the first MC-21 narrowbody airliner from its factory in Irkutsk in eastern Siberia.

13

NAA's Gaffney To Step Down
National Aeronautic Association (NAA) president and CEO Jonathan Gaffney is stepping down from his role at the end of September, following a nine-year stint in which he steered the organization back into financial stability.

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Airbus To Dispose of All Shares in Dassault Aviation
Airbus Group announced plans to dispose of all its remaining 1.33 million shares of Dassault Aviation. The private placement to institutional investors is via an issuance of bonds exchangeable into Dassault Aviation shares in five years, meaning Airbus will continue to hold about 11.7 percent of voting rights in Dassault until their conversion.

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Cessna Powers On First Citation Longitude
(See article on page 26).

Aircraft and engine OEMs forge ahead on development projects

by Curt Epstein

With 2016 ending on an off note in terms of overall aircraft deliveries and total billings, many in the industry believe a business aviation resurgence is on the horizon, and when it comes, it will be fueled by the arrival of new aircraft on market. As Pete Bunce, president and CEO of the General Aviation Manufacturers Association (GAMA), noted, "What is encouraging is that every GAMA airplane and rotorcraft manufacturer has a new product development program recently completed or currently under way, so optimism for the future runs high."

This past year saw its share of milestones from the airframers, from new product introductions to first flights, and from long anticipated certifications, to entries-into-service. Likewise, the OEMs trimmed some once popular products from their lineups, either with the advent of improved replacement models, or in an effort to occupy their particular niches more fully.

Cessna Dropped Citation CJ2+from Lineup

The Cessna Citation CJ2+ is no longer in production, as the Citation M2—an upgraded CJ1 with Garmin G3000 avionics—and CJ3+ "have proved to be a great fit for our customers," a Textron Aviation spokeswoman confirmed in early January. The CJ2+ (525A) has been built on the same production line as the CJ3+ and CJ4, so "we could build it if required for a customer mission," she said. However, the CJ2+ is no longer listed in the Citation product line-up.

The CJ2 entered service in 2000 and was the first derivative—a five-foot stretch—of the original CitationJet that spawned the CJ series. The original CJ2 was produced from 1999 until mid-2005; the updated CJ2+—which introduced Rockwell Collins Pro Line 21 avionics, better performance and Fadec—had been in production since late 2005.


Cessna Citation CJ2+

Unlike the other CJs and Citations (with the exception of the XLS+), Cessna did not invest in a changeover to Garmin avionics in new-production CJ2+s, foreshadowing its eventual phaseout. (It did, however, offer a Garmin G3000 retrofit for CJ2+s early last year.) According to data from GAMA's aircraft shipment reports, Cessna had not delivered a CJ2+ since the second quarter of 2014.

Daher Introduced TBM with Garmin G3000

In early April, Daher introduced the TBM 930, equipped with the high-resolution, touchscreen-controlled Garmin G3000 avionics suite. The instrument panel features three wide-format WXGA displays that can operate in a split-screen mode, enabling maps and flight plans to remain on the screen side-by-side with primary


Garmin G3000 in TBM

traffic and weather information. The touchscreen controls communication and navigation. Thanks to the higher resolution, synthetic vision better depicts terrain in 3D.

The TBM 900 and the TBM 930 share the same performance and technical specs, apart from the human-machine interface. The TBM 930 features flight envelope protection, thus retaining the "e-copilot" concept of the TBM 900's 2016 edition.

The price difference between the two models is about $225,000. The most expensive version of the TBM 930 sells for $4.1 million.

Ka-62 Medium Twin Helo Took to the Sky

After years of unexplained delays, the first prototype of the Russian Helicopters Ka-62 medium twin made its maiden flight on April 28. Taking off from the company's Arsenyev development and production site in Eastern Russia, the helicopter stayed in hover mode during the flight, which lasted less than 10 min-


Russian Helicopters Ka-62

utes, according to Russian website Prime Media. Russian Helicopters described the test as successful.

In 2014, Russian Helicopters was indicating a list price of about $10 million for the Ka-62. The company had found two launch customers—Brazil's Atlas Taxi Aereo and Colombia's Vertical de Aviacion—for the 12- to 15-seat rotorcraft.

The Ka-62 is powered by a pair of 1,680-shp Turbomeca Ardiden 3Gs.

First U.S.-built Embraer Legacy Rolled Down Line in May

Embraer Executive Jets officially opened its expanded assembly facility in Melbourne, Fla., on May 16, adding Legacy 450 and 500 production to the existing Phenom 100 and 300 line. Florida Gov. Rick Scott, U.S. Senator Bill Nelson (D-Fla.) and other elected officials joined company president and CEO Marco Tulio Pellegrini and Gary Spulak, president of Embraer's North American division, in cutting the ceremonial ribbon.

The expansion, started in October 2014, more than doubled the size of the facility, to 149,000 sq ft/124,600 sq m, allowing the Legacy 450/500 and Phenom 100/300 lines to be side-by-side under one roof. On May 13 the Phenom line was moved into its new position, which is 90 degrees to the previous production flow, while the first Legacy 450 started rolling down the line on May 16.

An adjoining 31,000-sq-ft/25,920-sq-m completion center/flight-prep building—which, unlike the previous flight-prep area, has a fire-suppression system to accommodate fueled aircraft—opened June 17. A separate two-bay paint facility and two-bay delivery center for the Legacy midsize jets opened at the end of the year.

Embraer Closed Legacy 650 Assembly Facility in China

Embraer and Avic subsidiaries Harbin Aviation Industry and Harbin Hafei Aviation Industry "phased out" their Chinese joint-venture company Harbin Embraer Aircraft Industry (HEAI) after 13 years of manufacturing and delivering commercial and executive jets in China, the companies announced in early June. The Harbin plant's last aircraft—a Legacy 650—was delivered in March.

Embraer ERJ-145 regional airliners and, later, Legacy 650 business jets were assembled in Harbin, using subassemblies shipped from Embraer's facilities in Brazil. Forty ERJ-145s were assembled in China from 2004 to 2010, and five Legacy 650s were built there from 2012 through last year.

"Embraer remains fully committed to and will continue to serve the Chinese commercial and executive aircraft mar-


Embraer Legacy 650

kets," the Brazilian OEM said. "Embraer has enjoyed an excellent relationship with its Chinese joint-venture partners over the last decade and looks forward to other opportunities [for] collaboration…to contribute to the continuous development of civil aviation in China."

FAA Papers in Hand, R44 Cadet Ready for Duty

Robinson Helicopter's R44 Cadet trainer received FAA certification on June 3, and the California-based airframer delivered the first two examples to launch customer Heliflite Australia the following month.

The Cadet has the same airframe, rotor system and Lycoming O-540-F1B5 as the R44 Raven I, but the Cadet's rear seats are removed, maximum takeoff weight is lowered to 2,200 pounds and the engine is derated to 210 hp for takeoff and 185 hp continuous.

Robinson began taking orders in February for the Cadet, which at $339,000

Continues on page 26 ▶

JUNE (cont.)

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CS100 Gains FAA, EASA Approval

The Bombardier CS100 received validation of its Canadian type certification from the FAA and EASA, clearing the first C Series variant for delivery to launch customer Swiss International Airlines.

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Piper M600 FAA Certified

The FAA awarded type certification for the M600 turboprop single during a ceremony at Piper's headquarters in Vero Beach, Fla. In attendance were 700 guests, among them Piper employees, dealers and suppliers and local community leaders. FAA ODA administrator Eric Wright presented the type certificate to Piper Aircraft president and CEO Simon Caldecott.

24

Industry Stunned By UK's European Union Exit Vote

Aerospace, defense and air transport companies tried to put a brave face on the anticipated fall-out from the UK's June 23 vote to leave the European Union (EU). Adverse market reaction to the so-called Brexit referendum sent stocks tumbling and pushed the British Pound to its lowest value against the U.S. dollar since 1985.

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Dassault Falcon 8X Gets European Nod

(See article on page 26).

29

Swiss Takes Delivery of First Bombardier C Series

Swiss International Airlines accepted delivery of the first Bombardier C Series CS100 after several program delays that contributed to $2 billion worth of cost overruns. Swiss has scheduled the first of its 30 CS100s on order to enter service on a July 15 Zurich-to-Paris Charles de Gaulle flight.

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Dassault Lands FAA Approval for Flagship Falcon 8X

Dassault's flagship Falcon 8X received U.S. FAA certification.

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Robinson R44

costs $40,000 less than the R44 Raven I. A float-equipped Cadet is available for $367,000. Among the options on the Cadet are air-conditioning—thus far available only on the Raven II—stability augmentation system, autopilot and VFR and IFR training avionics packages.

FAA OKs Williams FJ33-5A Turbofan

Williams International received FAA Part 33 type approval for the FJ33-5A on June 6. The turbofan employs aerodynamic and structural enhancements similar to those developed for the previously certified FJ44-3AP and -4A, giving the FJ33-5A more than 2,000 pounds of thrust, better fuel economy and a thrust-to-weight ratio greater than 6:1.

Since the new FJ33 variant has been selected to power the Cirrus SF50 Vision


Williams FJ33-5A

and Flaris LAR1, it also includes sensor suite redundancy and software revisions needed for the single-engine jet market. The engine was originally developed to power the single-engine Diamond D-Jet, which was shelved in 2013.

Williams said the FJ33-5A joins a "comprehensive" FJ33 and FJ44 product line that provides from 1,000 to 3,800 pounds of thrust.

Piper M600 Received FAA Certification

The FAA awarded type certification for the M600 turboprop single during a mid-June ceremony at Piper's headquarters in Vero Beach, Fla. Several months later, in September, the agency granted the company a production certificate for the airplane, allowing the manufacturer to produce, flight test and issue airworthiness certificates for the M600 for customer deliveries.

The $2.853 million M600 is a more powerful and extensively updated version of the M500, with a new wing and Garmin G3000 touchscreen-controlled avionics. Both share the same Pratt & Whitney Canada PT6A-42A engine, but


Piper M600

the M600's is flat-rated to 600 shp, up from the M500's 500 shp. The boost in power provides a significant increase in performance, and the M600's final performance numbers showed improvements beyond the originally projected figures.

According to Piper, the M600's maximum NBAA IFR range is 1,484 nm and max cruise speed rounds out at 274 ktas. The M600's mtow is 6,000 pounds, allowing for greater fuel capacity: 260 gallons versus the M500's 170 gallons. Full-fuel payload for the M600 is 645 pounds.

Falcon 8X Awarded European and U.S. Approval

Dassault's flagship Falcon 8X won EASA and FAA certification at the end of July, following a global proving tour, during which Falcon 8X S/N 03 demonstrated the capabilities of the aircraft under diverse operating conditions, with a 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.

The first of the ultra-long-range trijets was delivered in early October. Derived


Dassault Falcon 8X

from the Falcon 7X, the 6,450-nm 8X was unveiled at EBACE 2014 and first flew on Feb. 6, 2015.

Falcon 8X production is continuing to ramp up, with 11 aircraft currently in final assembly at Dassault's Mérignac production plant near Bordeaux. In addition, 16 Falcon 8Xs are in cabin outfitting at the company's completion facility in Little Rock, Ark.

Cessna Christened Turboprop Single the Denali

In July at EAA AirVenture 2016, Textron Aviation officially named its long-awaited new single-engine turboprop the Cessna Denali. First flight is anticipated in 2018 and letters of intent for the $4.5 million (introductory price), single-pilot-capable, six- to nine-passenger aircraft are being accepted. The Denali is expected to have a range of 1,600 nm, a maximum cruise speed of 285 knots and a full-fuel payload of 1,100 pounds. It features a flat-floor cabin, a 53-inch by 59-inch rear cargo door, a digital pressurization system that maintains a 6,130-


Cessna Denali

foot cabin to 31,000 feet and an optional externally serviceable belted lavatory with pocket door enclosure in the aft cabin. The interior also incorporates large passenger windows, LED lighting, a refreshment cabinet and a baggage compartment accessible in flight.

The aircraft will be powered by a new 1,240-shp GE Aviation Fadec-equipped turboprop with single-lever power and propeller control. In the cockpit, the Denali has a Garmin G3000 touchscreen avionics suite with weather radar, advanced terrain awareness warning system (Taws) and automatic dependent surveillance-broadcast (ADS-B) capabilities.

Gulfstream Dropping G150

Gulfstream Aerospace will cease production of the midsize G150 this year so it can "focus on the super-midsize and large-cabin jet markets," said Mark Burns, president of the Savannah, Ga.-based aircraft manufacturer, in late September. The company's line-up will thus consist of the G280 in the super-midsize category and the G450, G500, G550, G600 and G650/650ER in the large-jet segment.

The G150—a derivative of the G100/Astra SPX—has been manufactured under contract by Israel Aerospace Industries in Tel Aviv. According to Gulfstream, the last G150 will be delivered this year.

"Our product support organization will continue to provide support to our G150 owners and ensure there are enough parts, tooling, sustaining engineering and personnel available [for] the worldwide G150 fleet," said Burns.

Nearly 120 G150s are currently in service around the world and the twinjet is certified in 45 countries, among them the U.S., Brazil, Canada, China, England, Germany, Israel and Switzerland.

Cessna Citation Longitude Logged First Flight

The Cessna Citation Longitude made its maiden flight from the company's east campus Beech Field Airport in Wichita on October 8, a milestone that was passed less than a year after Textron Aviation unveiled the new super-midsize business jet at the 2015 NBAA Convention. The two-hour two-minute maiden sortie tested the aircraft's flaps, landing gear, pressurization system, stability and control.

The prototype, registered as N9227L, saw its electrical system powered on for the first time in mid-June. It will continue to expand the performance envelope, focusing on testing flight controls and aerodynamics, while the first production model will


Cessna Citation Longitude

be used primarily for systems testing, Textron Aviation said. FAA certification and entry into service is expected late this year.

Gulfstream To Cease G450 Production Next Year

Gulfstream Aerospace announced on October 21 that it will cease production of the G450 to make way for service entry of the fly-by-wire G500 early this year. The final G450 will be delivered next year. The G450 was built on the success of the GIV and GIV-SP, which

Continues on page 28 ▶

JULY

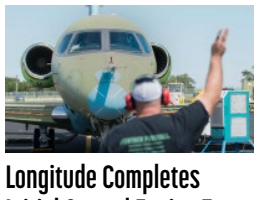
25

Cessna Unveils 'Denali' Turboprop Single

(See article on this page).

AUGUST

23



Longitude Completes Initial Ground Engine Tests

Cessna completed the initial ground engine tests on the jet's Honeywell HTF7700L turbofans.

SEPTEMBER

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Piper Secures PC for M600

(See article on this page).

26

Pro Golfer, Bizav Proponent Arnold Palmer Flies West

(See article on page 30).

OCTOBER

6

ICAO Approves Aviation Carbon-Offsetting Scheme

The assembly of the International Civil Aviation Organization (ICAO) approved a carbon offsetting strategy to cap international aviation emissions after 2020 in what was hailed as an historic and momentous action.

6

Global 7000 Powers On

Bombardier marked one of the final major milestones before first flight of the Global 7000, powering on the aircraft's GE Passport engines.

7

EASA Clears Super Pumas for Service Return

EASA has cleared the Airbus Helicopters EC225 LP and AS332 L2 for return to service.

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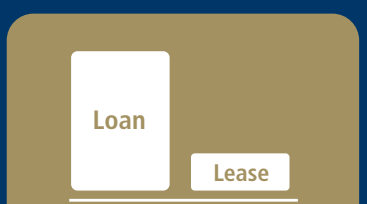

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Aircraft and engine OEMs

themselves were derived from the GIII and GII twinjets, which in turn share the fuselage cross section of the Gulfstream I turboprop twin. The GIV first flew on Sept. 19, 1985, and entered service in August 1987. Gulfstream produced 870 GIVs, GIV-SPs and G450s over the past 29 years. The GIV line also begat the ultra-long-range GV series.

Powered by a pair of Pratt & Whitney Canada PW814GAs, the 5,000-nm G500 has Gulfstream's Symmetry Flight Deck and a fly-by-wire system with active control sidesticks.

Cirrus SF50 Vision Jet Earned FAA Nod

Cirrus Aircraft received full FAA type certification for the SF50 Vision single-engine jet at the end of October. Deliveries were slated to begin in December and Cirrus plans to hand over one aircraft per week this year, according to Pat Waddick, Cirrus president for innovation and operations. In late October Cirrus had 10 SF50s in final assembly, and Waddick told **AIN** that plans are in place to raise the production rate beyond that number.

The SF50 has a top cruise speed of 300 knots, a service ceiling of 28,000 feet and a maximum range of 1,250 nm at 240 knots. The aircraft has the Garmin 3000-based Cirrus Perspective Touch avionics suite and is powered by an 1,840-pound-thrust Williams International FJ33-5A with dual-channel Fadec.

The company flew the first production version on May 5.

Cirrus says it holds orders for north of 600 SF50s.

Silvercrest Will Power Citation Hemisphere

Textron Aviation chose the Safran Silvercrest to power the Cessna Citation Hemisphere. A significant boost for the French engine maker's ambitions in the business aviation market, the announcement followed confirmation that the engine will earn certification in the spring of next year under the revised development timetable for the Dassault Falcon 5X twinjet, now slated to enter service in the first half of 2020.

Cirrus Aircraft SF50

The Silvercrest being developed for the Hemisphere will be designated the -2C. It will share the same architecture as the -2D for the Falcon 5X but with some features tailored to the new Citation, according to Silvercrest program general manager Michel Brioude. The Cessna team has visited Safran's facility in San Antonio, Texas, where they have been flight-testing the engine for the 5X.

Since 2015, the Safran engineering team has been quietly developing fixes for several technical problems that had prevented the Silvercrest from meeting its promised performance standards. The hardware changes now being implemented have focused on improving clearance and vibration controls, as well as reducing airflow leakage.


Snecma Silvercrest

Global 7000 Took to The Sky

Bombardier's flagship Global 7000 felt the wind beneath its wings for the first time on November 4, completing a two-hour, 27-minute maiden flight from the company's facility in Toronto. Under the control of captain Ed Grabman, copilot Jeff Karnes and flight-test engineer Jason Nickel, the aircraft departed at 10:25 a.m. local time, climbed to 20,000 feet and reached the planned test speed of 240 knots. During the flight the crew tested basic system functionality and assessed the handling and flying qualities.

The long-anticipated inaugural flight set in motion a flight-test campaign that is expected to encompass five aircraft and culminate in certification and market entry by late 2018. The aircraft, Flight Test Vehicle (FTV 1), continued initial trials in Toronto before it moved to Wichita to embark on the full flight-test campaign. Bombardier had powered up the GE Passport engines for the first time earlier in the year.

Announced in 2010, the Global 7000 will sit atop Bombardier's business aircraft product line with a four-zone cabin, 7,400 nm range and a speed of Mach 0.925. While the Canadian OEM has not released specifics for the order status of the $72.5 million jet, executives have noted that the 7000/8000 program has been a large contributor to Bombardier Business Aircraft's backlog, which at midyear stood at $17 billion.

The company plans to deliver the first aircraft in the latter part of next year. ❑

Bombardier Global 7000

Int'l collaboration

▶ Continued from page 21

in July finding that emissions from certain types of aircraft contribute to air pollution that endangers public health and welfare. That finding triggers a requirement for the agency to adopt emission standards.

The FAA, meanwhile, also made strides on the environmental front with its research on a replacement fuel for leaded aviation gasoline. Early in the year, the agency narrowed the field of potential replacement fuels under study to candidates from Shell and Swift Fuel. The FAA has as its goal transitioning to unleaded avgas by the end of next year.

Simplified Certification Processes

After years in the making, the FAA finally released its rewrite of Part 23 regulations governing small aircraft. *(See article on page 1.)* In March, the agency released a notice of proposed rulemaking that would make Part 23 certification standards more performance-based and less prescriptive. The NPRM would facilitate use of international aviation community consensus standards, rather than solely FAA-driven requirements.

Apart from a few quibbles about the fine details, the rulemaking drew rare universal praise from the industry. While the proposal was years in the making, the FAA has moved at almost record pace from proposal to the final rule. The agency had finished its work and shipped off its final rule for review by the Department of Transportation last summer. In October, that rule had moved to the Office of Management and Budget for final review. That review was completed in December.

FAA Administrator Michael Huerta described the intent of the rule to the Aero Club of Washington last fall: "There's a simple idea at the heart of it. The FAA doesn't want to tell manufacturers how to build things. We're not in the engineering business, and we can't assume we have all the answers about the best way to develop an aircraft."

The FAA's counterpart in Europe, the European Aviation Safety Agency, similarly issued its own proposed rewrite for CS-23 rules governing small aircraft. The FAA and EASA have been striving to take a global approach to these certification efforts and have been attempting to move forward in tandem on the rulemakings.

Europe also made strides on clearing the way for commercial single-engine turbine operations in instrument meteorological conditions (SET-IMC). The EASA Committee, comprising European Commission members and national experts from each European Union country, gave a key sign-off on such operations in June, marking a step toward implementation early this year.

The FAA also continued to make progress in its efforts to facilitate the introduction of and governing of unmanned aerial systems (UAS). The agency in June released the long-awaited final Part 107 regulation, providing for the operation of commercial, non-recreational small UAS, weighing less than 55 pounds. The regulation permits daylight-only flights that remain within the visual line of sight of the UAS operator. The agency also last summer established a new Drone Advisory Committee to advise it on introducing unmanned aircraft into the national airspace system.

The agency last year remained focused on collaboration, safety management, improved consistency and compliance. It continued to implement its compliance philosophy, which is designed to work with certificate holders on ways to improve compliance before it considers enforcement. It also continued to implement congressional directives and other initiatives to improve regulatory consistency, including work toward formation of a Regulatory Consistency Communication Board. —*K.L.*

NOVEMBER

8 — **Citation Longitude Takes Flight**
The Cessna Citation Longitude made its successful first flight from the company's east campus Beech Field Airport in Wichita. The company unveiled the new super-midsize business jet at the 2015 NBAA Convention.

12 — **FalconEye Gets EASA, FAA OK for 2000S/LXS**
Dassault Aviation obtained European Aviation Safety Agency and U.S. FAA approvals for use of its combined vision system, known as FalconEye, aboard the Falcon 2000S/LXS.

25 — **Bob Hoover Flies West**
(See article on page 30).

31 — **Textron Selects Silvercrest for Citation Hemisphere**
(See article on this page).

31 — **Cirrus SF50 Vision Jet Gets FAA Nod**
(See article on this page).

8 — **Global 7000 Takes To The Sky**
(See article on this page)..

24 — **Airbus A350-1000 Flies**
The Airbus A350-1000 flew for the first time, taking off from Toulouse-Blagnac Airport for a four hour, 18-minute mission over southwestern France.

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continued from page 28

Final Flights

by Nigel Moll

Arnold Palmer

Golf legend and long-time champion of business and general aviation Arnold Palmer died on September 25 in a hospital near his home in Latrobe, Penn., at the age of 87. The cause of death was reported as complications of heart problems.

While the golf world grieved the loss of one of its greatest and perhaps most beloved players, pilots mourned the final flight of an accomplished aviator and passionate advocate of the airplane as business-building tool. Arnie's first airplane ride was in a Piper Cub at Latrobe Airport (renamed to honor him in 1999 on his 70th birthday) when he was a kid. He took his first flying lessons there in Cessnas in 1955, soloing and earning his private certificate the following year. He built time flying 172s, 175s and 180s.

In 1962 he bought his first airplane, an Aero Commander 500 piston twin for $27,000, before upgrading to a new 560F a couple of years later. When he moved up to a jet he stayed with Rockwell, buying a Jet Commander in 1966. In 1968 he was the first player to pass $1 million in career prize money on the PGA tour. With two copilots and an observer, he flew a Learjet 36 around the globe in 1976, setting a world record speed of 57 hours 25 minutes 42 seconds in the process. But for ownership he settled in to a long line of Citations, starting with the 500 in 1977, then a II, two IIIs, a VII and two Xs.

Arnold Palmer

R.A. Bob Hoover

Bob Hoover, legendary for his WWII, early jet flight-test and airshow piloting, flew west on October 25 at the age of 94. In one of his final public appearances, Hoover attended the Reno National Championship Air Races five weeks before he died. For many years it had been the event at which, as pace pilot for the Unlimiteds, he herded the racers down the chute and onto the course before telling them, "Gentlemen, you have a race." He looked frail in September, but his hallmark smile beamed as strong as ever from beneath his broad-brimmed straw hat as he gently bumped knuckles with fans. Hoover's wife of 68 years, Colleen, died in March last year.

Bob Hoover

Hoover left the Air Force in 1948 and became a civilian test pilot. He worked for North American Aviation/Rockwell for 30 years. While there he intentionally put an F-100 Super Sabre into a flat spin from 44,000 feet from which he had to eject at 10,000 feet. The jet obliged Hoover's fervent wish as he hung beneath the silk and continued its flat spin all the way to a crump onto the desert floor.

Many hundreds of admirers gathered in a hangar at Clay Lacy Aviation on Van Nuys Airport on November 18 to give a fitting sendoff for the man widely regarded as the greatest stick-and-rudder pilot who ever lived. Airshow pilot Sean Tucker and Reno commentator Danny Clisham MCed.

John Glenn

Astronaut and Senator John Glenn passed away on December 8 at the age of 95. On Feb. 20, 1962, strapped into a cramped Mercury capsule called *Friendship* 7 atop an Atlas rocket at Cape Canaveral, 40-year-old Glenn became the first American to orbit Earth, which he did three times before splashing down in the Atlantic 800 miles south of Bermuda. How he dealt with concerns that the heat shield would separate on reentry cemented his reputation for staying calm under pressure. The five-hour feat instantly elevated Glenn, the last survivor of the seven Mercury astronauts, to the pedestal occupied by the likes of the Wright brothers and Charles Lindbergh.

He was invited to the White House by JFK and given a ticker-tape parade on Broadway, and he addressed a joint meeting of Congress at the Capitol in Washington, D.C.

Glenn served as a U.S. Senator from Ohio for four terms. In 1984 he mounted an unsuccessful bid for the Democratic presidential nomination and returned to the Senate for another 14 years.

On Oct. 29, 1998, Glenn returned to space aboard the shuttle *Discovery*, in which he spent nine days in orbit. At the age of 77, he was the oldest person to go into space.

As a Marine fighter pilot, he flew 59 combat missions in the WWII Pacific Theater, earning two DFCs, and 90 combat missions in the Korean War. In 1957 he piloted a Chance Vought F8U-1 Crusader from L.A. to New York in three hours, 23 minutes, 8.4 seconds, marking the first supersonic transcontinental flight. ❑


John Glenn's career spanned from Capitol Hill to space.

Piaggio boss signals interest in bizav market

Piaggio Aerospace was a late addition to the line-up of aircraft manufacturers exhibiting at last month's MEBAA show in Dubai, with the Italian airframer eager to re-affirm its commitment to the business aviation market. The company has a strong connection with the UAE through Abu Dhabi-based parent company Mubadala Aerospac

Last year, Piaggio gave some people the impression that it might be pulling back from the business aviation market to focus its attention on the defense sector, for which it is developing the Hammerhead unmanned version of the Avanti Evo twin turboprop.

But new Piaggio CEO Renato Vaghi insisted that this is not the case and that the company had simply intended to signal the fact that the new UAV will consume a significant portion of its resources in the next year or so.

"Our presence at this key business aviation event underlines Piaggio Aerospace's full commitment to the sector," Vaghi commented. "We are proud of our aircraft and will continue to promote it around the world."

According to Vaghi, Piaggio is working hard to improve customer support, especially through a campaign to improve the availability of parts, which has been a source of frustration for operators. "We are reaching agreements with third-party providers to ensure that what is needed is available," he told **AIN**. He pledged that significant improvements in this regard will be achieved by this year's second quarter.

Today, there are 220 Avantis in service: five Evos, 126 Avanti IIs and 89 Avantis. Piaggio recently rolled out the first Evo built on the new production line at Villanova d'Albenga near Genoa in northwestern Italy.

The Italian airframer is looking to produce 30 aircraft a year in the new plant and will be ramping up its supply chain accordingly. The facility has separate production lines for the Evo and the Hammerhead. —*C.A.*

G600 flies

▶ *Continued from page 1*

in 2018. Today's flight, which went flawlessly, represents a significant step forward in the journey to certification and delivery. The flight went exactly as anticipated, thanks in large part to the investments we have made in our ground-based laboratories."

The G600 will fly 6,200 nm at Mach 0.85, or 4,800 nm at Mach 0.90. Maximum operating speed will match the G650ER's Mach 0.925.

Meanwhile, the G500 being developed in tandem with the G600 is ahead of schedule to earn type certification, and projected first deliveries have been brought forward to late this year. The G500 has a maximum range of 5,000 nm. As of December 19, the five G500 test aircraft had conducted 494 flights, logging 2,015 flight hours.

The cabin interior of the G600 is almost three feet longer than that of the G500 (at 45 feet 2 inches versus 41 feet 6 inches). The larger model has a higher max takeoff weight of 91,600 pounds (versus 76,840 pounds).

The G600 cabin, which Gulfstream claims to be the longest in its class, can provide four separate areas for up to 19 passengers (with sleeping accommodation for nine). Like the G500, it has 14 large cabin windows providing plenty of natural light and panoramic views. Cabin altitude is never higher than 4,850 feet and passengers breathe 100-percent fresh air. ❑

Good news for first officers: regional salaries on the rise

by Curt Epstein

While starting salaries for pilots at U.S. regional airlines have historically been low and accepted as a fact of life, that paradigm finally appears to be shifting.

It has long been an industry truth that pay rates for first officers at the feeder carriers were unfavorable, a point that was illuminated by the 2009 crash of a Colgan Air Q400 (Continental 3407) near Buffalo, N.Y. Newspaper articles at the time described the 24-year-old copilot's cross-country commute from the Seattle-area home she shared with her family to her Newark Airport home base that morning to catch the doomed flight. Her annual salary was $16,000 a year.

Seven years later the compensation has improved, albeit only somewhat. Last August the Air Line Pilots Association (ALPA) issued a press release that provided a sampling of estimated first-year pilot base salaries exclusive of any bonuses, with Mesa Airlines offering $20,183, according to the union, while Great Lakes was listed at $29,484. In between were the three wholly owned American Airlines subsidiaries: PSA ($22,104), Envoy Air ($23,256) and Piedmont Airlines ($26,422). "While first-year salaries for pilots at regional airlines are moving in the right direction, new pilots are looking for a long-term career with growth and good quality of life," said union president Tim Canoll at the time.

Shortly thereafter, in mid-September, there was a spate of press releases touting higher pay rates for starting pilots by Envoy Air, PSA and Piedmont. Envoy announced it "will nearly double the starting rate of pay for new hires, to nearly $38 an hour." Likewise PSA's release stated it would implement "an immediate 56-percent increase in first-year wages." Piedmont noted that first-year first officers will now "earn nearly $60,000 while training and flying under the colors of Piedmont's parent company, American Airlines."

Airline pilot salaries are largely determined through collective bargaining between the carriers and their pilot negotiating committees, which tend to be dominated by captains. As a result, more emphasis is placed on seniority when it comes to determining shares of the compensation pie.

"First-officer salaries have increased not just in the last couple of months, but over the past couple of years," said Faye Malarkey Black, president of the Regional Airline Association (RAA), who noted such bargaining is in place at most of the group's members. She pointed out that the collective bargaining process has incorporated some innovative ideas to include the first officers. "In many cases where an airline wasn't able to secure the boost through the collective bargaining process for that first-year first officer, they've offered bonuses."

Before 2001, the airlines were growing at a steady clip, but that changed after 9/11, noted Piedmont Airlines CEO Lyle Hogg. "After 9/11, the industry was going through a difficult time…and it wasn't a really attractive industry for either new pilots or for pilots to get out of the military and give up their military career," he told **AIN**.

"Certainly after 9/11 and the two economic recessions, there was not a lot of hiring happening at the mainline carriers, and so the pilots at the regionals did stagnate and stayed there in some cases—for those that wanted to move on—longer than they had anticipated," said Paul Ryder, ALPA's resource coordinator.

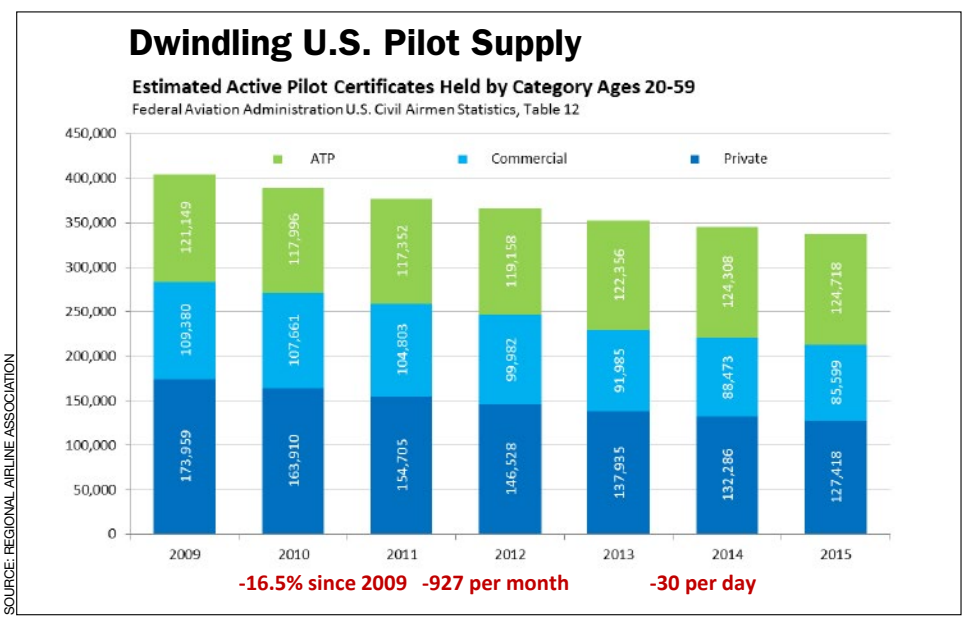
But as the U.S. has steadily clawed its way back to relative economic health, things seem to be on an upswing for those interested in a pilot career, even as costs for pursuing an aviation degree and pilot certificate in a four-year academic program can approach $200,000. "When you are talking about salaries below $30,000 and living in a metropolitan area, it doesn't take much imagination to picture what circumstances that puts an individual into," said Ryder.

"As the economy has turned around and gotten better, there are more employment opportunities for pilots," he told **AIN**. "If you're looking for someone to serve as a pilot, you have to compete with other interests, and we've seen this trend over the last couple of years."

Temporary Incentives

Signing and retention bonuses cover much of the slack to make for a more enticing wage. At Piedmont, new hires currently receive a $15,000 bonus ($20,000 if they have previous regional airline experience), and other carriers have implemented similar opportunities. Retention bonuses are also in play.

Because of the recent changes in flight-hour requirements for first officers—1,500 hours of flight experience in most cases—many candidates work as flight instructors. As part of its pilot



As the number of pilots dwindles in the U.S., regionals are likely to have to increase salaries to attract and retain available talent.

First officers of Colgan Air's Q400 can expect a bump in salary.

recruitment initiative, Piedmont offers a program allowing potential pilots who sign a letter of intent to work for them once they fulfill their experience requirements to receive an advance of $500 a month on their bonus to help defray living and student loan expenses.

At Piedmont, where first officers will likely advance to captain after a year, second-year salaries for Embraer jets increase to $59.03 per hour, plus a captain retention bonus of $7,500. Those who do not upgrade to captain will receive a salary of $40,770 (based on 1,000 hours) plus a $10,000 first-officer retention bonus. Performance bonuses and profit sharing also serve to sweeten the deal, while pilots who elect to remain on the Dash-8 turboprops receive more incentives.

Ryder believes that the bulk of the increases are merely temporary to address staffing shortcomings. "We feel that if the airlines want to encourage the next generation to begin flight training, and recruit and retain the current generation of pilots, they're going to need to make these changes more sustainable and more permanent."

"I think they are going to be permanent because of the demand in the industry," Hogg told **AIN**. "If you look at the large mainline carriers—American, United, Delta—they're all going to be hiring a tremendous number of pilots in the coming years." The dynamics that will lead that demand hinge on the mandatory retirement age of 65 for air transport pilots, he noted. "Airlines typically grow in peak economic times, so…each carrier's seniority list is packed full of pilots pretty much the same age all hired during those peak economic times," he explained. "We just happen to be coming at a peak in the industry when a lot of pilots are retiring at age 65."

Pilot Shortage?

"At this point there is a very constrained supply [of pilots]," noted Black, adding that her constituents filled 64 percent of their desired new pilot quotas this year. "Airlines are just poaching pilots from one another, and what we really need is a new influx of pilots." She noted that the current barriers of cost and flight hour requirements are acting as an anchor on the student pilot pipeline and could have a major impact on the industry.

"The [pilot] hiring at major airlines in the next four years is going to approach 18,000 to 20,000. I have between 17,000 and 18,000 pilots flying in my entire membership, so [the majors] are going to burn through our entire pilot supply in four years," she explained, adding that a study conducted by the University of North Dakota showed that in a decade there could be a deficit of 14,000 pilots in the U.S. airline fleet alone. According to the RAA, its members are already having to alter their schedules and routes to work around crew availability.

Yet ALPA disputes the notion that there is a pilot shortage. "Currently we have an excess of pilots who hold an ATP rating who are under the age of 65 and have a first-class medical," Ryder told **AIN**. "When we hear people talking about a pilot shortage, we think that the data shows otherwise, and I think the distinction has to be whether it's a pilot shortage or an applicant shortage." The shortage is one of pilots who are qualified and who have the interest to work for regional carriers' wages, "and that's an important distinction to make."

Hogg disagrees, citing the pace of advancement and the flow programs, which could move pilots to different pay scales at the major carriers in a matter of several years. "People can look not that far down the road to a very high salary," he noted, "so to me it's not the fact that people are not coming back to the industry because of pay; the numbers just aren't out there."

It's clear that pilots will gain more leverage in the future, but unless pilot production picks up, the effect on the industry could be deleterious, according to Black, as the regional airlines' growth could be hampered by a pilot shortage—even as they experience 80-percent load factors, the highest they have ever seen. "It's Economics 101: supply and demand," she acknowledged. "If we don't get more pilots, then the regional airlines that are offering the salaries are going to become pretty unhealthy, and the major airlines that are relying on that lift and all of those salaries that are dependent on their health are going to become pressured.…I would caution that too much more pressure may kill the golden goose." ❑

Parachute company sees niche in UAVs

by Matt Thurber

The concept of rescuing an out-of-control drone before it crashes to the ground has still not penetrated far into the nascent unmanned aerial vehicle (UAV) industry, but parachute manufacturer Fruity Chutes aims to change that. Unlike a helicopter, multi-rotor drones cannot autorotate to the ground after losing power, and a ballistic system that pops out a parachute can save an expensive vehicle from certain destruction as well as protect people on the ground from the impact of something falling out of the sky.

Gene Engelgau founded Fruity Chutes in 2007 to provide parachutes for hobby rocketeers and for payload recovery for research balloons. In 2009, he noticed that radio control modelers were asking about parachute systems, and he began supplying that market, which morphed into today's growing drone industry. Drones equipped with Fruity Chutes systems range from small UAVs (two to three pounds) to large (700-pound) fixed-wing UAVs.

Drone chutes aren't just for rescuing failing aircraft but also for recovery of fixed-wing UAVs in hostile terrain. While a fixed-wing drone can land safely in a clear area, that isn't always available. A Canadian drone operator flies its fixed-wing aircraft with Fruity Chutes that pop open to allow for a soft landing without the need for a skilled pilot to steer the craft into a clear space.

Simple, Reusable System

Unlike one-time-use ballistic parachute systems mounted to some general aviation aircraft, drone chute systems can be reused until they wear out, often hundreds of times. The deployment mechanism, whether mechanical like the Skycat or CO_2-based like the Peregrine system, can be reset in the field and the chute repacked for reuse. The chute canopies are made from 1.1-ounce calendared ripstop nylon that meets Mil Spec PIA-C 44378 Type IV. The shroud lines are made of 400-pound test IIIa Paraline for larger chutes or high-strength Spectra for small chutes.

Fruity Chutes start with simple systems that use a drogue chute to pull out the main chute, which works as long as the aircraft is moving through the air, and thus these are limited to fixed-wing UAVs. Cost for a three- to five-kg fixed-wing UAV is $225 to $300. Multi-rotor drones require ballistic deployment so the chute is ejected out and away from the drone. A Skycat system with a Fruity Chutes canopy sells for about $500 for a lightweight drone and up to $900 for a 10-kg drone. Peregrine systems with canopy sell in the $3,000 range, for drones weighing up to 100 kg.

Engelgau sees plenty of opportunities for drone parachute systems because of rules designed to protect people beneath drones, but also to prevent losing a device that costs tens of thousands of dollars. If a drone crashes, he explained, "you're pretty much guaranteed a bad outcome.

With a chute, there's a high probability of a good outcome." He believes that regulators will allow more drone flying over people when the drones are equipped with parachutes. A parachute cuts the energy of impact by 98 percent, he said.

The parachute can prevent damage to the drone and protect people on the ground in the event of a crash.

"A chute system is like an airbag or a seatbelt for cars; it's a safety device with a clear benefit."

While more countries' regulators are embracing drone parachutes, not many drone manufacturers have done so, he said. Just as the auto industry finally added modern safety features after they were mandated, Engelgau expects that regulators will favor drones equipped with parachute systems, especially when flown over populated areas. "There's a huge opportunity, especially down the road as more countries mandate that operators need chute systems. This has already happened in Europe. They've taken the approach that they have to limit impact energy to 69 joules, to fly over people or populated areas."

A factor holding back the addition of parachute recovery systems to drones is that many drone manufacturers don't make available a servo channel and switch on the transmitter to operate the chute. Operators can purchase a separate system with its own transmitter and servo to activate a chute, which has the advantage of providing redundancy because it isn't dependent on the main transmitter/receiver system.

"But manufacturers are not motivated [to include the extra servo channel] because they're not forced to do it," he said. As more operators ask for parachute recovery systems, drone manufacturers should also add features to incorporate these systems into their products, Engelgau said. ❑

Drone ATC

▶ *Continued from page 15*

"Underwriters Lab for drones" that will set standards for UAS airworthiness certification.

At the UTM conference, Gov. Andrew Cuomo announced that New York will invest $30 million of the funding to develop an instrumented UAS flight corridor between the Syracuse and Rome airports using NASA-developed ATM concepts.

"They're projecting that this could be a trillion-dollar industry," Cuomo later told reporters.

UTM conference speakers were enthusiastic about the industry's prospects and their ability to manage the anticipated growth in disparate drone traffic through common software protocols and Internet-enabled "cloud" data sharing. airspace, network-managed robots and airspace." This is the "Jetsons vision" the American public has long imagined, said Jonathan Evans, CEO of Portland, Ore.-based Skyward, which provides an Internet-based mapping and flight-planning tool for drones. "We can show that with the simple tech of today—with API [application programming interface] driven architectures and cloud-based databases—we can say who is flying what in space, where and when. We can exchange that information."

For now, planners envision the UTM construct taking shape in Class G uncontrolled airspace below 500 feet agl—keeping drone traffic below the FAA's prescribed minimum safe altitude for manned GA aircraft in other than congested areas.

"The FAA provides services in the controlled airspace; in uncontrolled airspace the FAA typically doesn't provide services," Kopardekar explained. "When you have that kind of a division, it lends nicely to innovation because now we can focus on pieces of airspace that are uncontrolled, where the FAA or any ANSP (air navigation service provider) does not provide services, which provides an opportunity for all of us to innovate much faster and look for new opportunities in terms of technical and operational capabilities as well as business models.

"UTM resides right now under the 'service not provided' airspace category, but it has hooks to go into [other airspace]—the vehicles can go back and forth between the airspace where the services are provided and where they're not provided," he added.

NASA

Testers with Drone Co-Habitation Service operate a DJI Phantom 3 during UTM TCL2 demonstration in Nevada in October.

Kopardekar acknowledged that the system architecture "sounds simple on paper but has huge implications" for the roles and responsibilities of the FAA and what system architects call UAS service suppliers—organizations other than the FAA that would provide drone authentication, flight planning and tracking services in a federated UTM network. Relieved of those responsibilities, the FAA will retain its role as the overarching regulator.

Offering a taste of the companies interested in being UAS service suppliers, telecommunications giant AT&T announced a formal collaboration with NASA at the UTM conference, saying it brings expertise in wireless networking, extracting information from devices and machines through the "Internet of Things," cloud services, identity management and cyber-security.

While the UTM concept emerged as a technical challenge at the NASA Ames center in California's Silicon Valley, Congress formally directed the FAA to be involved in the FAA Extension, Safety and Security Act of 2016, which became law on July 15. The reauthorization legislation calls on the FAA Administrator, in coordination with NASA's Administrator, to produce a research plan for UTM development and deployment. "The research plan shall include an assessment of the interoperability of a UTM system with existing and potential future air traffic management systems and processes," the act instructs. The act also directs the FAA and other parties to establish a UTM system pilot program.

The FAA took a step toward UTM oversight with the release of a "UAS Notification and Authorization" request for information (RFI) to industry last August, later amended. Its objectives in issuing the RFI were to develop "a practical approach to information and data sharing" between the FAA and private entities involved in small UAS (sUAS) operations, and to organize demonstrations of data-sharing techniques for notification and authorization of drones plying the airspace.

"Information sharing readily lends itself to automated technologies since there are many ways information may be shared and exchanged, using web-based and other technologies," the solicitation states. "However, currently there are no conventions or standards for exchanging information between FAA and external entities about sUAS operations using automated techniques and standards." ❑

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Abu Dhabi's Falcon Aviation Boosts Maintenance Capability

Falcon Aviation Services is expanding the maintenance services offered through its Falcon Engineering branch. The Abu Dhabi-based group has added the Gulfstream G550 and Leonardo AW169 to its maintenance approvals, and recently completed the first maintenance action at its Al Maktoum International Airport facility. The company also announced a five-year agreement to provide engineering support to Air Astana, the national airline of Kazakhstan.

"Falcon Engineering is trusted and certified by market leaders such as Embraer, Bombardier, Gulfstream, Leonardo, Airbus Helicopters and Bell," said Raman Oberoi, COO of Abu Dhabi-based Falcon. "We are offering different maintenance services on rotary- and fixed-wing aircraft and will elevate our processes to support customers at the highest standard."

Dubai Handler Set To Expand in India

Dubai-based Aviation Services Management (ASM), which specializes in support for operations in Africa, Asia and South America, is expanding its presence in India and its focus on China. ASM currently has Indian offices in Goa, Delhi and Mumbai. "We have staff in those three locations, but we want to add more," said Valdo Gomes, the company's commercial manager. "We feel there's a huge potential for growth." The company has a number of clients based in India, as well as "foreign companies that fly in for business reasons."

In addition to its flight and ground handling services, ASM can offer clients fuel at many locations, as it also handles fueling for airlines. ASM offers flight planning, overflight permits, landing clearances, ground handling, visa arrangements and security services. The company also provides charter brokerage and aircraft management services.

Sky Prime Turns To Honeywell for JetWave Connectivity

Sky Prime Aviation Services selected Honeywell's JetWave Ka-band satellite connectivity hardware and GoDirect cabin connectivity services to operate on its A319 and A330. Switzerland-based completions and refurbishment specialist Amac Aerospace will install the equipment.

The two aircraft will be able to access Inmarsat's Jet Connex high-speed in-flight connectivity service. In addition, Honeywell's GoDirect cabin connectivity services, a suite of services and mobile applications improving information networks, will help Sky Prime's flight crews and maintenance teams optimize the airplane's connectivity.

Sky Prime operates a fleet consisting of seven Gulfstreams; three Phenom 300s; nine ACJs; and five other aircraft.

DC Aviation And Lufthansa Technik Complete First Joint A-Check

DC Aviation Al-Futtaim (DCAF), a joint venture between DC Aviation Group and Lufthansa Technik, recently completed its first A-check for an A319. The A-check was performed for an undisclosed customer from the region at the company's Al Maktoum International Airport in Dubai.

The inspection took about 350 hours and involved checks of all systems relevant to flight safety, exchanging a number of components, completing service bulletins, and testing the ram air turbine. As part of the cooperation agreement, the companies are offering regular checks and maintenance services, including AOG. The cooperation also includes aircraft cabin services and minor modifications, and plans call for the addition of mobile aircraft and cabin services for the region.

DCAF's hangar, spanning 61,355 sq ft, has space to accommodate business jets and private aircraft up to the size of an A320 or 737. Handling is provided in DCAF's 14,000-sq-ft Dubai FBO. The Lufthansa/DC Aviation cooperation also extends to aircraft management and charter services.

DAVID McINTOSH

MEBAA SHOW REPORT

What comes next for Middle East bizav?

by Charles Alcock

No one could accuse Dubai of having anything less than a glass-half-full attitude, making it the ideal venue for a gathering of a business aviation industry that needs some convincing about prospects for growth in the Middle East. The 10th MEBAA show (held from December 6 to 8) didn't deliver much in terms of substantive evidence that the sector in that part of the world will deliver on its once-golden promise, but there were glimmers of hope even through the dense fog that enveloped the Dubai World Central (DWC) site in the morning.

At the conference of the Middle East and North Africa Business Aviation Association (MEBAA), held on the eve of the show, leaders of the region's business aviation community called for a more business-friendly regulatory environment as well as progress on controlling rising costs. The biennial event opened less than a week after Middle Eastern economies were boosted by news of an agreement by OPEC oil producing nations to cut supply rates beginning this month in a bid to end the slump in prices that has stunted economic growth. However, experts indicated that crude oil prices will need to get well above their current level of just over $50 per barrel to have a lasting effect on economies in the Gulf states.

Homaid Al Shimmari, CEO of Abu Dhabi's Mubadala Aerospace, which is the leading shareholder in Piaggio Aerospace, said the Middle East needs more concerted lobbying and advocacy, as fragmented industry representations to government and regulators are not sufficient to effect change. "Currently, the business aviation industry faces a lot of challenges. It needs to understand how to compete and grow. If you are not agile, flexible and smart enough to predict some of the headwinds, you are not going to be able to sustain your presence in this industry," he told the conference in its keynote address.

"Pressure from customers is [having] a significant impact on this industry. They want to go farther, they want better services, and they want to pay less. They want more for less. There are many opportunities for us to achieve significant improvements for our customers," Al Shimmari said. In his view, enhanced first- and business-class services on Gulf airlines Emirates, Etihad and Qatar Airways represent a threat to business aviation operators. All three are constantly improving premium-segment travel and enhancing service standards on board.

Al Shimmari also argued that there are too many service providers chasing too little business to make the industry viable. "From an investment point of view, if there is a one-million-passenger market for small and medium-size aircraft in this region and I get an eight-to-nine percent internal rate of return, I would definitely invest. As an industry, you are not helping us to look at those investment opportunities."

Oil Price Boost

The prospect of a sustained recovery in oil prices could provide a welcome boost for a Middle East business aviation community that has been in the doldrums since the 2014 MEBAA show. In reality, it will have to wait until at least the end of this year's first quarter to determine whether OPEC's November 30 decision will get the price for barrels of crude up to and beyond its $60 target.

In early trading after the move the price climbed by 14 percent, to just over $53. As of December 12 it stood at $53.80 (WTI Crude) and $56.58 (Brent Crude) and was expected to reach $60 by the end of that week. While rising fuel prices are not generally welcomed by aircraft operators, in the Middle East they are viewed in a positive light as a driver of prosperity that might bear fruit in the form of new aircraft sales or more charter bookings.

According to research conducted by aircraft broker Jetcraft, oil prices of at least $80 per barrel would result in "a material increase in business aircraft orders" from emerging markets such as the Middle East. However, for the purposes of its most recently published survey of market conditions, the company reckoned on an average price below $50 for the next 10 years.

It is worth keeping sight of the fact that OPEC's planned cut in supply is predicated on a complex and hard-to-police agreement on production rates holding firm. The brunt of the short-term sacrifice will be taken

by Saudi Arabia, the United Arab Emirates (UAE), Kuwait and Qatar, and it remains to be seen whether their trust in the commitment of other OPEC producers proves to be well founded. Equally, non-OPEC states could undermine the market correction measure by refusing to follow the group's example.

Ten percent of the Middle East's corporate aircraft fleet of midsize and large-cabin business jets and private airliners, worth almost $1 billion, is currently for sale, according to new research released at MEBAA by financier Global Jet Capital (GJC). JetNet data shows 732 jets are registered in the region and 73 are on the block, the research finds: 26 in the UAE, 23 in Saudi Arabia, 14 in Turkey, the remainder scattered around the region, with their value totaling $939 million. Many owners of the for-sale aircraft "are looking to upgrade to a more modern aircraft," said Simon Davies, GJC sales director for the Middle East.

PETER SHAW-SMITH

Mubadala Aerospace CEO Homaid Al Shimmari (left) wants stronger lobbying.

The research hints that a growing number of regional owners may be ripe for an upgrade. According to GJC's research, between 2006 and 2015, some 293 midsize and large-cabin jets—about 40 percent of the fleet, with an estimated value of $14.65 billion—were delivered to the Middle East. The largest number of deliveries went to Turkey (77) followed by the UAE (63) and Saudi Arabia (58). Overall, midsize jets account for the largest share of the 739 jets in the Middle East fleet (537), followed by large-cabin jets (112), private airliners (83), light jets (4) and very light jets (3), according to GJC's research.

Some 350 business jets worth $10.5 billion are expected to be delivered to the Middle East over the next decade, and most experts see promise in the regional market. A GJC survey of 200 business aviation professionals found that 59 percent see the current market as "attractive for finance companies," while only 15 percent called the environment "unattractive." Moreover, 41 percent believe the market will become more attractive over the next three years, while only 13 percent see it becoming less so.

As for the availability of financing, half of these experts say funds will increase between now and 2019, with 8 percent saying the gain will be dramatic. Another 23 percent see available capital remaining at current levels, while 21 percent expect a decline.

Charter Growth

A combination of rising demand for long-haul leisure travel and easier access to business aviation through new business-to-consumer (B2C) technology is driving growth in the Middle East market, according to online charter marketplace Avinode. Data from the Avinode Marketplace over the past 12 months shows what the company describes as "a healthy increase" in both domestic and international flight requests for the Middle East. "The market is being led by confident leisure and long-haul family travel, which is also driving an increase in heavy jets and VIP/ultra-long-range aircraft," commented Avinode managing director Oliver King.

Flight request data for the period November 2014 through October 2015 with the period November 2015 through December 2016 shows that the Middle East actually saw the weakest growth—at 9 percent—among international charter markets. By comparison the number of requests handled by Avinode Marketplace grew by 29 percent in Russia and the CIS, by 15 percent in Europe and by 19 percent across the rest of the world. For the period January 2014 to October 2016, the number of charter flight requests each month has fluctuated from a low of 1,000 in August 2014 to a high of 3,500 in June 2016. As of October, it stood at 2,500.

So far this year, five of the aircraft most requested by Middle Eastern customers have been heavy jets, with the others being in the ultra-long-range and midsize categories. The most popular aircraft was the Challenger 604/605, followed by the Legacy 600/650, the G450, Global 5000 and the Hawker 750.

Legacy Sale

Lebanon's Middle East Airlines placed an order for a Legacy 500 for its private jet affiliate, Cedar Executive. The company's first Legacy 500, which entered service in January 2016, was on display in Dubai and the second will be delivered in mid-2017. In addition to charter services, Beirut-based Cedar Executive provides FBO services including hangar storage, maintenance and facilities for general aviation aircraft at Rafic Hariri International Airport.

Embraer is expecting a slight dip in the market worldwide and relatively flat growth in the Middle East this year, with stronger growth not coming until after 2018, according to Claudio Camelier, the company's vice president of sales for Asia-Pacific and the Middle East. Presenting the most recent version of the company's rolling 10-year outlook, Camelier said Embraer expects 8,400 jets valued at $244 billion will be delivered through 2026. This is a "slight increase, but not a big increase" over the

Continues on next page ▶

@MEBAA

Saudi Operator Chooses Sabena To Refurbish A310

Saudi Arabia's Al Atheer Aviation has chosen Sabena Technics to refurbish an Airbus A310. The bedroom, bathroom, private office and lounge will undergo extensive soft furnishing replacement, including seat and divan upholstery, with the contemporary design incorporating Arabian motifs. Additionally, the in-flight entertainment system will be upgraded with an HD screen. The cabin work will take place at the same time as a heavy maintenance C-check, with the entire project slated to take three months.

Daif Alsolamy, CEO of Al Atheer, indicated that his company selected Belgium-based Sabena for the work, in part, because of the limited aircraft downtime.

Vertis Supports JetSmarter's New Dubai-London Shuttle

Large-cabin jet charter operator Vertis Aviation announced a partnership to support and develop charter broker JetSmarter's new Dubai-London shuttle service. The shuttles are shared flights available on a per-seat basis to JetSmarter members. Vertis was involved in providing the first aircraft JetSmarter is using in the Middle East, a Legacy 650.

"JetSmarter identified that a certain sector of the market demanded regular, cost-effective intercontinental charter that links the UAE, the UK and the U.S. and approached us to help source the right aircraft," said Vertis chief commercial officer Catherine Buchanan.

"We really like what JetSmarter is doing and believe the shared-aircraft model is perfect for the local charter market. There is a growing demand in the region for this kind of service, so we are pleased to be its local partner, and look forward to helping it develop here."

Switzerland-based Vertis operates from the Middle East, Europe and South Africa with three ACJ319s, a BBJ, G450 and G650, a Global 6000, Global XRS and Challenger 350.

Rockwell Collins Ready To Introduce Stage Content Service

Rockwell Collins is bringing its new Stage cloud-base content service to market this month. Stage enables operators to preload entertainment and information on an onboard server. The server will hold up to two terabytes of information, enough for 70 passengers to stream movies, store or access information through their individual devices. The system works through the cabin's Wi-Fi capabilities, and information can be downloaded through a USB port.

The content and entertainment packages will be accessible in multiple languages and will eventually include regional entertainment. While the initial rollout will involve preloaded information, Rockwell Collins plans to provide the capability to access live events. The server is offered initially as a standalone unit that works on personal electronic devices such as tablets, but Rockwell Collins expects to offer the capability to tie into existing Venue cabin management systems by year-end.

Hadid Expands African Flight Support Network to Chad

Hadid International Services is to open a station in Chad, as the company expands its presence to cover 70 percent of Africa's major airports. According to Issa Zuriqi, Hadid's commercial director, the company is waiting to receive a handling license from authorities in the Central African country.

Headquartered in Dubai, Hadid has 10 offices around the world, six sales representatives (some of them in Malaysia and China) and will have 19 locations with supervisory staff present when the Chad operation opens. According to Zuriqi, South Africa and Nigeria continue to be leading centers of African business aviation activity, with Ethiopia, Angola, Algeria and Morocco also now seeing growth.

@MEBAA

Abu Dhabi Charter Group GI Aviation Secures UAE Air Operator Certificate

GI Aviation, an Abu Dhabi-based charter company, received an air operator certificate from the UAE's General Civil Aviation Authority (GCAA). The operator is hoping to build the local market for single-engine turboprops with Pilatus PC-12NGs now that commercial operations of such aircraft under IFR conditions are gaining acceptance.

Hafsa Al Ulama, managing director of GI Aviation parent company Global Ideas, said, "Our team has been working hard this past year to deliver a brand-new entry-level service for business aviation in this region, which has, until now, been dominated by larger business jets. We have received significant interest."

The operator accepted its first PC-12 last year and plans to take delivery of a second this month. The aircraft have custom-designed interiors by BMW DesignWorks. Initial charter flights began last month.

"We are able to serve all the major business and capital cities within the Gulf Cooperation Council and surrounding region and will also serve popular resort destinations such as Sir Bani Yas, Ras Al Khaimah and Fujairah," said CEO Marios Belidis.

Jordan's Wings Group Expands Charter Fleet

Arab Wings, Gulf Wings and Iraq Gate—all subsidiaries of Amman, Jordan-based International Wings Group—announced recent and upcoming additions to their charter fleets. Arab Wings recently added a second Legacy 650 and a third Challenger 604 to its roster. To accommodate its growth, Arab Wings recently moved to new offices, the company reported.

Dubai-based Gulf Wings recently added a late model Legacy 600 to its fleet, and the company expects to add a Global 5000 and Challenger 605 by this year's second quarter. Gulf Wings is currently pursuing Wyvern and IS-BAO Stage III certification, expected in the first quarter. It was among the first UAE operators to obtain IS-BAO Stage II approval, as well as European third country operator (TCO) approval.

Iraq Gate, which provides domestic and international flights from Iraq, added a third CRJ200 to its fleet and announced an expansion of its ground handling supervision service to third parties and international carriers. The Baghdad-based company also operates a pair of Hawker 800XPs and a King Air.

Satcom Direct and Lufthansa Technik Team To Provide Streamed Content

A new service providing streaming movie and television content is available from a partnership between Satcom Direct and Lufthansa Technik. Called Nicemedia, the service is initially available on aircraft equipped with Lufthansa Technik Nice HD cabin management systems with content provided on portable memory devices that plug into the CMS.

New content will be available each month and is delivered on the memory device so Internet connection is not required. Nicemedia can carry 50 movies and 30 television shows, and it is available in English, German and Spanish, with genres such as action, adventure, comedy, family and science fiction.

Midyear, customers will be able to purchase the Nicemedia Smartbox, which is powered by Satcom Direct and allows viewing content either on cabin monitors or by streaming to tablets and smartphones. This will work with all in-flight entertainment and cabin management systems.

Djibouti's First Charter Operator Sees Growth in East Africa

Ivory Jet Services, Djibouti's first private aviation company, is set to add a Dassault Falcon 900 to its fleet early this year. The group already owns and operates a Falcon 50 and a Falcon 7X, with emergency medical evacuation flights and government transportation forming a significant part of its business. It works with teams of doctors and nurses from three different hospitals, providing transportation for patients across Africa.

The company has its own air operator certificate and is able to take charter bookings for flights across Africa.

▶ Continued from preceding page

previous 10-year period cited, when 8,166 jets valued at $198 billion were shipped, he said.

The Middle East is expected to account for just 2 percent of the world market during the forecast period and 3 percent of the value. Embraer anticipates 200 new business jets worth $8 billion will be delivered into the region. The Middle East remains more heavily weighted toward larger aircraft, which leads to the slightly higher forecast in value than in actual deliveries. However, Camelier noted that Embraer has had some opportunity with light jets, including an order from Etihad Airways for four Phenoms for flight training.

According to the Brazilian airframer, the Middle East fleet has grown by 7 percent a year since 2004, reaching 390 aircraft this year. Large aircraft account for 234 of that total and mid-size aircraft another 129. In the next few years, Embraer expects the market to remain relatively flat with slow growth, Camelier said. Despite recent contraction, he said the market has stabilized.

In total, Embraer has shipped 50 aircraft to the region. The majority have gone to customers in the UAE (19) and Saudi Arabia (12). And the overwhelming majority—42—have been the top-end Legacy 600/650 and Lineage 1000 and shuttle variants.

ACJneo Sale

Airbus Corporate Jets secured another commitment for the more fuel-efficient ACJneo, bringing orders and commitments for the next-generation line to eight. The re-engined Neo series has become one of the ACJ line's strongest sellers, remaining on a pace of one sale every two months. This is a rate that ACJ president Benoit Defforge said he hopes to continue this year. He also hinted at the show that the European manufacturer might be close to completing sales for two ACJ350 widebodies.

The newest commitment is for an ACJ320neo, boosting the order and commitment tally for that model to six. The ACJ319 accounts for the remaining two.

Deliveries of green ACJ-320neos are expected to begin at the end of next year, while the ACJ319 neo will begin shipment in the second quarter of 2019. Airbus is not disclosing its customer base for most of the Neo series, but Alpha Star, based in the Saudi Arabian capital Riyadh, is the launch customer for the ACJ319neo.

Airbus also unveiled a new private version of the ACJ350 airliner that is designed with "Easyfit" provisions to smooth the cabin outfitting process. Based on the A350 XWB, the aircraft has 2,910 sq ft of cabin space in the -900 version and can fly up to 10,800 nm (20,000 km), or 22 hours. With Easyfit, the carbon-fiber fuselage is pre-fitted with hundreds of attachment points, which will simplify the completions process.

However, the airframer also announced that it is to exit the private airliner completions business and this year will switch its Airbus Corporate Jet Center (ACJC) in Toulouse from ACJ completions to upgrades for its commercial airliners. The company decided it was a better use of internal capabilities to focus on commercial upgrades rather than competing against its six approved outfitters, he said. ACJC has completed fewer than 10 of the 70 ACJs sold to date.

Jet Aviation and Airbus signed an agreement appointing Jet Aviation's maintenance hub in Dubai as a member of the Airbus Corporate Jets (ACJ) service center network. The appointment allows Jet Aviation to offer line maintenance, retrofits, modifications and cabin and systems upgrades for ACJ owners and operators. In May, Jet Aviation's maintenance, repair and overhaul (MRO) hub in Basel, Switzerland, joined the ACJ service-center network.

9,042 visitors flocked to Dubai for December's MEBAA show, where they found nearly 50 aircraft on static display.

Falcon 8X Debut

Dassault Aviation's ultra-long-range Falcon 8X made its public Middle East debut at MEBAA, leading a display of the company's long-range, large-cabin jets. Following certification by the FAA and EASA in June, the 8X entered service in October; the French manufacturer delivered the first 8X ordered by a Gulf customer last month.

"The delivery of a Falcon 8X to a regional operator barely a month after the entry into service of the first aircraft says a lot about the important role the Middle East is expected to play in the success of our new flagship," said Renaud Cloatre, Dassault's international sales director for the Middle East.

The UAE and Brazil's ANAC also recently approved the 8X, and it's expected to receive certification in China shortly. As with the Falcon 7X, Dassault's most popular jet in the Middle East, the company expects the larger 8X (which like the 7X, from which it's derived, carries a maximum of 19 passengers) to be a big seller in the region, thanks to its combination of range, cabin comfort and operating efficiency. Over the past seven years, the Falcon fleet in the region has almost doubled, to more than 70 jets, according to the company.

New Falcon 8X operators in the Middle East can also take advantage of service options offered by Dassault's support organization. The company has authorized service centers in both Dubai and Jeddah and recently introduced Falcon Response, an AOG support service that operates a pair of Dassault-owned Falcon 900s dedicated to resolving AOG events.

With a range of 6,450 nm, the 8X can fly nonstop between Dubai and New York, Dubai and Adelaide, or Jeddah and Chicago. Cockpit options include Dassault's FalconEye combined vision system (the first head-up display to combine synthetic and enhanced vision), and Falcon Sphere II, an electronic flight bag.

King Air Upgrades

Textron introduced Pratt & Whitney Canada PT6A-67A engines to boost the performance of its Beechcraft King Air 350HW and 350ER. The company is also offering a higher maximum takeoff weight of 17,500 pounds for the two aircraft.

Both modifications are approved by the FAA and EASA and are available as factory options for new aircraft, or as retrofits. The work can be done

by any of Textron's 19 company-owned authorized service centers.

The more powerful PT6A-67As boost takeoff and climb performance, particularly for hot and high operations. With an outside air temperature of 50 degrees C (122 degrees F), the engine upgrade allows for a sea-level maximum takeoff weight 2,700 pounds higher than that of the standard aircraft. The increased gross weight option provides operators greater flexibility between payload and fuel, representing a potential increase in loiter time of two to three hours.

The 350HW is the heavyweight version of the King Air 350, providing greater load-carrying capability thanks to its larger and stronger main landing gear struts, wheels, tires and brakes. The 350ER is the extended-range version with more fuel capacity through the addition of low-drag metal fuel tanks aft of the powerplant. With NBAA IFR fuel reserves, its max ferry range is 2,690 nm (4,982 km), and it can also offer an endurance time of 12 hours for surveillance missions.

Textron also promoted the Grand Caravan turboprop single for special-missions work, billing it as a sound value for a variety of operators thanks to its low operating and acquisition costs. The Caravan can carry between 10 and 12 passengers or a mix of equipment for multi-role operations including medical evacuation. It offers range of up to around 1,000 nm.

More Range for A321

Comlux announce at the MEBAA show that it is to offer a forward auxiliary fuel tank for the Airbus A321. The modification promises to boost range by 500 nm for a typical private operator carrying up to 25 passengers, while a more typical commercial configuration would gain an additional 300 nm. Comlux engineers worked with Airbus to design a forward tank to complement the A321's existing additional center tank options (ACTs), which are already installed on 40 percent of in-service aircraft. The new system is expected to be ready for installations to begin in this year's third quarter. "For operators this guarantees U.S. coast-to-coast and transatlantic range," said Comlux chairman and CEO Richard Gaona.

Comlux America has handled all the engineering work to support the STC for the new fuel tank. The Indianapolis facility will conduct the first installation in this year's third quarter. Beyond that, the company expects to appoint facilities in the U.S. and Europe to handle installation work for customers.

Meanwhile, Comlux America is set to team with aircraft interior designers Alberto Pinto Design, DesignQ, Unique Aircraft and Winch Design. The company's goal is to develop floorplan and interior options for the ACJneo and BBJ Max 8. Early this year Comlux intends to release concept books to show prospective customers an array of cabin interior renderings developed by the four design groups.

Gaona rejects what he calls a trend in the completions industry to ask aircraft buyers to confine themselves to a relatively small selection of standardized cabin designs. "I still believe that when people buy an aircraft they want their own design," he told **AIN**. "What we are doing is a different approach from those who are offering complete standardization. We must not forget that in the VIP world, the customer is king. If you keep them happy, they come back to you in three or four years [for more aircraft]."

Jumbo Windows

Boeing Business Jets (BBJ) has partnered with GKN Aerospace's Fokker unit to develop, produce, offer and support the SkyView Panoramic window for various BBJ models, including the BBJ Max. The window, which will be the largest available for a passenger jet, will be offered on the BBJ, BBJ 2 and all three BBJ Max bizliners. In addition, Fokker is offering the window as a retrofit on existing BBJs. The window is scheduled to enter service on the BBJ Max next year.

Larger than three existing 737 windows together, the SkyView Panoramic window measures 4.5 feet by 1.5 feet. It is placed aft of the wing, but can vary in location depending on the aircraft type. The size provides an "unparalleled perspective of the world," Boeing said. SkyView is a demisting, acrylic window that incorporates GKN's Crystal Vue II coating.

Meanwhile, BBJ is also working to boost the used market for its airplanes by developing a package of purchase support services and coordinating with completion centers on power-by-the-hour programs for would-be buyers. Noting that pre-owned business jet transactions are trending upward, BBJ president David Longridge said, "Boeing is focused on the fact that many of our customers may be looking to sell their current BBJs to buy a new one."

The manufacturer has assembled an "all access pass" that covers a series of typical charges the used aircraft owners might incur. This will cover Boeing technical support, document updates, waiver of intellectual support royalties involved with upgrades, BBJ training course options, and on-site contract and sales document support to assist with the actual sale and entry into service.

The access pass is priced at about $500,000, Longridge said, estimating it offers $3.5 million to $4 million in value. He noted that either sellers of used BBJs can buy the pass as an incentive for would-be buyers, or purchasers of used BBJs could buy the pass.

In addition, BBJ has turned its attention to support of used aircraft, and has worked with its authorized centers to develop power-by-the-hour programs that would be offered through those centers. The programs offer coverage for either the airframe or engine that would encompass both scheduled and unscheduled maintenance, parts, line-replaceable units and labor. For the airframe package, Part M continuous airworthiness compliance would also be included. Another package was developed for interiors that could extend to upgrades, refurbishment, cleaning and scheduled and unscheduled maintenance.

BBJ typically has a smaller percentage of the fleet available—7 percent compared with the business jet average of 11 percent. But Longridge said, "We are concerned about how long it takes to sell a BBJ when it is used," adding that the new purchase support package and coordination on power-by-the hour are designed to "make buying and selling a used BBJ much easier."

Online Partnership

Click Aviation Network unveiled a platform where various businesses, from charter brokers to service providers, can connect with each other and explore business opportunities. The Dubai-based company, which launched in 2015, hopes to develop an expansive online aviation network.

"Changing the dynamics of how industry professionals collaborate and do business in this new era of aviation is Click Aviation Network," said founder and CEO Aiham Bader. "We are revolutionizing the industry by introducing a single unified approach to aviation, where different players—from charter brokers, operators, suppliers and other service providers—can come together under one roof, explore business opportunities and discover ways to increase operational efficiency and business growth, eliminate risks, reduce costs and build credibility."

Click members can build a portfolio and present their services on the Click platform. The platform is designed to simplify operational, commercial and financial processes. It enables multiple user access, charter inquiry management, access to the location of an aircraft, access to airport and FBO directories, direct communication with operators, and access to invoices and management reports. The company also has an established operations control center with flight operations and flight dispatch specialists to provide services that range from coordinating air traffic rights to customized trip planning.

Training in Abu Dhabi

CAE announced the expansion of a flight training agreement with Abu Dhabi Aviation (ADA) to support growth in the region. The expansion encompasses the commercial, business and helicopter aviation training collaboration between the two companies and includes the sale of two full-flight simulators and CAE instructor-led training. CAE had announced the simulator sale in October, but at the time did not disclosed the customer.

Under the collaboration, CAE and ADA will provide the training to operators in the region at ADA's new facility in Abu Dhabi. The eight-bay center is expected to begin training in this year's first quarter.

The CAE 7000XR-series simulators, equipped with CAE Tropos 6000XR visual systems, will be ready for commercial pilot training next year. These will complement existing CAE simulators for the Leonardo AW139 and Bell 412.

"CAE has been training our pilots and providing state-of-the-art training equipment for a decade and we are looking forward to this extended collaboration, for the support of our own and our customers' growing training needs long into the future," said ADA chairman H.E Nadir Al Hammadi. ❑

DAVID McINTOSH

AfBAA seeks to address Africa's unique challenges

by Ian Sheppard

Business aviation representatives need to engage local regulators country-by-country to support the growth of the industry, which has significant potential on the continent. That was the message from leaders of the African Business Aviation Association (AfBAA) at the association's recent annual conference in Cape Town. They also called for more companies to become involved with AfBAA to help enable growth and partnerships.

Tarek Ragheb, AfBAA founding chairman, reflected that the continent presents "a unique environment with unique challenges"—not least of which is having 54 countries. A single regulatory environment remains but a dream in Africa so he suggested the way forward is "innovation."

The industry took the first step last year at a roundtable event in Addis Ababa, Ethiopia, where the local industry was able to help regulators understand the nature of business aviation, as distinct from the airline sector. In addition, it saw the launch of the Ethiopian chapter of AfBAA.

A local partner is critically important to starting business in a new country, said several panelists, who pointed out how difficult it can be to find one. Gavin Kiggen of ExecuJet said his company had struggled to find a suitable partner in Mozambique and Congo (Kinshasa). However, he added,"We are going into Dakar [Senegal] as we have our first aircraft owner there. That'll be our way in there."

The number of regulators in Africa—there are 53 CAAs—presents a "big problem," said Segun Demuren, who established the first FBO in Lagos, Nigeria.He explained, "Most African countries have had either wars or coup d'etats, so security is a very high priority of governments, meaning enterprise comes second." He added, "Everything we've done is in spite of government red tape."

The panel commented that regulators perceive business aviation as for the rich and for heads of state, so there is a need through AfBAA to "create awareness." Atedo Peterside, entrepreneur and founder of ANAP Jets, explained how

AfBAA chairman Tarek Ragheb (left) addressed delegates to the association's annual conference during a reception at the Cape Town Club on the event's first day. At right is AfBAA vice chairman Nuno Pereira, CEO of BestFly of Angola.

his company has successfully adopted the fractional ownership model using Embraer Phenom 300s based in Nigeria. However, he acknowledged that it will take time to change the perception of business jet usage.

In addition to improving the African regulatory environment, the association sees innovation, especially new technology and business models, as a key to making business easier, said Ragheb. An OEM panel discussion heard how Africa is no longer "the dumping ground for old aircraft." Ragheb explained, "In Africa we don't have open skies or much infrastructure, so we should embrace technology to leapfrog," referring in particular to new business models such as that used by JetSmarter—which has not turned to Africa yet but did give delegates an update on its rapid growth and ambitions elsewhere during the conference.

The conference closed with a forum on Remotely Piloted Aircraft Systems (RPAS), including a presentation about ZipLine, which is using RPAS to deliver medical supplies in Rwanda.

AfBAA announced in Cape Town that it will hold its annual conference in the South African city every year from now on. The association has yet to come to an agreement over the North Africa region which both it and MEBAA claim to represent. The association's next regional symposium will take place this year in Nigeria, with West African business aviation as its theme. The next two roundtables will be held in Kenya and Nigeria, and at the EBACE show in Geneva the association will promote its new Access Africa concept, designed to encourage companies to engage with the African business aviation sector and provide assistance in that endeavor. ❑

Customs closures hit France

by Guillaume Lecompte-Boinet and Gordon Gilbert

French airports industry group UAF is pressing authorities to reconsider a decision to close customs and immigration facilities at 13 airports, among them the popular French Riviera gateways La Mole-Saint Tropez and Le Castellet. The closure means that the airports have not been able to accept flights from outside the Schengen area of the European Union, in which passport controls are not required. This has blocked business aviation traffic from places such as Russia, the Middle East and the UK.

The closures were confirmed on October 29 when the *Official Journal of the European Union* published an updated list of French airports with customs service, with the 13 airports no longer included. UAF representative Nicolas Paulissen said the closures were quietly implemented without any study of the economic impact to save money.

According to Aéroports de la Côte d'Azur, almost one third of passengers arriving at Saint Tropez are from non-Schengen states. During the peak summer period, the airport receives between 90 and 100 movements per day.

In fact, the airport has continued to receive some flights from outside the Schengen zone. It provides French customs officials with passenger manifests and leaves it to them to decide whether or not to require screening. So far, the authorities appear to be tolerating this unofficial process.

Industry Support

The European Business Aviation Association is supporting its local chapter and UAF in their effort to overturn the closures. It said this "short-sighted decision fails to consider the economic impact of these actions." EBAA France points out that removing the clearance status of Saint Tropez, Le Castellet and Annemasse Airports affects 700 non-scheduled flights per year and will entail considerable financial losses for these regions.

"This is yet another blow to regional connectivity," the EBAA said. It follows a recent revision of the guidelines on state aid at regional airports "that would force such facilities to close if they are unable to demonstrate financial autonomy." This situation is further compounded by the "perennial lack of political support and foresight to equip regional airports with satellite-based augmentation system procedures to enable their use to be optimized."

Currently there are some 65 regional border airports in France that have permanent or on-request customs and immigration clearance services. ❑

UPDATED DORNIER SEASTAR SET TO FLY THIS YEAR

The revived Dornier Seastar amphibian is on track to make its first flight by year-end, Simon Schell, chief of technical sales, told **AIN** last month at the MEBAA Show.

The first flight will mark a significant milestone in one of history's longest aircraft development programs. The 12-passenger Seastar was certified in Germany to Part 23 [general aviation] standards a quarter century ago, but never brought to market. In 2014 Dornier partnered with two Chinese state-owned companies to complete commercial development.

The aircraft is being updated to incorporate a Honeywell Primus Epic avionics suite, stern hydrothruster for improved water maneuvering, new landing gear and many other improvements. Powered by two Pratt & Whitney Canada turboprops mounted push-pull high on the fuselage centerline, the Seastar has a maximum cruise speed of 180 knots and a 900-nm (1,667-km) range.

The fuselage, made of fiberglass reinforced plastic, and most other airframe components will be manufactured in Canada. Final assembly will take place at Dornier's plant in Germany and at a new facility in Yixing, China, for which ground was broken in September.

Dornier Seawings is aiming the versatile aircraft at the commuter, private, corporate and special-missions markets. The order book is open but Dornier has not yet actively marketed the Seastar, priced at $7.21 million (2016 dollars), pending availability. —*J.W.*

Court blocks new U.S. overtime regs

by Kerry Lynch

In a move welcomed by aviation businesses, a U.S. district court has issued a preliminary injunction to block a Department of Labor rule that would significantly increase eligibility for mandatory overtime. The Department of Labor (DOL) in May released the rule, which raised the minimum salary for employees "exempt" from mandatory overtime requirements to $47,476 from $23,660. Under the rule, the exempt threshold would be adjusted periodically. The rule was to take effect December 1.

The DOL issued the rule, which expanded the number of employees eligible for mandatory overtime to 11 million from six million, over the objections of numerous business groups, among them a number of aviation entities. NATA had expressed concern about the impact on small businesses and NBAA had noted that the change was among "the most substantial since the introduction of the Fair Labor Standards Act (FLSA) in 1938."

Twenty-one states and 50 business organizations are challenging the rule, and on November 22 the U.S. District Court for the Eastern District of Texas issued a preliminary injunction blocking both implementation and enforcement of the rule. The court determined that the rule "does not comport with Congress's intent" as far as who is exempt from the mandatory threshold. The court noted that the rule's "significant increase to the salary level creates essentially a de facto salary-only test" for exemption, but said this is not in line with congressional intent.

The court noted arguments made by the states that the rule's provision for periodic adjustments is illegal, because it bypasses a notice and comment period. The court further determined that "because the final rule is unlawful, the court concludes the department also lacks the authority to implement the automatic updating mechanism."

National Implications

While the lawsuit was filed by specific states and businesses, the court decided to apply its ruling nationwide because "the scope of the alleged irreparable injury extends nationwide" and added that such application would protect employers and employees from being subject to different regulations based on location.

Aerospace Industries Association (AIA) president and CEO David Melcher lauded the ruling, echoing the belief that the rule exceeded the DOL's statutory authority and cited Congressional Budget Office estimates that the rule would impose $1 billion in costs to business.

"A responsible increase to the salary threshold for overtime pay is due; however, the DOL rule moves too far, too fast and disproportionately impacts small businesses, nonprofits, local governments and academic institutions," Melcher added.

The Aeronautical Repair Station Association (ARSA) called the decision of the judge a welcome relief, noting that the rule "would have imposed a significant burden on commercial enterprise, particularly small businesses."

ARSA cautioned that the injunction, "does not eliminate all uncertainty for businesses, particularly those employers who had already planned to comply with the mandate only to have it reversed in the final two weeks before implementation." ❑

PILOT REPORT

FALCON 8X

Dassault's largest and longest-range business jet

by Matt Thurber

The Falcon 8X is not only Dassault's largest business jet; it also propels the OEM into the popular ultra-long-range arena, the segment that has experienced the most activity in the past few years. The 8X isn't just a 7X with fuselage plugs, and it isn't replacing the 7X; the newest Falcon stands on its own as the flagship of the French manufacturer's fleet.

The 8X received EASA and FAA certification in June, and in September the first aircraft was delivered, to Greek operator Amjet. Production is ramping up, and while Dassault doesn't disclose exact delivery schedules, in mid-December there were 11 Falcon 8Xs assembled and 14 in the completion stage, according to sales engineer Frédéric Recher. "We will deliver in 12 countries in the next few months," he said.

Besides boosting range at Mach 0.80 to 6,450 nm from 5,950 nm, the 8X fuselage is 2.6 feet longer than the 7X's, accomplished via two fuselage plugs. The 8X is 3,000 pounds heavier, with a maximum ramp weight of 73,200 pounds, and all of the extra plus another 200 pounds goes to fuel, with maximum fuel now 35,140 pounds, up from the 7X's 31,940 pounds.

Although the 8X's three Pratt & Whitney Canada PW307D engines, which each deliver 6,722 pounds of thrust, are about 5 percent more powerful than the 7X's 6,402-pound-thrust PW307As, the direct operating costs for both jets are the same, according to Recher. The 307D is more efficient, with specific fuel consumption lower by 2 percent. Further contributing to the 8X's efficiency, Dassault engineers were able to carve 600 pounds out of the wing. "It's the same wing as the 7X's," he said. "We know the wing perfectly, and we saw it could be optimized internally without changing anything."

Other changes are more subtle, such as new winglets that add a tiny bit of span, reinforced landing gear for the higher mtow and some changes to the avionics. The 8X has the Honeywell Primus Epic-based EASy III flight deck, complete with a new Honeywell RDR-4000-based digital radar and Dassault's optional FalconEye head-up display (HUD) and enhanced vision

PHOTOS: DASSAULT AVIATION

The extra length of the 8X's fuselage allowed designers to outfit three zones and include a shower in the lavatory. All completions are done in Little Rock, Ark.

Sidestick-operated fly-by-wire flight controls make for a clean, uncluttered flight deck. The 8X's EASy III avionics system, based on Honeywell's Primus Epic suite, features synthetic vision and 3-D digital radar. The FalconEye HUD and combined vision system is optional.

system, the first certified application of combined vision, where synthetic vision and enhanced vision imagery is shown simultaneously on the HUD.

The 8X's cabin is now the longest in the Falcon line, 42.6 feet long and providing 1,695 cu ft of volume. Like the 7X, the cabin altitude in the 8X is maintained at 1,000 feet to FL270, then holds 3,900 feet at FL410 and 6,000 feet at the FL510 maximum altitude. Interior noise has been cut substantially below that of the 7X, down 2 to 3 dB SIL.

With full fuel, the 8X can fly at Mach 0.80 up to 6,450 nm from a sea-level runway with a balanced field length of less than 6,000 feet, carrying eight passengers and three crew.

Flying the Fly-by-wire

Before climbing into the 8X cockpit, Dassault test pilot Hervé Laverne took me for an introductory flight in FlightSafety's 8X simulator at the FlightSafety Paris Le Bourget learning center. The simulator is an excellent representation of the 8X and highly accurate in all respects, including the difficult-to-replicate nosewheel steering and taxiing regime.

We spent some time letting me get used to the handling of the 8X's fly-by-wire flight controls, which are flight-path stable, meaning that the jet will remain on the same flight path or trajectory until the pilot moves them for a different flight path. Non-FBW airplanes are speed-stable and tend to remain at the trimmed speed when nothing is done to the controls. By comparison, Gulfstream's G650 and in-development G500 and G600 are also speed-stable FBW designs. The Embraer Legacy 450 and 500 FBW systems are flight-path stable, with the addition of a trimmable speed-stable regime during landing. Airbus designs are also flight-path stable. (I have flown the Legacy 450 and 500 as well as the G500 lab simulator, but as yet not the Airbus.)

For most pilots, what they'll notice right away in a flight-path stable FBW jet is that there is no pitch trim. The 7X and 8X (I'll refer to the 8X henceforth as both FBW systems are identical) move the trimmable horizontal stabilizer for pitch trim, but the pilot doesn't feel this happening as it's completely automatic and part of the FBW system.

The primary pilot control in the 8X, as in most other FBW airplanes, is a sidestick. Exceptions include the yoke-fitted G650 and all FBW Boeings. Unlike the active control sidesticks in the G500 and G600, which move together like traditional yokes and also like the G650 and Boeing yokes, the Falcon sidesticks move only at the pilot's command. For this type of sidestick (also found in the Legacy 450 and 500 and Airbuses), pilots need to know when the other pilot is trying also to move the stick simultaneously. In the 8X, this is done with a vibration in the stick and an aural warning ("dual input"). When both pilots move their sticks simultaneously, the command is algebraically summed.

There is a priority button on each stick, with which one pilot can deactivate the other stick by holding the button. The priority remains activated by pressing the button for more than 30 seconds, then the button can be released. The other pilot can reactivate his stick at any time by pressing his priority button.

From a complexity standpoint, FBW might seem to present some challenges; after all, the system must supply not only the desired trajectory, handling characteristics, envelope protections and other features but also reliability that meets the same certification safety requirements applied to a mechanical flight control system. Dassault has been designing FBW flight controls for decades, and the 8X's system is the latest generation.

For the pilot of the 8X, there is very little that must be known about the system except for how it degrades when a problem arises and what backup systems serve its electrical needs. In actuality, there is little that the pilot can do other than be prepared if the FBW moves from normal law to alternate law or direct law, which can happen when there is a flight control computer, sensor or actuator problem.

In direct mode—which is not accessible in normal flying conditions; that is, there is no switch in the cockpit that allows changing to direct mode—the pilot needs to be careful not to exceed normal envelope restrictions, the same way as when flying a traditional airplane. Some of the flight envelope protections available with FBW disappear in alternate law and all of the protections are unavailable in direct law.

In short, the FBW system is supported by three main flight control computers (FCCs) and three secondaries (backups), which calculate how to move the flight control surfaces in response to information provided by five flight data concentrators. Four actuator control and monitoring units select which of the FCCs will provide the calculation, then transmit that command to the actuators and measure the amount of the actuation. Four maintenance and avionics interface computers are responsible for data exchange with avionics. The backup to the backup is provided by an analog computer, which gives the pilots direct control of the horizontal stabilizer and spoilers (backup mode). In this case, pilots control pitch using trim switches designed only for this purpose and spoilers via the rudders. The analog backup is considered temporary while all the other computers reset themselves and restore some or all FBW functionality. Most flight controls are electrically controlled and hydraulically actuated, except the horizontal

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FalconEye

Dassault's new FalconEye combined vision system (CVS) will be certified soon on the 8X and is already approved on the 2000S/LXS. CVS plays on the 8X's single head-up display (HUD) on the pilot's side, although Dassault will certify a dual-HUD setup for the 8X in 2018. The HUD and FalconEye camera are optional on the 8X, and so far 90 percent of 8X buyers have opted for the HUD, although not all have selected the FalconEye camera. The system uses an Elbit HUD and camera system, and the HUD uses LCD technology, which is lighter and smaller than the CRT-based HUDs on older Falcons. The FalconEye camera sensors are partially recessed into the upper nose cone for better aerodynamics than the earlier sensor.

CVS blends synthetic vision, thermal (infrared) and low-light camera imagery into a single depiction of the outside world on the HUD. HUD resolution is 1280 pixels horizontal and 1024 vertical, the same as a high-definition display, with a larger field of view of 40 degrees horizontal by 30 degrees vertical.

The camera sensor scans 35 degrees horizontal by 36 vertical, with slightly lower resolution. The sensor is uncooled, so there is no delay during initialization as there is with cooled sensors. Six different multispectral sensors make up the camera package, four for daytime, one nighttime and one thermal (infrared). The system fuses the images from all of the sensors to present the best image to the pilot, and one of the sensors can see LED lights, which are found at a growing number of airports.

An interesting characteristic of FalconEye is that the camera image is not superimposed on top of the synthetic vision (SVS) image on the HUD. The HUD view is divided into two parts; the upper is SVS and lower is the camera image. A switch on the sidestick allows the pilot to move the limit line between SVS and camera image to show more or less of each. The way this works is that the pilot typically wants to see the camera image, especially thermal, of the runway and surrounding terrain, and thus will move the sidestick switch until this shows on the lower part of the HUD. The upper part of the HUD will be set to SVS, which gives the pilot a good look at terrain farther away in case of a missed approach or go-around. Even if the pilot pulls the SVS image down toward the runway, the runway area is always available as a clear zone to be shown using only camera imagery, so the limit line bends around the runway in this case.

Future capabilities for FalconEye include operational credit to descend to 100 feet using the HUD during IFR approaches, and this is expected after the 8X FalconEye certification. ■

▶Continued from preceding page

stabilizer, which is electrical only. The 8X has three hydraulic systems.

Electrical power is essential for FBW, and in the 8X each of its three engines has a generator and a dedicated permanent-magnet alternator. If all of those fail (or all three engines fail), a ram-air turbine powers the flight control system. There is a Honeywell 36-150 APU, but this is for ground use only.

For the most part, these issues are not top of mind when flying the 8X, unless an emergency develops. What I found more compelling and relatable was how the airplane handles and what happens when I experienced the 8X's stability-augmentation and envelope-protection features.

With **AIN** *writer Matt Thurber in the left seat of the 8X, Dassault test pilot Hervé Laverne (left) flew right seat while senior chief test pilot Philippe Deleume (right) provided an extra set of eyes from the big Falcon's jump seat.*

The FlightSafety simulator gave me a foretaste of the real thing, and Laverne used our time in the sim to introduce me to some of the 8X's flying characteristics, chief among them the flight-path stable trait. This means that wherever I pointed the airplane in certain attitudes, the FCS would maintain that flight path. If I want a 20-degree bank to the left, I deflect the stick left until reaching the desired bank, set the nose level, and the FCS automatically maintains that path. The same is true of pitch: set the path and release the stick.

The indicator for the flight path is the flight path symbol (FPS), which gives a direct indication of the flight path or trajectory on the attitude display indicator (ADI) on the primary and secondary flight displays. Dassault explains that flying with the FPS is much simpler than using the pitch angle as on traditional ADIs, because pitch angle doesn't always correspond to the flight-path angle. During a stall, for example, the pitch angle could be well above the horizon, yet the airplane's trajectory is descending. The FPS eliminates the need for the pilot to interpret the trajectory by assessing the pitch angle, airspeed, vertical speed and altitude.

When banking, the FBW controls automatically compensate for loss of lift so there is no need to pull back on the stick to keep the FPS level on the horizon. However, at steeper bank angles it's necessary to pull the stick aft to compensate for loss of lift. At bank angles of up to 35 degrees, letting go of the stick maintains the trajectory, but beyond 35 degrees the FBW automatically drives the angle back to 35 degrees. It is necessary to move the stick beyond the soft limit to bank steeper than 35 degrees, so the pilot feels some pressure on the stick. Pitch has a similar soft limit in the down direction as well as hard limits that protect the airplane from excessive up or down pitch inputs.

In the simulator, I tested the low- and high-speed protections. I pulled the stick back to maximum pitch, and the FBW system maintained a margin above stall, even as I banked left and right. If the pilot pushes the nose down as far as the stick will move, the FBW pulls the nose up to keep from overspeeding. With the autopilot on, autothrottles will switch on and pull the power back to help slow the 8X, but if the autopilot is off, then autothrottles don't assist and only the pitch change prevents the overspeed.

I flew the sim back to Le Bourget for a raw data ILS to Runway 27, then a go-around followed by another ILS approach and landing. We then took off from Runway 7, and Laverne pulled the number-one (left) engine to idle after V1. I had to step on the right rudder to avoid drifting off the runway heading—although the FBW does compensate somewhat for the inop engine—as we climbed to 2,000 feet and entered a left downwind while Laverne ran the engine-out checklist. We flew the ILS then landed.

The 8X Aloft

When I climbed aboard the 8X the next day at the Istres-Le Tubé Air Base military flight test facility where Dassault's flight-test operations are located, I felt immediately comfortable in the cockpit. We were flying Serial Number 1, the first 8X to fly (with Laverne at the controls). This 8X is still equipped with full flight-test instrumentation and no cabin furnishings. Senior chief test pilot Philippe Deleume flew jumpseat. We were fairly light, with about 12,000 pounds of fuel on board and a 51,000-pound takeoff weight, well below the 73,000-pound mtow. The sidesticks leave space for a stowable work table in front of each pilot. And the rudder pedals are adjustable using a switch on each pilot's side ledge.

I taxied from the Dassault ramp to Runway 33 and quickly became comfortable with the nosewheel steering. The 8X's nosewheel steering, operated entirely with the rudder pedals, is

Manuals

Flying many different airplanes gives me an opportunity to sample a variety of flight manuals, and the 8X's manuals are among the best I've seen.

All OEMs are required to provide documentation, but Dassault goes further to help pilots, especially those new to the brand. My favorite of the bunch are the Crew Operational Documentation for Dassault EASy (Codde) documents, such as Codde 1, Airplane Description, Codde 2, Operations Manual, and Codde 3, QRHs. Unlike many OEM manuals, the Codde documents don't always assume that the pilot comes to the 8X with an understanding of some important fundamentals.

For example, Codde 1 starts with an excellent explanation of the flight path symbol (FPS), how and why it is used and how pilots can use it to fly smoothly, accurately and safely. Codde 1 delves into all the aircraft systems, starting with a discussion of design principles and how the system works with detailed diagrams and descriptions of system controls. The document's avionics sections are well laid out and delve into deep and useful detail on operation of the Honeywell-based EASy III flight deck, especially the I-Nav flight planning functions, which are extensive. The explanation of how the fly-by-wire flight controls work is also well done.

For more detail on certain aspects of avionics operation such as lateral and vertical flight planning and other FMS operations, weather radar, datalink and satcom functions, the EASy III tips and tricks manual is a handy guide. ■

Falcon 8X Specifications and Performance

Price (typically completed and equipped)	$57.5 million
Engines (3)	Pratt & Whitney Canada PW307D, 6,720 lbs each
Avionics	Falcon EASy III (Honeywell Primus Epic)
Passengers (typical)	3 crew + 14 pax
Range (w/NBAA reserves, 200-nm alternate)	6,450 nm at Mach 0.80
High-speed cruise	Mach 0.90
Long-range cruise speed	Mach 0.80
Fuel capacity	34,900 lbs
Max payload w/full fuel	1,959 lbs
Maximum altitude	51,000 ft
Cabin altitude at ceiling	6,000 ft
Max takeoff weight	73,000 lbs
Balanced field length at mtow (sea level, standard)	5,880 ft
Landing distance	2,150 ft
Length	80.2 ft
Wingspan	86.2 ft
Height	26.1 ft
Cabin	
Volume	1,695 cu ft
Width	6.27 ft
Height	6.17 ft
Length (seating area)	42.6 ft
Baggage capacity	140 cu ft
FAA certification (basis, date)	FAR Part 25, 6/27/16
Number delivered	3 (12/01/16)

surprisingly steady, not at all too sensitive and carefully graduated according to speed. I found it less prone to the jerkiness that I suffer from in jets with tiller steering.

We set the slats/flaps to SF2, and I pushed the power levers to the stops. It didn't feel at all strange to be manipulating three levers, and other than three sets of engine gauges and the more crowded throttle quadrant, three engines doesn't seem too much different from two.

The weather was clear but the wind was blowing at 30 knots gusting to 42. The three PW307Ds quickly accelerated the 8X to rotation speed, and I pulled the sidestick back smoothly, rotating the FPS into the flight director cue. There is a rotation indicator on the PFD, but both pilots said it isn't really necessary to use that unless making a high-performance takeoff.

Pulling the power levers back to the climb detent, we climbed to FL350 at 260 kias while I replicated some of the moves from the simulator, feeling the FBW controls in turns and varying pitch attitudes. I find getting used to the flight-path stable FBW system easy, after flying the sim and other FBW jets. It doesn't take long to get comfortable flying with tiny nudges of the stick to put the attitude right where I want it. And it's pleasant not to have to be constantly manipulating the controls, to the point where it's not even tempting to turn on the autopilot.

Once at altitude, I did some more turns, some with steep banks, and we tested the FBW's low-speed and high-speed envelope protections. Laverne had me start with shallow turns, where the bank angle stays as selected (below 35 degrees), then increasingly steep. My 60-degree steep turns weren't so pretty; balancing the need to pull the stick back at the higher bank angles and pushing against the stick's gentle force as it tried to return to 35 degrees was challenging. But putting the FPS right on the ADI's horizon line made maintaining altitude simple. From there, I banked even steeper, to 90 degrees, watching the FBW drop the nose to keep within the safe flight envelope.

Descending to 15,000 feet, we accelerated to the Mach 0.90 VMO then slightly above that to test the overspeed protection feature. With autopilot off (and thus no autothrottle), the FBW system automatically pulled the nose up as we reached Mach 0.91and slowed the 8X to below redline.

I flew some more steep banks, then Laverne had me slow the 8X with gear and flaps/slats fully extended. I then pulled the sidestick all the way back, feeling the 2-g limit that the FBW enforces in that configuration (it's 2.5 g clean). Then with the stick full aft and at idle power, the 8X slowed to its maximum margin over stall speed—we were flying at VMIN well under 100 kias—and stayed comfortably there, even though I banked from side to side. The 8X was flying perfectly smoothly, with no hint of lack of control; I could make it do exactly what I wanted, and it would never stall. After switching on the autopilot, the FBW automatically engaged the autothrottles and powered the 8X out of the VMIN condition.

Returning to Istres-Le Tubé, I flew a steep approach at minus 6 degrees in landing configuration with airbrakes extended. These operate smoothly with no rumbling and, thanks to FBW, no limits on how fast they can be activated.

As we neared the runway about 200 feet above the landing zone, Laverne pulled the left engine to idle and I flew an engine-out go-around, first pushing the takeoff/go-around button then advancing the other two engines' power levers to maximum. Laverne selected slats/flaps SF2, retracted the landing gear then selected SF1 until we climbed to a safe altitude. The 8X still felt like it was flying on three engines, and I needed just a light touch on the right rudder to keep flying straight.

While flying away from the airport, we received an actual Tcas resolution advisory, and I had to shove the nose down quickly to follow the guidance on the ADI, the first time I had ever done so in a real situation. The 8X reacted quickly to my command, and the FBW protected any imaginary occupants in the cabin from being thrown around.

I flew a relatively large traffic pattern to accommodate some local fuel tankers, then flew another ILS approach on raw data for a full-stop landing. The gusty wind blew straight down the runway and still at up to 42 knots, but I was easily able to fly the 8X straight down the glideslope. The 8X stayed solidly right where I wanted, and keeping it on speed—VREF was about 115 kias plus about five knots for the gusts—required just occasional light touches on the sidestick. Descending below 50 feet, I flared high and had to add a little power, but the Pratts responded promptly and the resulting touchdown was satisfyingly smooth with little need for reverse thrust thanks to the powerful brakes.

Dassault's Falcon 8X is impressively easy to fly, and the well designed EASy III flight deck should present a low learning curve for pilots new to Falcons. ❑

Falcon Sphere II EFB

Dassault selected a new Esterline CMC electronic flight bag for the Falcon Sphere II EFB installation on the Falcon 8X. The Microsoft Windows-based touchscreen EFB mounts on brackets on the upper left and right sides of the cockpit, and it is connected to ship power and the aircraft's databus, but it can be removed for off-aircraft use. Falcon Sphere II is an option on the 8X.

The EFB comes with apps for flight manuals, weight-and-balance, cruise and takeoff and landing performance, charts and weather. An EFB manager function allows a central administrator to manage all EFBs for a flight department and issue notifications to all EFB users.

Pilots will soon be able to run mission planning on an iPad then synchronize with the in-aircraft EFBs, saving the trouble of removing the EFBs for off-airplane use. Another useful feature in development is a maintenance dispatch app. The pilot simply types in the type of fault, and the app steps through the MEL process, which will be much simpler than looking up the information in the MEL manual.

Documents in the EFB are linked, so if a pilot is looking up an emergency procedure, any supplementary information is just a hotlink away. ■

More Space for Cabin Interior Designers

The extra 2.6 feet in length in the 8X cabin (compared to the 7X) offered new options for interior designers, and buyers can choose various ways to outfit the entryway to accommodate operational needs. The short entryway plan adds the extra fuselage length to the passenger cabin, while the mid entryway plan shares the added length between the cabin and the forward section near the main entry door. The large entryway floorplan uses the extra length to accommodate a crew rest area, for operations that plan on fully using the 8X's long-range capability or for commercial operators where a crew rest facility is mandatory. Mid- and short-entryway floorplans are for operators that will fly shorter routes regularly.

The passenger cabin space excluding the added space for the larger entryway is exactly the same as the 7X provides. The forward area accommodates a 93-inch galley, and two windows add extra light. The crew rest section opposite the galley is convertible to a crew seat qualified for takeoff and landing.

The choice of the entryway size doesn't affect the layout of the cabin, just the space between each zone. The added length offers more outfitting flexibility, according to sales engineer Frédéric Recher. "You can have a cozy corner in the back with a huge screen and two long divans."

While the 7X can have a shower in the back of the cabin, that limits the cabin to two lounge areas. The added length of the 8X allows for installation of a shower while retaining three lounge areas and the crew rest area opposite the galley. "It's a huge lavatory because of the extra room," he said. The shower stores enough water for up to 30 minutes of use.

Another factor was the new length of the long entryway, which could look like a narrow corridor without the two additional windows on each side. "We said we need extra light," explained Rémi Bachelet, director of aircraft specifications and design. "Thanks to the extra space, we were able to open up this area and bring in more light."

More than 80 percent of 8X buyers are opting for the standard dual three-place divans in the aft zone, but this area can also be customized with cabinets, he said. "We remain quite flexible on this airplane."

The 8X's cabin management system is the Falcon Cabin HD+, which is based on the Rockwell Collins Venue system. Features include up to 32-inch bulkhead monitors, dual Blu-ray players, Airshow moving-map, plug-in monitors and iPad connections at each seat for video/audio on-demand and cabin control, and movie streaming via the Rockwell Collins Skybox.

Falcon 8X buyers can visit Dassault's Le Bourget showroom and spend the day with manager of interior design Caroline Larmaraud and her team to select interior materials and the paint scheme. A mockup cabin section is used to demonstrate galley layouts and seats. Each customer gets an opportunity to evaluate one seat built to their specifications; once satisfied, the rest of the seats can be completed.

All 8X completions are being done at Dassault's facility in Little Rock, Ark. ■

Lassetter perishes in airplane crash

Stephen Lassetter, retired president and COO of Sun Air Jets in Camarillo, Calif., died in the crash of a Piper PA-28 in the San Gabriel Mountains near San Antonio Heights, Calif., before dawn on November 22. Lassetter, 66, held many positions in business aviation charter, aircraft management and FBO management since earning his private pilot certificate in 1975. At the time of his death he was said to be working on his commercial pilot certificate, with plans to become a flight instructor. After working in marketing at an air charter company flying Learjets and King Airs, Lassetter was hired by charter operator Jet Fleet and then moved to AMR Combs, spending two years (1998 to 2000) as COO and developer of Hong Kong Business Aviation Centre. He then returned stateside to run the Signature FBO at DeKalb-Peachtree Airport in Atlanta. After that, he moved west to Sun Air Jets in Camarillo, Calif. Lassetter is survived by his wife, Suellen; mother Gloria, of Dallas; and sister Nancy, of Vail, Colo. —*N.M.*

FBO chain pioneer Ed Nelle dies

Ed Nelle, credited as the pioneer who built Butler Aviation into the first chain of FBOs, died on November 20 in Asheville, N.C., at the age of 91. Butler Aviation eventually merged with Page Avjet to form Signature Flight Support, the goliath among FBO chains today.

FBO business veteran Bob Showalter remembers: "Ed was chairman of the board of NATA from late 1976 to 1979 and helped shepherd that organization through some of its most treacherous financial times. I was on that board from 1978 and it was how the two of us first got to know each other. I had been working for Butler for only a few days as the new v-p of operations at the home office in the early 1980s. I went into his office to discuss a problem. He said: 'When you come into my office with a problem, bring me at the same time at least two possible solutions for your issue.' I later found out he used that line with almost every new hire. I have used the same line ever since with folks who reported to me. Ed Nelle was an incredibly wise man. I stayed in touch, and I will miss him greatly."

Nelle's aviation career began in the military. Budd Davisson, who was the director of marketing at Butler and called Ed both boss and friend, recalls that "Ed was in one of the last Army flight cadet classes in 1945 to actually finish training and transition into fighters. Specifically, bubble-top P-47 Thunderbolts. I remember him as almost giddy when he climbed into the Jug I leased and had on the ramp for the opening of the Charlotte facility. Immediately after the war he was flight instructing and flying charter for an operation at Teterboro. Shortly after that he began his climb up the FBO ladder."

Nelle joined The Port Authority of NY&NJ and later Butler Aviation, where he led the La Guardia FBO, and then as general manager running the FBO in San Francisco. In 1966 he was appointed v-p of system services at Butler headquarters in New York City. He eventually rose to president and CEO of Butler Aviation International and held that position for the longest tenure in the history of Butler Aviation, the first FBO chain in the nation. Nelle presided over the company's most successful years, leaving his mark on not only that company but also on the entire FBO industry. Davisson recalls, "During that time Butler grew from about 15 operations to 34 or so, and gross revenue tripled at least. At one point we were pumping a billion gallons of fuel, including airlines, and operating 43 fuel farms and the port-to-airport pipeline in Anchorage."—*N.M.*

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Western Jet preps for mx, avionics projects

by Matt Thurber

Western Jet Aviation services the Rolls-Royce Spey, Tay and BR710.

Slowly but surely Western Jet Aviation, an independent FAA Part 145 repair station that specializes in Gulfstream maintenance, grew into the hangar that it occupies at Van Nuys Airport in Southern California. At first, Western Jet occupied just a portion of one end of the large Quonset-style hangar, which it shared with a Raytheon defense division.

Five years ago Western Jet took over the entire hangar after Raytheon moved out, and the company now easily fills the spacious facility with combinations of up to 12 GIIIs and GIVs or 10 GIVs and GVs. The hangar has been upgraded to meet modern earthquake standards, so while it looks somewhat dated, the building will be around for many more years to come.

Founded 18 years ago and owned by general manager Jim Hansen, Western Jet is not just a maintenance shop but also has expanded into an avionics installation and repair center, and the company also invited other service providers to rent space and add to the menu of services available to customers.

In an unused space upstairs in the hangar, JetSet Interiors is outfitting an interior refurb shop and design center that will eventually employ a dozen specialists. That new 100- by 30-foot space is set to open this month, but before that six JetSet employees have been refurbing seats and interiors at an offsite facility near Van Nuys Airport. JetSet also has facilities in Henderson, Nev., Dallas and Hartford, Conn. "Now we can say yes [when customers ask about] interior work," said Hansen.

To help Western Jet customers make the all-important decisions about seat upgrades, JetSet is building a demo area in the Western Jet lobby, where customers can try out different seat configurations. One JetSet design widens the seat by one inch without expanding the seat's footprint or intruding into the airplane's aisle. JetSet designers have also incorporated seat controls and USB ports into the inside armrest, as well as a storage space and light in the outside armrest, and all this with an overall lower weight for the entire seat without impinging on the seat's TSO certification.

JetSet's Van Nuys location will specialize in the Gulfstreams that usually frequent Western Jet, but the two companies are open to other types as well, and JetSet's employees are experienced on interiors for the Challenger 300, Citations, even Airbuses and Boeings, according to president Ron Larabie. JetSet can also refurbish headliners and sidewalls, repair carpets and reconfigure cabinets. The company recently received FAA approval to install 16-g belted divans for the GIII, GIV and GV.

"Customers like a one-stop shop," said Hansen, and having JetSet in-house also helps Western Jet maintain its promises to customers. "We're perfectionists," he added. "When we send an airplane out, it's 99 percent on-time and on-budget. Even though JetSet is [separate], they understand how we do things, and the job is easier to control."

The other shop-inside-a-shop at Western Jet is Mike Boal Designs, which specializes in designing paint schemes but also handles small paint jobs such as touch-ups, registration numbers, striping and components such as flight controls. This capability saves a lot of time and enables Western Jet to help keep customers' airplanes looking sharp without having to send the airplane or components elsewhere.

Demand for Avionics Capabilities

The avionics shop is a significant addition to Western Jet's capabilities, especially considering the growing demand for NextGen upgrades such as Fans and ADS-B. Director of avionics Tim Atkinson has developed the avionics department and shop into a sophisticated operation with its own engineering team that designs cabin-management system and NextGen avionics installations. The shop's technicians can make long wire-looms for GIVs and GVs in-house as well as harnesses for cabin touchscreen controls, which helps keep downtime low. After making and installing new wiring, the company supplies customers with a complete copy of the new wiring diagram. There is no extra charge for the diagram document, which is provided as an electronic PDF.

A new vacuum table, designed and built by Western Jet technicians, holds metal blanks tightly in place without the need for clamps while a CNC machine routs out desired instrument panel shapes.

To help educate clients, Western Jet built a customer presentation center, which shows videos explaining the various technologies that they might want to consider as upgrades. A demonstration area in the avionics shop lobby is fitted with cabin lighting and speaker systems so customers can see and hear options for CMS upgrades. "They ask questions and we tell them what we think," said Hansen.

Western Jet's maintenance hangar at Van Nuys has room to house 10 to 12 Gulfstreams (depending on model) simultaneously.

Many GVs are coming due for a major maintenance event, the 192-month inspection, which takes six to eight weeks, Atkinson noted. "Customers [facing that inspection] are asking about CMS upgrades and JetSet interior refurbs," he said. "It's a nice match."

Western Jet's avionics shop tries to anticipate customer needs, stocking materials that are typically required to avoid long lead times when a customer wants an upgrade or repair while the airplane is in for maintenance. "Because avionics feeds off maintenance," he said, "we can't wait for long lead times." For example, Western Jet always keeps a complete Gogo Business Aviation ATG5000 Wi-Fi installation kit in stock. The company also purchased four Rockwell Collins TDR-94D transponders, required for many ADS-B upgrades, so customers can exchange their old transponder instead of waiting to have their unit shipped to Rockwell Collins for the upgrade. "We can't do the job if we can't get the transponder," Atkinson said.

When it comes to pricing avionics upgrades, Atkinson is careful not to give out rough numbers and prefers to work up a firm quote. This avoids the problem of giving one low number then having to ask the customer for more money as the full nature of the job becomes evident, while the job is under way.

"We do our homework," said Hansen. This includes asking the customer for the current wiring diagram to make sure the quote is completely accurate and achievable.

Western Jet maintains a couple of hundred Gulfstreams, and while the company's technicians can do everything from routine inspections and line maintenance to the heaviest inspections and major sheet metal repairs, he added, "we can't do everything." But for operators that want an alternative to the factory-owned maintenance centers, especially owners of older Gulfstreams, "we're here as an option," Hansen said. ❑

News Note

Southern California-based business aircraft management, charter, maintenance and ground handling company ACI Jet has donated a Cessna 172 to A Different Point of View's (ADPOV) aviation career program. ADPOV is a Santa Barbara-based nonprofit organization that seeks to "engage, inspire and transform youth using flight lessons as a launching pad."

ADPOV offers programs in leadership, workshops in ATC communication, airframe and powerplant maintenance and flight training in full-motion simulators and aircraft.

The Cessna 172 donated by ACI Jet will initially be used for maintenance training with kids enrolled in ADPOV who are potential airframe and powerplant mechanics. Once flight ready, the piston single will then move to ADPOV's flight instruction program for primary training. It currently uses a Beech Bonanza A36 for flight training. ■

Flight dept job security: get to know co. execs

by Robert Finfrock

When companies across the country slashed expenses and overhead in the wake of the Great Recession, many chose to cut back (or eliminate) their corporate flight departments. While the operating environment is generally less stressful today, the impetus remains for these operations to consistently demonstrate the value they bring to their companies, and one way to do that is for the flight department to understand the company's goals and demonstrate how it facilitates accomplishing them.

The mission of NBAA's annual leadership conference (February 14-16 in Miami this year) is to empower flight department managers to move beyond the hangar—where they're often most comfortable—and into the unfamiliar environment of company headquarters. The event acknowledges, as Dustin Cordier, a member of NBAA's business aviation management committee and v-p of sales at jetAviva, told **AIN**, that "Aviation requires a vast amount of technical expertise, and that does not necessarily translate into management expertise." He added, "Flight department leaders must learn to manage not only down the chain—the people within their own department—but also up the chain. They must also manage their own boss, other executives and the board."

Embrace Company Goals

Drawing from his own experiences in the U.S. Air Force, Cordier pointed to a number of lessons he has shared with flight department managers to employ when speaking with company executives. Cordier suggested managers draw from the goals shared in their company's annual report to better understand how their flight department is measured against them.

"If I'm a supervisor and my flight department comes to me demonstrating that level of understanding, I realize that I now have an ally toward accomplishing my own goals," he added. "That shifts my perception of the department; what may have only been a huge cost center to manage is now an important asset toward achieving strategic corporate goals."

The flight department and its leadership "can't become invisible," he continued. "Participate in meetings, and be active in them. Invite your bosses into your flight department [so that] you establish a good relationship and are able then to promote your department upstream. This allows you to lead your bosses, indirectly, and influence them about your department's capabilities and needs through their own filter."

In addition to reaching existing department managers, such lessons are also important for flight department employees as they progress through their careers and ultimately into managerial roles. Bill Baldwin, aviation manager for J.W. Childs Associates, reflected on how attendance has evolved since he [along with MD Aviation's Ed White] hosted the 2008 conference.

"We had a lot of department managers at that event, but our primary aim was to draw both existing and aspiring leaders within our industry to provoke thought about how we approached everyday business at a high level," Baldwin said. "Looking across the room now, I see established leaders sitting alongside those who are just opening the doors to their future. That's exciting." ❑

The Safe Flight angle-of-attack system, circled, is standard equipment on all Cessna 172S Skyhawks.

Cessna Skyhawks flying with Safe Flight AOA indicator

by Matt Thurber

Beginning with model year 2016 deliveries last January, Textron Aviation added the Safe Flight angle-of-attack (AOA) system to the Cessna 172S Skyhawk. The AOA system is standard on new Skyhawks, including the diesel engine Turbo JT-A that will enter service early this year, and it is a $5,000 option on the 182T Skylane and Turbo Stationair HD T206H.

I tried out the Skyhawk AOA system during a flight with demonstration pilot Dale Bleakney last year at Textron Aviation headquarters in Wichita.

Single-engine Cessnas are still fitted with the tried-and-true suction-type stall-warning horn, which relies on the vacuum created at the leading edge of the left wing to suck air through a reed that generates noise to announce the approach to stall. The new Skyhawk is equipped with Safe Flight's AOA lift transducer mounted on the right wing leading edge and the AOA indicator (Indexer Computer) mounted on top of the cockpit glareshield on the left side of the compass. The AOA system is calibrated to deliver accurate indications in any configuration and at any speed, including during slips. Whether in an accelerated cross-control stall or a straight-ahead power-off stall with flaps up or down, at any weight, wing loading or cg, the indicator will accurately show the actual AOA.

The new Cessna single-engine airplanes are all equipped with Garmin G1000 flight decks. (The TTx has a G2000 system with touchscreen controls, but no AOA.) Some wonder why Cessna didn't just employ a Garmin AOA with the display on the G1000 primary flight display (PFD), but this configuration would tend to keep the pilothead-down, looking at the PFD instead of outside the cockpit during landing. The Safe Flight Indexer is easily viewable while looking through the windshield, and its LED display is plenty bright when sunlight is shining on it. Pilots can set a reference marker on the Indexer "for establishing AOA climb, cruise and approach AOA targets," according to Safe Flight.

The Indexer uses red, yellow and green LED lights to indicate AOA, along with audible Geiger-counter-like clicking sounds that speed up as AOA nears the stall. While the AOA system can help pilots fly more precisely and maintain a safe margin above stall, the system is advisory-only and is not to be used for any performance credit or to replace the stall-warning system, Safe Flight warns.

Flying with the AOA

After departing Wichita's Eisenhower Airport in CAVU weather, we climbed to 4,500 feet over Cheney Reservoir, where I flew some steep turns and stalls. During the steep turns, the AOA climbed into the yellow and began buzzing to indicate the lower margin over stall. In the stalls, the AOA's top two LEDs turned red and the audible warning buzzed faster, always before the full stall and wing drop occurred, giving the pilot plenty of warning that it's time to reduce pitch and AOA. During cross-control stalls, the AOA gave plenty of warning before any adverse reaction by the airplane, and it was easy to stop the buzzing and bring the Indexer back into the green by simply reducing pitch.

When properly calibrated during installation, the Indexer can be used to show various phases of flight: long-range cruise, with head- or tailwind or no wind, normal or short-field/obstacle clearance takeoff, maximum endurance and landing approach modes such as fast, on-speed or slow.

I flew two touch-and-goes on Runway 36 at Clyde Cessna Field in Kingman, Kan., one with full flaps and one no-flaps. While I've flown airplanes with AOA indicators, most of those that I fly aren't equipped with AOA systems, so I had to force myself to watch the Indexer during the approaches. I tried the "fast" landing indication of two green LEDs on the Indexer and found that gave me plenty of energy for a smooth flare. With full flaps and using the on-speed indication, airspeed settled at 60 kias, and the Skyhawk felt comfortable in the final-approach zone that I am used to. Watching the Indexer, it was easy to adjust pitch to keep the LEDs in the green and right where I wanted while still looking through the windshield. It is important to monitor airspeed, of course, with an occasional glance at the PFD, but the AOA system made me feel more confident about maintaining a stabilized approach with plenty of margin over the stall.

We returned to Eisenhower for another full-flap landing, and I kept my eyes on the Indexer while Bleakney monitored the airspeed, and the resulting flare and landing worked out perfectly.

Adding the Safe Flight AOA system to the Skyhawk makes perfect sense, because in my opinion all entry-level training airplanes should be equipped with AOA systems. Simply adding the system to an airplane doesn't instantly improve safety, but as pilots and especially flight instructors become more familiar with AOA systems and incorporate them into training and operational flying, there will be a significant safety benefit. ❑

NBAA HONORS MEMBERS FOR SAFE FLYING

NBAA recently honored six member companies with its 50 Year Safe Flying Achievement Award and acknowledged hundreds of others for safe flying achievements. The flying achievement awards were presented in November at the NBAA Convention as part of the association's Flying Safety Award program.

"By following safety best practices and achieving accident-free operations, these member companies have proved to be exemplary safety standard-bearers for the business aviation industry," said NBAA president and CEO Ed Bolen.

The most recent 50 Year Safe Flying Achievement Award recipients are Cargill, Caterpillar, Hess, Eli Lilly, Red Wing Shoe and Corning. NBAA noted that Corning has marked more than 60 years of safe flying. The awards recognized milestones reached by the end of last year.

NBAA also presented other awards to companies and individuals for safety achievements. These included the Corporate Business Flying Safety Award, which was given to 230 companies that had collectively accrued 9,548,085 safe hours. NBAA also presented the Commercial Business Flying Safety Award to 35 companies that have compiled 1,199,723 safe hours.

In addition, 426 pilots who have flown 3,196,566 safe hours received either the ATP or Commercial Pilot Safety Award; 98 companies qualified for the Aviation Maintenance Department Safety Award; 261 technicians received the Maintenance/Avionics Technician Safety Award; 215 support personnel were recipients of the Aviation Support Services Safety Award; and 111 schedulers and licensed dispatchers were honored with the Schedulers & Licensed Dispatchers Award.

The most recent recipients joined thousands of NBAA member companies and individuals recognized since the Flying Safety Awards program was established in 1953. The program recognizes companies for "exceptional achievement in maintaining safe flying operations." The awards, the association said, have brought worldwide attention to the business aviation safety record and "serve as testimony to the high degree of professionalism inherent in business aircraft operations, and as tribute to the skill of a company's management, maintenance, pilot and support personnel teams."

The awards also were presented as NBAA established a new policy to underscore its commitment to promoting safety as a key part of its mission.—*K.L.*

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Part I: The U.S. ADS-B mandate

by Matt Thurber

The deadline for equipping your aircraft with ADS-B is only 36 months away. Aircraft owners and operators hoping that the FAA is going to delay the implementation of the upcoming mandate might want to think carefully about what they plan to do after midnight Dec. 31, 2019. Come 12:00:01 a.m. Jan. 1, 2020, aircraft without ADS-B OUT will be prohibited from flying in much of the airspace covering the U.S. The FAA has clearly said that the ADS-B OUT rule will not be delayed. The bottom line: if you want to fly in airspace that currently requires a transponder after midnight Dec. 31, 2019, your aircraft will need rule-compliant ADS-B OUT.

At a meeting a few months ago held by a regional business aviation group, one of the avionics shop managers expressed concern that some pilots he had spoken with had zero knowledge of ADS-B OUT and the rapidly approaching deadline. These were pilots flying business jets whose owners had made no plans for the upgrade, and this shop manager was surprised that these pilots not yet even begun the education process.

While the number of aircraft that have been upgraded for ADS-B OUT is climbing, the most recent statistics suggest that the fleet of 150,000 or so airplanes that will need this new capability is nowhere near where it should be to meet the deadline. There will be grounded aircraft on Jan. 1, 2020.

According to the FAA's latest figures, as of the beginning of last month, 27,304 aircraft in the U.S. are equipped for ADS-B OUT. These numbers include 5,165 "non-performing emitters," which are aircraft (primarily light) with ADS-B signal outputs that don't meet the minimum requirements, likely because of installation errors or equipment problems.

The number of GA aircraft equipping for ADS-B OUT isn't growing very quickly but it has climbed from 1,000 per month at the beginning of June to 1,500 per month. Yet there are just 36 months remaining until the deadline, and likely 125,000 aircraft to go, which averages out at 3,500 per month needing upgrades.

The business aircraft side (turboprops and jets) is facing some challenges as far as compliance is concerned, according to Carey Miller, manager of business development at Universal Avionics. He plumbed registry databases to determine how many aircraft are likely to need to be ADS-B OUT equipped and found that 19,000 jets and turboprops are affected. For comparison purposes, Miller looked at the last major business aviation mandate, the requirement for RVSM upgrades after the rules changed to lower altitude separation minimums above FL290. The RVSM mandate didn't affect as many aircraft—a lot of turboprops didn't need the upgrade—but the amount of work needed was analogous to ADS-B OUT, he discovered.

The most telling part of Miller's analysis is that only 6,500 business aircraft needed the RVSM upgrade to meet that mandate's deadline. That is roughly a third the number that need to be ADS-B equipped by midnight on Dec. 31, 2019. Avionics manufacturers, engineers and installers geared up massively to help their customers meet the RVSM deadline. Unlike the ADS-B mandate, Miller pointed out, there was a way for non-RVSM airplanes to continue flying, by using waivers and the occasional clearance through RVSM airspace or the more common although far less expedient option of flying below FL290. Even today, pilots sometimes have to resort to flying low while waiting for a delayed letter of authorization (LOA) for RVSM operations. Fortunately, the FAA opted not to require an LOA for ADS-B OUT, which makes eminent sense because operationally it is no different from a transponder, and the only control pilots have is an on-off switch.

ADS-B OUT compared to RVSM

RVSM	ADS-B OUT
~6,500 corporate A/C	~20,000 corporate A/C
FAA was not ready	FAA ready
~36 months to equip all operators (incl. 12 mo. after)	38 months left to equip
Operate below FL290	Not equipped in time: **Grounded**

SOURCE: UNIVERSAL

During the RVSM upgrade process, the bulk of the work took place 24 months before and 12 months after the deadline, according to Miller. Unlike ADS-B, the FAA wasn't ready for the sudden influx of supplemental type certificate (STC) approvals, he explained. "It was way behind. This time the FAA is ready. The ground infrastructure is done, the agency has [allowed] certifications to be done under field approvals if it has the data and there is no LOA required. The FAA is also offering financial incentives [rebates for light aircraft]. From what I've seen, the FAA is doing everything it possibly can to help out." Nevertheless, the data show that getting all of the 19,000 business aircraft ADS-B OUT compliant by midnight Dec. 31, 2019, is going to be impossible. "There is no way corporate operators will be able to get it done," Miller said.

The one olive branch that the FAA is not holding out is the possibility of delaying the ADS-B OUT mandate. Even though some airspace in the U.S. falls outside the mandated coverage area, corporate operators typically fly in areas that will require ADS-B OUT and definitely in Class A airspace (above FL180), where it is unquestionably required.

The FAA also will not allow portable ADS-B OUT transceivers. The FAA system for monitoring ADS-B signal quality has seen degraded performance in some aircraft with poor antenna location, and a number of these were using portable devices, the agency explained. Each ADS-B OUT system transmits a mode-S transponder code, which is assigned to the aircraft in which the equipment is installed. For portable receivers to work, a new code would have to be programmed every time the system was moved to another aircraft, which opens the possibility of input errors. This could "prevent proper target correlation within ATC automation systems (target drops/traffic conflict alerts), which have resulted in higher workload and unnecessary distractions for pilots and controllers," according to the FAA.

Finally, the FAA doesn't like the idea of suction-cup GPS antennas for these units blocking pilots' view and wires to and from the unit for the antenna and power supply snaking around the cockpit. This last point is debatable, because there are plenty of aircraft, some of them business jets and turboprops, flying around with portable ADS-B IN receivers using external GPS and ADS-B antennas and there doesn't seem to be a serious safety issue.

The ADS-B rules do allow for the possibility of a one-time deviation in certain circumstances, such as the need to fly to an airport of ultimate destination, with intermediate stops, with inoperative ADS-B OUT, or even in a non-equipped aircraft. But ATC has the authority to decide and "to deny such requests when deemed appropriate," according to the FAA.

Got Equipment?

Once the decision to equip for ADS-B OUT and the other major NextGen opportunity, Future Air Navigation System (Fans), is made then the question of determining how to equip comes up. For a few years after the ADS-B OUT rules were issued in 2010, there weren't a lot of choices for upgrades, and prices, especially for business aircraft, were in some cases shockingly high. That situation has settled somewhat. For popular aircraft there are many options, and for nearly all the affected aircraft, there is at least one solution available. Prices have settled to what industry experts assert are the lowest levels possible, so there is no benefit in waiting in the hope that a lower-cost solution will be offered in time to meet the deadline.

All of the business aircraft manufacturers have stepped up with service bulletins and upgrade packages for their in-service fleets. Gulfstream, for example, worked with Garmin to develop ADS-B OUT AND IN for the G150 and G200. Bombardier is helping operators of its legacy jets connect with third-party STC

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Time’s running out. We’re ready for ADS-B Out. Are you?

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developers for ADS-B upgrades, when necessary. Textron Aviation's Citation and Hawker Beechcraft service center network has already installed more than 1,000 ADS-B upgrades and has solutions for Citations, King Airs and Hawkers. Business aviation avionics shops have also prepared for the mandate and either developed their own STCs or worked with engineering firms such as Dan Buzz and Associates to develop ADS-B OUT packages for a huge number of aircraft types. The number of entities that have worked on ADS-B is staggering, and they have done their best to prepare for the vast influx of work that is on the horizon. Even better, the FAA has smoothed the path for approved model list (AML) STCs for Part 25 business jets, vastly speeding the approval process.

Equipment Options

Avionics manufacturers—ACSS, Appareo, Aspen, Avidyne, BendixKing, FreeFlight, Garmin, Honeywell, Rockwell Collins, Trig and Universal—have expended extraordinary resources to help the industry meet the ADS-B OUT mandate. For a current list of aircraft models and all of the available ADS-B solutions, see www.faa.gov/nextgen/equipadsb/adsb_ready/.

In the business aircraft arena, Aviation Communication & Surveillance Systems (ACSS), the L-3/Thales joint venture, recently unveiled a transponder and self-contained GPS receiver that meet the latest regulatory requirements, for about 40 percent less cost than some existing offerings. The NXG-900 GPS eliminates the need to upgrade an old FMS or other installed avionics with a new GPS sensor, which can be expensive. The ACSS GPS is there only to provide the required position accuracy needed for ADS-B OUT, however, and it can't be used for any aircraft navigational or Tcas functions. The NXG-900 GPS also has an ADS-B IN receiver, so buyers can receive free FIS-B weather information (in the U.S. only) wirelessly on mobile devices via Bluetooth.

Last year, ACSS announced the NXT-700 transponder, which is plug-and-play compatible with the Honeywell MST-67A found in a number of business jets, including older ones without another reasonably priced ADS-B solution available. No wiring or rack changes are needed to replace the MST-67A with the NXT-700. ACSS has received an AML-STC covering a number of business jets, and from 4,000 to 5,000 older business aircraft that need a new transponder qualify to use the NXT-700, according to ACSS president Terry Flaishans.

ACSS also makes two transponders that serve the business jet and air transport markets, the NXT-600 and NXT-800, respectively, as well as the L-3 Avionics NGT series ADS-B OUT transponder for smaller aircraft. Installers have found a home for single and dual NGT-9000 installations in some light jets. "We're in a good position with our transponders," said Flaishans. "There are no issues to meet the needed quantities, from a supplier standpoint."

ACSS is among the companies to offer equipment to meet the ADS-B mandate.

At Honeywell Aerospace, solutions for ADS-B and in many cases Fans upgrades are available for business aircraft as far back as 1980s models. "We have interesting offerings in terms of mandates and features," said Todd Mathis, manager of technical sales. "We want to get the word out to operators: we have the equipment and we are ready for this. We need the operators to come in, and we're concerned about the myths that the ADS-B OUT mandate will be delayed. We have competitive offerings no matter what class or era of aircraft you have, offerings that maintain the existing configuration and support well into the future aircraft systems support and future upgrades."

The best place to look for available upgrades from Honeywell is the company's latest mandates chart, available by searching online for "mandates-at-a-glance."

At Rockwell Collins, said Rob Myhlhousen, principal marketing manager for ADS-B, "We're planning for the demand for the current fiscal year, and making sure products are available and service centers are ready and equipped for customers who may need upgrades." Myhlhousen's team is monitoring the marketplace, he explained, to detect a rapid uptake in interest for ADS-B upgrades so "we're able to meet the demand."

On the Fans side, those upgrades, said Rockwell Collins Fans principal marketing manager Chuck Wade, "are available for all but one or two aircraft. We're ready, and we've been waiting." Bombardier jets and Dassault Falcons are the primary market for Rockwell Collins Fans upgrades, and the company is trying to encourage operators to consider doing ADS-B and Fans upgrades at the same time, to reduce overall downtime. "It's real savings," he said. "Whether it's a Challenger 300, Falcon 50EX or 2000, everything is there and ready."

Rockwell Collins's website shows all the available upgrades for aircraft with its avionics, including third-party options: www.rockwellcollins.com/ads-b.

"Our big push is that [the equipment] is certified and ready now," said Myhlhousen. "Our transponders are certified, GPS sensors, everything you need from a hardware perspective. We've had a great response from our dealers and the OEMs [certifying service bulletins and STCs], and in many cases customers have multiple options when it comes to upgrades. In business aviation, the market responded greatly in terms of getting certifications ready, and these are available as soon as the customers decide they're ready."

"We've planned for [the demand for upgrades]," said Universal's Miller. "We're one of the few avionics manufacturers that has our own production facility, here in Tucson, and our lead times are normally short. We don't think our equipment is going to have a lead-time issue when things get busy."

Basic or Integrated?

One decision that business aircraft owners and operators will have to make when planning for NextGen upgrades is whether to buy the least expensive "federated" package that will keep the aircraft legal or to seek an upgrade that is integrated with the existing avionics suite and not only retains the current autopilot/FMS functionality but also enhances that with features such as LPV approaches and is prepared for future NextGen developments. That latter choice is more expensive, but the benefits might outweigh the added costs, according to avionics manufacturers.

"There are two mandates where that becomes important," said Honeywell's Mathis, "ADS-B and Fans. The case for integration is compelling. You have a range of elements with a certified configuration and system integrity that you have with an integrated solution. Our offerings are really price competitive with many of the add-on solutions."

The other issue with this choice is aircraft value and the ease of selling when that time comes. "You might save a little going with a [non-integrated] add-on, but on the whole you won't be ahead." The idea is to be ready for future upgrades, especially considering business aircraft have long service lives, he explained. Integrated systems are easier to maintain, he added.

"Future maintainability is key," agreed Hurst. "Federated systems make that more difficult to do."

"We're trying to educate operators to think beyond ADS-B and look at performance-based navigation and other areas where it needs SBAS GPS," said Myhlhousen of Rockwell Collins. "You could put in a third-party solution with an SBAS GPS, but that doesn't integrate with the FMS. With the Rockwell Collins GPS sensor, you're one step closer to RNP and LPV capability. If it's a third-party solution, you're not positioning the aircraft for additional airspace modernization benefits. And it preserves the value of the aircraft, and affects the ability to support it."

There are some cases where a federated upgrade makes sense, particularly older jets. "Since our FMS is a federated type in most installations, older aircraft can upgrade with our package

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Where is ADS-B required?

Here is where aircraft will be required to have ADS-B OUT equipment (basically an upgraded transponder and current GPS receiver).

United States: Class A, B, and C airspace. Class E airspace within the 48 contiguous states and the District of Columbia at and above 10,000 feet msl, excluding the airspace at and below 2,500 feet agl. Class E airspace at and above 3,000 feet msl over the Gulf of Mexico from the coastline of the U.S. out to 12 nm. Around those airports identified in Part 91, Appendix D.

Europe: the European ADS-B OUT mandate takes effect on June 7, 2020, but it applies only to aircraft weighing more than 5,700 kg (12,566 pounds) or with a maximum cruising true airspeed of greater than 250 knots.

Australia: By February 2 this year, all aircraft must be ADS-B OUT-equipped to fly IFR. However, there are some exceptions for Australian-manufactured aircraft (built before Feb. 6, 2014) that apply until Jan. 1, 2020. Foreign-registered aircraft flying IFR "may fly in Australian airspace, including oceanic control areas, but must fly below 29,000 feet in continental airspace unless they receive a clearance from ATC. They will need to be equipped with ADS-B when the instrument expires on June 6, 2020," according to Airservices Australia.

Hong Kong: Required in all airspace FL290 and above.

Indonesia: Required in all airspace FL290 and above starting Jan. 1, 2018.

Mexico: Proposed, to begin Jan. 1, 2020, Class A, B, C, E above 10,000 feet, possibly earlier in some Gulf of Mexico airspace.

Singapore: Required on some airways.

Sri Lanka: Required in Colombo terminal control area FL290 and above.

Taiwan: Required all airspace FL290 and above.

Vietnam: Required on some airways.

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reasonably," said Miller of Universal Avionics. But this could also be considered as a building-block approach, with compliance first, then the ability to add new functionality later, and this is something that Universal offers. An operator, for example, could upgrade an older Universal FMS with a new nav computer for ADS-B OUT and later add LPV capability to take advantage of the 3,500 LPV approaches now available.

Better Get Scheduled

There is a growing sense of urgency among the avionics and aircraft manufacturers, service centers and regulators, that the ADS-B deadline is rapidly approaching, and aircraft owners and operators need to make immediate plans to upgrade or face grounding on Jan. 1, 2020.

"We're hearing there are upgrades taking place," said Myhlhousen, "but not significant numbers, [although] signs are pointing in the right direction. We're hearing from dealers that there is a lot more activity around quoting. We hope that's a good sign for 2017."

Honeywell's Hurst worries about the capacity of the avionics shops as the deadline approaches. "At some point if you continue to wait, you will not get a slot," he cautioned.

"For Honeywell," added Mathis, "we look at this in terms of three segments where there is market interest and we have offerings. On our newer production aircraft with Epic or 2000-era systems, ADS-B OUT has been wildly successful, with extremely high adoption in the larger jets. For the mid-90s jets, those customers are upgrading to ADS-B OUT. But the issue is [the difficult] decision-making on lower hull values for 80s-era jets."

Mathis stated the issue clearly for procrastinators: "We must get the word out to operators and owners that their aircraft need to be upgraded ASAP and the time to get that done is now. Prices are going to slowly increase rather than decrease."

"Our network is concerned with that issue," said Hurst. "We provisioned heavily for inventory to support this, but we need people to come in."

"If demand is so high and supply meets only a certain amount, then the price is going to go higher," agreed ACSS's Flaishans. "The business jet market is picking up; it's a little slow, but we're seeing a pickup. Dealers are getting more efficient at installing these upgrades. The message should be, 'Start equipping because time is going to run out.'"

Another consideration, explained Universal's Miller, is that some avionics manufacturers are offering incentives for early adopters, but those are going to disappear as demand rises sharply. Avionics shops are likely to raise their rates, too, when demand picks up. "Dealers are concerned," he said. "[Owners] that pop in and want to have this done right away are going to be in for a shock." ❑

FAA signs off on EFVS

▶ Continued from page 1

located within the maximum primary field of view of the pilot monitoring," it said.

The new final rule opens up EFVS approach capabilities at more runways with a larger number of approach types, applies it to Part 91, 91K, 121, 125 and 135 operations and allows commercial operators to dispatch when destination weather is worse than currently allowed, including initiating and continuing an approach when visibility is below minimums. For airline aircraft that are EFVS equipped and crewed by appropriately trained pilots, this should help reduce ground-stop delays attributable to below-minimums weather at the destination.

There are training and airworthiness requirements under the new rule, and a letter of authorization is still required for EFVS operations. To remain current in EFVS operations, pilots must have logged six approaches using EFVS in the past six months, including one to a full-stop landing using EFVS. The training and currency EFVS flying can be done in a level-C or -D flight simulator.

The FAA's discussion of the new rule also addresses combined vision systems (CVS), in which EVS and synthetic vision imagery are combined on a display such as a HUD. According to the FAA, "A CVS consisting of an enhanced flight vision system and synthetic vision could be approved for EFVS operations if it met all the requirements of the EFVS regulation." ❑

Effective March 13, pilots flying in the U.S. with an enhanced flight vision system such as Dassault's FalconEye (pictured above), will be able to continue the approach to landing using only the images displayed by the EVS on the HUD, all the way to landing "in lieu of natural vision."

Part 23 rule signals new era

▶ Continued from page 1

This approach, he said, represents a "fundamental shift in how the FAA approaches certification," but a shift that he said is critical in extending the U.S.'s role in innovation.

"This rule is an exciting breakthrough for the aviation industry and our economy as a whole," he said, noting that general aviation contributes $80 billion and 400,000 jobs to the U.S. economy.

The rule applies to aircraft that weigh less than 19,000 pounds and have 19 or fewer seats. It opens the door for the use of standards established by an international ASTM committee, F44. Three hundred people representing aviation authorities from seven countries, manufacturers, design specialists and other interested parties are on the ASTM committee. In the past three years alone, the committee has agreed on 21 standards and is ready to review the next set of technologies.

Manufacturers that want to protect proprietary intellectual property can also work directly with the FAA to establish standards and meet performance objectives.

Simplified Process

The rule provides flexibility on testing requirements, as long as the ultimate performance objective is met, noted Dorenda Baker, director of the FAA's Aircraft Certification Service. Baker added that the rule will cut down on the number of special conditions required, since those conditions are designed to provide an alternate means of compliance to prescriptive standards.

General Aviation Manufacturers Association chairman and Piper Aircraft CEO Simon Caldecott, who participated in the December 16 press conference alongside Huerta, called the rule a model of good rulemaking. "This rule will allow Piper Aircraft to bring new safety-enhancing technologies and aircraft to our customers without being held back by outdated…regulations."

Hartzell Propeller president Joe Brown added that the previous regulations deterred general aviation startups from entering the market, but the rule paves the way for new entrants. He noted that the rule will clear the way for operators to obtain new safety technologies that are more readily available to the experimental community, which does not face the same certification requirements. "As a pilot I am positive that the rate of innovation it invites is going to make aircraft more attractive to customers. It's going to differentiate new from used," he said, adding that "I see this as a jobs creator."

Also appearing at the press conference was Brad Mottier, GE Aviation's vice president and general manager for business and general aviation and integrated systems, who noted that the pace of technology is rapidly advancing and the rule will better equip the FAA to keep up. He cited additive manufacturing and electric and hybrid propulsion as areas that could advance more quickly. The rule, Mottier added, "is a testament to what we can accomplish when government and industry work hand in hand."

Huerta agreed, and noted that people within the agency are "wildly enthusiastic" about the changes, because "we are all frustrated by how long" change takes.

But he also acknowledged that the rulemaking "was a huge undertaking, one of the most extensive and challenging rewrites ever tackled by our agency."

"Today is a landmark day for the general aviation industry," GAMA president and CEO Pete Bunce said. "The rule is nothing less than a total rethinking of how our industry can bring new models of pistons, diesels, turboprops, light jets and new electric and hybrid propulsion to market."

Aircraft Owners and Pilots Association (AOPA) president Mark Baker called the rule "perhaps the most significant and pivotal" reform for the future of general aviation aircraft. But he also emphasized that AOPA continues to seek reforms ease the approval process for retrofits.

While the rule will not take effect for eight months, Huerta and Baker said the agency has already been moving toward a more performance-based approach and many of the elements are in motion. Huerta added that he expects the rule to serve as a template for other certification areas, such as Part 27, which governs helicopters.

Along with the changes to the certification process, the final rule adopts tighter standards for flight in icing conditions and standards designed to address loss-of-control accidents, such as enhanced stall characteristics and minimum control speed requirements. ❑

GEORGIA MAINTENANCE SCHOOL LOSES FAA CERTIFICATE

Georgia's Atlanta Technical College has surrendered its aviation maintenance technician school certificate after the FAA issued a suspension order, based on allegations that the school failed to maintain approved grade, attendance and make-up reports for students in its aviation maintenance technology (AVMT) program. According to the agency, grade records for students were incomplete or not signed by instructors, and students who had missed classes were permitted to move on to the next block of instruction without having to make them up.

The school has not enrolled any new students or conducted any AVMT classes since May 2014, and the FAA rescinded its approved curriculum a month later. However, since that time the technical college has continued to administer exit examinations and issue certificates of completion to its former students, even though it no longer had authorization to do so, the FAA said. In addition, the school failed to provide the FAA with requested copies of each certificate of completion along with a detailed analysis of how students received such certificates in the absence of an agency-approved curriculum. In the suspension order, issued November 29, the FAA noted that the school could reapply for the certificate once it demonstrates its Part 147 record-keeping qualifications.

TAG COMPLETES ITS FIRST 120-MONTH GLOBAL INSPECTION

TAG Aviation has completed its first 120-month inspection on a Global Express, the largest maintenance event performed on the aircraft thus far. This inspection requires a thorough airframe inspection, necessitating removal of the interior.

The project, accomplished at the company's maintenance facility at Farnborough Airport, also included a full exterior strip and repaint, a major landing gear overhaul and a SwiftBroadband connectivity update with the Satcom Direct Router, made possible by the convenience of having access to the aircraft's empty interior. The company's Geneva location subsequently performed a cabin refurbishment on the aircraft.


Jet Aviation Dubai

JET AVIATION DUBAI MRO TAPPED AS ACJ SERVICE CENTER

Jet Aviation's maintenance hub in Dubai has been appointed the newest member of the Airbus Corporate Jets service-center network. This designation allows Jet Aviation to offer line maintenance, retrofits, modifications and cabin and systems upgrades for ACJ owners and operators at its Dubai facility. In May, Jet Aviation's MRO facility in Basel, Switzerland joined the ACJ service-center network.

Jet Aviation Dubai opened as a joint venture with Al Mulla Business Group at Dubai International Airport in May 2005, and the facility offers 45,192 sq ft of hangar space, including a 10,760-sq-ft workshop and a two-story, 11,300-sq-ft FBO terminal. It holds repair center approvals from the FAA and EASA, as well as from regulatory authorities in Bahrain, Bermuda, the Cayman Islands, India, San Marino, Saudi Arabia, UAE, Pakistan and Afghanistan.

The facility is also an authorized service center for maintenance and warranty support for BBJs; the Falcon 900, 2000 and 7X; and the G150, G200, GIV/G450, GV/G550 and G650. The company also offers full-service capability for Legacys and the Hawker 800/900 series. Since 2012, Jet Aviation has provided private aircraft handling services at Al Maktoum International Airport at Dubai World Central, in addition to around-the-clock AOG service at airports in Abu Dhabi, Sharjah and Al Ain.


TAG Aviation Global Express inspection

JET AVIATION DUBAI APPROVED TO SUPPORT G550s AND G650s

The UAE General Civil Aviation Authority (GCAA) has approved Jet Aviation's Dubai maintenance center to provide maintenance on the G550 and G650, making the facility the only Middle East maintenance center capable of fully supporting Gulfstream's complete lineup of large-cabin jets, according to Jet Aviation. Located at Dubai International Airport, the Dubai maintenance center is factory authorized as a service center for the G450, G550 and G650.

INFINITY AVIATION OK'D AS WILLIAMS, NEXTANT DEALER

Florida-based Infinity Aircraft Services is now an authorized dealer for Williams International and Nextant Aerospace. The Part 145 maintenance provider, formed this past summer by the merger of B. Coleman Aviation's MRO division and Mobile Aircraft Services, is headquartered at Palm Beach International Airport and has facilities at Gary/Chicago International and Atlanta Dekalb-Peachtree Airports.

According to the company, the new agreements will allow it to perform manufacturer-specific tasks and requirements at all three locations. Since it will be able to buy directly from Williams and Nextant, it will provide cost savings that can be passed along to customers, Infinity says. The authorizations also require Infinity to keep its tooling requirements up to date and send its technicians to recurrent training.

"These new dealership authorizations are just the most recent additions to Infinity's growing list of service capabilities," said company president Todd Sabo. "They extend our capacity to handle most any aircraft maintenance and repair need that might arise."

TECI INKS SURPLUS DEAL WITH HARRODS AVIATION

As part of its excess inventory management program, FAA-accredited parts supplier Turbine Engine Consultants (TECI) has signed a consignment agreement with UK-based Harrods Aviation to market and sell its excess aircraft parts inventory. According to TECI, the program was designed to maximize clients' excess inventory profits while streamlining their workload, and allowing them to directly target specific fleets, operators and geographic areas.

Harrods operates FBOs at London Luton and Stansted Airports, and its engine shop provides service for the Honeywell TFE731 and HTF7000 turbofans, as well as line service for the Honeywell GTCP30-92 and GTCP36-100/150 APUs. The facility also carries the Honeywell Staar (service target authorization and approval rating) designation. In addition, it provides service for the GE Aviation CF34 turbofan. Joplin, Mo.-based TECI owns a 75,000-sq-ft secure, climate-controlled warehouse for its EIM inventory and offers multiple loading docks and different shipping options.

ASTRONICS TO SUPPLY POWER SYSTEM FOR DENALI

Textron Aviation has tapped Astronics to supply the electrical system for Cessna's new Denali turboprop single. The aircraft will feature Astronics' Corepower induction starter generator and circuit breaker units, as well as the company's 28-volt DC Empower in-seat power supply. Its brushless starter generation unit eliminates the need for brush maintenance, which is often one of the most frequent maintenance items with the poorest reliability on business aircraft, Astronics said. In addition, secondary power distribution will be provided via the electronic circuit breaker units, which manage power throughout the aircraft and provide fault detection, circuit protection and programmable load management through automated power control functions.

According to Astronics AES Airborne Power & Control vice president Kellsey Justus, "The technology and innovation being applied to the Denali program are typically reserved for larger aircraft, and we believe the addition of these systems will enable a significant increase in features and performance for smaller business and general aviation aircraft."❑

NEWS UPDATE

Bombardier CS300 Enters Service

The first Bombardier C Series CS300 entered service for launch customer Air Baltic on December 14 on a route between Riga, Latvia, and Amsterdam. Two weeks earlier Bombardier celebrated the delivery of the first CS300 to Latvian flag carrier Air Baltic during a ceremony in Montreal. The handover of the 130- to 150-seat single-aisle jet came five months after the smaller CS100 entered service with Swiss International Airlines.

In October the CS300 finished a series of route-proving flights in Europe and the Middle East alongside Air Baltic in preparation for entry into service. The jetliner received European certification on October 7. On November 23 Transport Canada and the European Aviation Safety Agency granted the CS100 and CS300 Same Type Rating status. According to the manufacturer, the approval will save operators "significant" costs and reflects the 99-percent parts commonality that the two aircraft share. Bombardier designed the two versions of the C Series in tandem, making only the center section of the CS300 longer than that of the CS100.

LHT, GE To Open Polish MRO Unit

Lufthansa Technik and GE have chosen the Legnica Special Economic Zone in Sroda Slaska, Poland, as the site for their maintenance, repair and overhaul (MRO) joint venture for GEnx-2B and GE9X engines. Plans call for the joint venture, called Xeos, to invest $267 million in the new facility. The companies expect to break ground on the 350,000-sq-ft facility in the spring, in time for its opening in September next year. Initially tasked with repairing GEnx-2B engines, which power the Boeing 747-8, the plant will start work on the 777X's GE9X in 2021, according to GE. Employment will begin at 220 and grow to 500 at full capacity.

GE and Lufthansa Technik expect the center mainly to provide service for GEnx-2Bs, some 500 of which now fly with 18 operators.

The companies signed a memorandum of understanding to create the joint venture and build the new engine overhaul facility at the 2015 Paris Airshow. They expect to finalize "certain agreements" associated with the joint venture during this year's first quarter.

Airbus Announces Job Cuts Tied to January 1 Integration

Airbus Group will progressively cut 1,164 jobs as part of its planned integration scheduled for January 1, the company announced in late November. The reductions will mainly affect support and "integrated functions" and positions in the Chief Technology Office organization, it added. The move constitutes part of a continuing effort by the European manufacturer to reduce costs that have compromised the profitability of the A350 widebody and other Airbus programs.

The merger will effectively complete the re-location of company headquarters from Paris and Munich to Toulouse, a move that will precipitate the transfer of another 325 jobs. At the same time, however, Airbus said it expects to create 230 jobs to effect what it calls its digital transformation.

The company has set a target of midyear to reach agreements with its employees on appropriate "social measures," such as voluntary departures, redeployments and early retirements.—*G.P.*

The first of three Airbus A350-1000 flight-test aircraft took to the air on November 24.

Airbus outlines plans for A350-1000 flight testing

by Ian Goold

Airbus plans a 1,600-hour flight-test schedule for the three A350-1000s that it will use to certify the new stretched variant of the wide-body twinjet, the first of which flew on November 24. The scheduled first-flight profile took the initial aircraft—MSN059—to 25,000 feet and the type's maximum operating limit speed.

Between FL100 and FL150 crewmembers explored the flight envelope in both direct and normal control law as the A350 flew in all configurations, according to Airbus chief test pilot Christophe Cail. Tests included, for example, handling at maximum flap extension speed (VFE) and at low speed in landing configuration.

A crew comprising Airbus head of flight and integration tests flight-test engineer (FTE) Patrick du Ché; FTEs Emanuele Costanzo (head of A350 development flight tests) and Stéphane Vaux; test-flight engineer Gérard Maisonneuve; and experimental test pilots Frank Chapman and Hugues van der Stichel flew the A350-1000 while accompanied by a Dassault Falcon 20 chaseplane. Chapman performed the landing when the aircraft returned to the Airbus final-assembly plant and test center at Toulouse in southwest France more than four hours after takeoff.

Airbus has split the three-aircraft A350-1000 flight-test program into five phases covering initial development; development and initial certification flying; final certification work; preparation for entry into service (EIS); and support following EIS, although Airbus has not published target dates associated with each phase.

Initial operations with MSN059, equipped with heavy flight-test instrumentation, involve further exploration of the flight envelope and trials of handling qualities and systems, engines, loads and braking, according to Cail and Airbus marketing senior vice-president François Caudron. Schedules call for MSN059 to complete approximately 600 hours of flight-tests, including all the EIS support flying.

An early program key point with MSN059 will involve freezing of the aerodynamic configuration, nominally expected almost halfway through the first phase. That milestone will come as second aircraft MSN071—another heavily instrumented machine that faces 500 hours of flight-testing—joins the program. Airbus expects the third A350-1000, MSN065, to fly a 500-hour schedule toward the end of initial development.

Plans call for MSN071 to accomplish performance, powerplant, systems and autopilot trials. In the first half of second-phase flight-test work, it will conduct the cold-weather campaign, followed by airfield performance at high altitude and in warm conditions, according to Cail.

This second phase will see MSN065, the cabin-development aircraft fitted with light flight-test instrumentation and a representative passenger interior, involved in cabin-air and external noise-emission measurement. All three A350-1000s will participate in the third phase of testing, scheduled to lead to final airworthiness approval ahead of EIS in the second half of this year.

Among final duties, MSN065's fourth-phase flight-testing will begin with route proving, followed later by initial extended-range operations and confirmation of EIS performance. The A350-1000, which accommodates 41 passengers more than the baseline A350-900, uses a reinforced structure that allows it to operate at higher design weights (including higher maximum takeoff weight) and with greater payload. Stretching the fuselage involved the insertion of six forward and five aft frames into the fuselage parallel section and an improved wing with aerodynamic changes such as an extended trailing edge to support higher weight at approach speeds.

The heavier aircraft sits on new six-wheel main landing-gear bogies to reduce airport pavement loading, while more-powerful Rolls-Royce Trent XWB-97 engines each provide 97,000 pounds of thrust. Ahead of the November 24 maiden flight, Airbus and Rolls-Royce performed two rounds of Trent XWB-97 trials on a flying testbed (A380 MSN001) and expected toaccumulate 305 hours of flying by the end of last month. The first campaign, between November 2015 and April last year, logged 148 flight-test hours that included Rolls-Royce "certification specification for engine (CS-E)" operability tests, according to Cail.

A second round of testing that began at the end of July is set for completion after 157 flight hours. The sequence will cover de-risking, maturity and items for certification specification for engine integration, including hot weather, natural icing, drainage and fire extinguishing. ❑

Embraer delays E175-E2 entry into service by a year

by Gregory Polek

Embraer has moved back its schedule for entry into service of the new E175-E2 by about a year, to 2021 from 2020, in part because of the failure of U.S. major airlines to negotiate relaxed scope clauses with their pilots. The pilot contracts of all three of the airlines—United, American and Delta—stipulate a limit on maximum takeoff weight of airplanes flying at their regional affiliates. Although the current 76-seat E175 fits within those limits, the heavier E175-E2 does not, nor does the competing Mitsubishi MRJ-90.

Whether those limits expand to allow for the operation of the E175-E2 within the year Embraer has given itself remains in question, however, as the mainline pilots have shown little appetite for compromise on the issue. Most recently, Delta Air Lines pilots on December 1 ratified an agreement that maintains the 86,000-pound-mtow and 76-seat capacity limits on airplanes operated by their regional affiliates until 2020. A contract extension reached with United Airlines pilots in January runs until 2019, while American Airlines' contract becomes amendable in 2020.

Unfortunately for both Embraer and Mitsubishi, most of the interest in both the E175-E2 and MRJ90 has come from U.S. regional airlines, virtually none of which can operate those airplanes without scope-clause changes. However, Embraer insists that interest in the current E175 remains strong in North America, and Mitsubishi says its big U.S. customers can opt to change their orders from MRJ-90s to the smaller MRJ-70s, now scheduled for EIS in 2019. Mitsubishi expects to deliver the first MRJ-90 to Japan's All Nippon Airways in mid-2018.

"This decision [to move the E175-E2's EIS target] is driven by continued interest in the current-generation E175 in the North American market," said Embraer in a statement. "The E175-E2 is now scheduled to enter service by 2021, and its backlog remains unchanged."

EIS schedules for both the E190-E2 and E195-E2 remain unchanged. Embraer reiterated that the development and certification programs of those aircraft continue to progress as expected.

"We continue to see demand for the current E175 in North America," said Embraer Commercial Aviation president and CEO John Slattery. "It's simply the best in class for the airlines in terms of economic efficiency and of course the passenger experience. Embraer and our suppliers are fully committed to the development of the E175-E2. The E175 is the fleet smart solution available today as the E175-E2 will be for tomorrow."

Embraer has sold some 330 E175s to airlines in North America since January 2013, accounting for 80 percent of all orders in the 76-seat segment, according to the company. ❑

NORWEGIAN AIR'S IRISH UNIT WINS RIGHT TO FLY TO U.S.

The U.S. Department of Transportation on December 2 approved Norwegian Air International's application for a foreign carrier permit, drawing immediate condemnation from U.S. airline lobbying interests and applause from consumer groups. A day earlier the European Commission filed for arbitration over the three-year-old dispute and formally charged the U.S. with breaching the EU-U.S. Air Transport Agreement, or so-called Open Skies pact.

The Irish subsidiary of Norwegian Air Shuttle, which already flies to the U.S. under its Norwegian air operator certificate, applied for rights to fly to the States in December 2013. Under pressure from U.S. airlines and legislators to deny the application because of what they consider NAI's unfair labor practices, U.S. authorities delayed issuing a foreign operator permit far beyond the customary time frame, according to the EC.

Critics of Norwegian's business model, in which its NAI subsidiary flies under an Irish operating certificate and employs contract workers based in Thailand, claim the arrangement amounts to a subversion of labor standards. The EC, meanwhile, holds the position that the EU-U.S. Air Transport Agreement requires a "swift" decision from the DOT, which, in fact, granted tentative approval on April 15, 2016.

"We welcome the long overdue news that Norwegian Air International (NAI) has finally been awarded a foreign carrier permit by the US Department of Transportation," said Norwegian in a statement. "While the delays Norwegian have faced have been unfortunate and unnecessary, ultimately the decision now made by the US DOT finally paves the way for greater competition, more flights and more jobs on both sides of the Atlantic." —*G.P.*

A Norwegian Air Boeing 787 taxis at London Gatwick Airport.

Boeing, Iran Air announce deal worth $16.6 billion

A definitive agreement between Boeing and Iran Air announced on December 11 calls for delivery of fifty 737 Max 8s, fifteen 777-300ERs and fifteen 777-9s valued at $16.6 billion at list prices. But questions surrounding the political environment and its potential effect on the deal remain as an incoming U.S. presidential administration openly critical of Barack Obama's nuclear settlement with Iran prepares to take office this month.

Although not yet a firm order, the agreement accompanies for the first time detail of the fleet composition, as well as timing of planned first deliveries.

Even though the agreement complies with the terms of the U.S. government license issued to Boeing in September, Congressional Republicans have pledged to block final approval from the U.S. Treasury Department. In fact, the U.S. House of Representatives in November voted 234 to 174 for a bill prohibiting any U.S. transaction connected with the export of passenger airplanes to Iran. The bill would next need to pass the Senate, which, although Republican controlled, failed to pass an earlier bill this summer that would have blocked sales of commercial aircraft with a certain amount of U.S. content. At the time, President Obama vowed to veto any such bill, but during the election campaign President-elect Donald Trump pledged to unilaterally abandon the nuclear deal with Iran when he takes office in January.

Meanwhile, financing of the package would likely require support from the U.S. ExIm Bank, which effectively can't finance any significant foreign transactions until Congress allows for the election of a third board member. For a year-and-a-half the ExIm Bank has operated with just two board members, one fewer than needed to approve transactions worth more than $10 million.

In a statement issued on December 11, Boeing said that it "coordinated closely" with the U.S. government throughout the process leading up to the sale and that it continues to follow all license requirements as it moves toward implementation of the sales agreement.

"Today's agreement will support tens of thousands of U.S. jobs directly associated with production and delivery of the 777-300ERs and nearly 100,000 U.S. jobs in the U.S. aerospace value stream for the full course of deliveries," said Boeing. "The first airplanes under this agreement are scheduled for delivery in 2018."

An Iran Air Boeing 747-200 takes off from Hamburg, Germany, in 2005.

FLICKR CREATIVE COMMONS (BY-ND) BY SMITTY42

Boeing also counts some 13,600 U.S. supplier and vendor partners comprising a supply chain that it says supports more than 1.5 million U.S. jobs.

The Obama Administration's deal with Iran to curb its nuclear ambitions allowed for the lifting of sanctions that until this year prevented any manufacturer from selling airplanes with at least 10 percent U.S. content to airlines in the Islamic Republic. Now, as an incoming administration openly hostile to the deal prepares to assume power this month, Republican politicians have cautioned Obama against taking any action that could compromise Trump's ability to institute his policies as they relate to Iran.

In November the U.S. Treasury Department's Office of Foreign Assets Control issued a second license to Airbus for the sale of airliners to Iran. The approval covers a second tranche of airliner sales over which Airbus continues to negotiate with Iran Air. The first license, issued in September, covered "short-term" deliveries of 17 A320s and A330s to Iran Air. This second license addresses the remainder of a contract negotiated in January covering 21 airplanes from the current A320 series, 24 A320neo-series airplanes, 27 of the current A330 line, 18 A330-900s, 16 A350-1000s and 12 A380s. —*G.P.*

NEWS UPDATE

Santulli Departs Milestone

GE's Milestone Aviation announced that chairman Richard Santulli, 72, is stepping down. Santulli co-founded the helicopter leasing company in 2009, but he is better known as the founder of fractional jet giant NetJets, which he formed in 1986 and built into the world's largest private aviation company. Milestone president Daniel Rosenthal will assume CEO duties there January 1. The helicopter lessor has 215 helicopters under lease and orders and options worth $3.2 billion.

CHC's S-92s Support FLNG

A trio of CHC Sikorsky S-92s will join one already in service flying missions supporting Shell's Prelude floating liquefied natural gas (FLNG) project from their base in Broome, Australia. The Prelude FLNG is one of the world's first to produce liquefied natural gas at sea and transfer it directly to tankers. The CHC contract runs through at least May 2019.

North Sea Producer Dropping Super Puma

Although the EASA cleared the helicopter for return to service in October, Norway's Statoil announced last month that it will never again allow its workers to be flown in Airbus Super Puma series helicopters. The decision follows the crash of an Airbus EC225LP near Turoy, Norway, in April last year, killing 13 people, 11 of them Statoil workers. The grounding of the type by British and Norwegian airworthiness authorities remained in effect at press time.

AW169 Gets Gross Weight Increase

Leonardo has obtained EASA certification for an increased gross weight (IGW) kit on the AW169 medium twin, bringing the weight to 10,582 pounds from 10,141 pounds. The kit allows 441 pounds more payload and adds 100 nm of range to the original ferry range of 431 nm (no reserve). The AW169 received EASA certification in July 2015.

More Big Iron for the Bundespolizei

The German federal police has signed a deal to acquire three new multi-role Airbus Helicopters H215s (Super Pumas) for delivery in 2019. The Bundespolizei currently operates 19 Super Pumas.

Job Cuts at Airbus Helicopters

On the heels of posting a 17-percent decline in earnings this past fall, Airbus Helicopters has announced a plan to trim its workforce by 582. The cuts will come mainly at Marignane, France, and would be implemented through voluntary departures and attrition over the next two years.

For the third quarter, revenue was off 3 percent while earnings slid $219 million from the year-ago period. The revenue slide was fueled by waning demand for super-medium and heavy helicopters, as well as an overall drop in commercial hours flown. Airbus Helicopters has also been hurt by the worldwide grounding of the heavy H225 models in June following a fatal April 29 North Sea crash. While the EASA lifted that grounding in October, it remains in force in the UK and Norway. In financial reports, Airbus Helicopters hinted that the results could have been worse if not for the continued strong demand for the H135 and H145 twins as well as implementation of continuing"transformation measures and efforts to adapt to market challenges."—*M.H.*

MARENCO SWISS OWNER APPOINTS NEW CEO

The founder and CEO of Marenco Swisshelicopter (MSH) resigned at a December 5 board meeting. Martin Stucki is being replaced by former Airbus Helicopters senior executive Andreas Loewenstein. Founded by Stucki, Marenco is now largely funded by Russian billionaire Alexander Mamut, whose interests on the board are represented by Marina Gronberg. Bruno Gubser, Marenco chief operating officer, is assuming Stucki's responsibilities until Loewenstein formally begins with the company this month.

Marenco unveiled the $3.5 million SKYe SH09 single-turbine utility helicopter in 2009 but the program has been beset by repeated delays and schedule slippages. The first prototype did not take flight until 2014. Flight-testing was halted while the main rotor head and rotor blades were redesigned and fitted to the second prototype, which then took flight this past February. Meanwhile the certification timetable slipped from 2014 to 2016 to 2018. A third prototype is currently under construction and is expected to fly next year. Marenco has 150 employees and says it has letters of intent from customers for 90 helicopters.

Loewenstein is a former executive with the precursor companies of Airbus Helicopters, Aerospatiale and Eurocopter, and their parent corporation EADS (now Airbus Group). Since 2010 he has served as executive vice president for strategy partnership and innovation and a member of the management board of DCNS, a provider of naval defense systems and energy based in Paris. Loewenstein holds a Master of Laws (LL.M.) degree in Air & Space Law and Economics from Canada's McGill University and an MBA from France's HEC. He is trilingual in German, French and English.

In a statement issued December 7, Marenco said, "The Board of directors expressed its gratitude to Martin Stucki for his visionary ideas, relentless efforts and entrepreneurial spirit that led MSH from a most respected engineering bureau to the brink of becoming a full-fledged player in the helicopter industry. In his role, Martin Stucki has brought significant contributions to the helicopter industry in Switzerland. The Board of directors is convinced that Andreas Loewenstein together with the MSH management and employees will accelerate the transition from a technology pioneer to the first Swiss global helicopter provider and manufacturer." The company added that it is currently "engaged in the construction of new facilities" in Switzerland. —*M.H.*

Marenco Swisshelicopter founder Martin Stucki saw the company through first flight for the first two prototypes of the SKYe SH09.

FAA SAFO emphasizes hover checks

by Mark Huber

The FAA has issued a Safety Alert for Operators (SAFO) reminding helicopter pilots about the importance of using checklists and performing stabilized hover checks before departure (SAFO 16016). The FAA notes that a review of accidents/incidents over the last five years involving helicopter loss of control (LOC) immediately after liftoff while light on the skids/gear suggests issues caused by missed checklist items. "Several recent helicopter accidents have occurred as a result of pilots not bringing the helicopter to a stabilized hover before initiating takeoff. Rather, pilots elected to take off immediately and rapidly from the ground. In some cases this has led to a LOC where the result was either an incident or an accident resulting in significant damage to the helicopter and/or fatalities to those on board," the FAA noted.

Pilots in these accidents/incidents typically proceeded with takeoffs even though there were early indicators or anomalies that should have suggested aborting the takeoff as soon as the helicopter became light on the gear, according to the agency. In these cases, the FAA data suggests a disregard for proper procedure and lack of judgment on the part of the accident pilots.

"Post-accident analysis indicated that the accident sequence began with indications that were evident when the helicopter was light on the skids, yet the pilot elected not to abort the takeoff by reducing collective. Instead, the pilot continued pulling in collective (or continued manipulating the controls), resulting in a complete LOC. In many of these accidents the helicopter was not properly configured for flight, either because a checklist item was missed, or because a checklist was not used at all by the pilot.

"In other instances, pilots have attempted to perform either maximum-performance or confined-area takeoffs without completing a hover power and systems check. One accident resulted from a pilot attempting to take off from the surface without completing a hover power check. As the aircraft lifted from the rooftop helipad and over the edge of the rooftop, the aircraft lost power and crashed into a parking lot below. It was discovered that one of the two engines was in the 'fly' position but the other was still in the idle position. If a hover check was performed before takeoff, this accident could have been prevented."

The FAA is making five recommendations in the SAFO:

- Take off from an area sufficiently large for the capabilities of the aircraft and ensure that the area is free and clear of debris.
- Always use the appropriate checklist to ensure the helicopter is properly configurefor takeoff.
- Unless precluded by brownout etc., always hover check before takeoff. If taking off from the surface, hover check, land and then depart.
- On vertical takeoffs, raise to hover altitude (two to three feet) with minimal lateral/longitudinal movement while maintaining a constant heading. If the helicopter does not appear stabilized during the initial collective pull, abort the takeoff by smoothly reducing collective. Review the FAA Helicopter Flying Handbook, chapters 9 (Vertical Takeoff to Hover) and 10 (Advanced Flight Maneuvers). ❑

DAVID McNTOSH

Older generation models such as the early S-76 have been particularly hard hit by the oil price slump.

Despite stalled global market, leasing remains attractive

by Mark Huber

A recent analysis of the global civil helicopter market released by the IBA Group consultancy paints it as an attrative venue for more leasing activity despite continuing negative trends. The number of new helicopter deliveries dropped 11 percent in 2015, to 718 from 804 in 2014. That itself was a 21-percent drop from 2013. Heavy helicopters took the worst of it, with sales declining 49 percent year over year, while mediums dropped 25 percent and light singles declined 5 percent. Super-mediums bucked the trend, posting year-over-year gains of 31 percent, and light twins recorded a 1-percent gain. As a percentage of all 2015 deliveries, light singles constituted 62 percent, light twins 17 percent, mediums 13 percent, super-mediums 2 percent and heavies 5 percent.

Harder-hit Sectors

North America continues to be the dominant market, representing a 41-percent share, followed by Europe and the CIS with 22 percent, Latin America with 10 percent, Asia and Australia and Oceania with 9 percent each, followed by Africa at 5 percent and the Middle East at 2 percent. Utility and offshore energy configurations account for 50 percent of all new orders, and IBA notes that although fleets in Latin America, the Middle East, Africa and Asia-Pacific are small, those markets account for a disproportionate share of new helicopter orders.

The drop in energy prices is disproportionately hitting the demand for older-generation medium and heavy helicopters such as the Airbus AS332 and AS365 and the Sikorsky S-76; and in general accelerated the retirement of older helicopters, depressed the prices of new orders, and produced diminished revenue for hourly maintenance programs as flight hours have decayed. However, as Bristow has demonstrated in the UK, there are opportunities to privatize previously government-operated search-and-rescue operations as the legacy helicopters used in those operations reach their useful life limits.

While helicopters have a longer useful life, depreciate more slowly than airplanes and are thus more attractive vehicles for leasing, certain models are less so. IBA's analysis shows that between 2014 and 2015 among light singles the Robinson R44 Raven II and the Airbus EC130B4 each depreciated 7 percent, the AW119/Ke 8 percent, the AS350B3/H125 9 percent, the MD600N 12 percent and the AS350 13 percent. In the light-twin category the AgustaWestland AW109S was down 7 percent, the MBB BO105 8 percent, the BK117 10 percent and the MD902 17 percent.

Big drops in the medium/super-medium category included the Airbus AS365N2 and the Sikorsky S-76C+, each down 10 percent, and the Airbus AS332L/L1 Super Puma, the worst performing model tracked by the company, losing 25 percent of its value in just one year. As a class, despite declining worldwide demand, heavies did better: the Sikorsky S-92A lost 4.8 percent, the Airbus H225 was down 4.2 percent, the AS332L2 Super Puma fell 6 percent and Sikorsky S-61s were off 13 percent, no doubt a reflection of their advancing years. The last S-61 was produced in 1980.

Nevertheless IBA points out that service-life-extension programs, upgrades and hourly maintenance programs can extend the useful life of a helicopter to up to 40 years, larger helicopters depreciate more slowly, overall 10-year valuations on average are still 70 to 80 percent of list prices, and historic low production rates keep prices stable in the long-term. IBA concludes that there is plenty of room left for more leasing capacity in the helicopter market and that it remains economically attractive for investors. ❑

U.S. will buy no more Russian helos for Afghans

The U.S. will not be buying any more Russian helicopters for the Afghan Army. The controversial program is officially over. The depleted fleet of 50 Russian Mi-17s that the U.S. bought for the Afghans will be replaced by a fleet of refurbished Sikorsky UH-60 Black Hawks under a budget amendment submitted to Congress. Parts for the Mi-17s have been hard to come by in the wake of U.S. and international sanctions against Russia following that country's annexation of the Crimea from Ukraine in 2014.

Shortly thereafter, President Obama banned most dealings with Russian arms manufacturers, including state-owned Rostec, parent company of Mi-17 manufacturer Russian Helicopters. The native Afghan fleet was kept flying by obtaining parts from India, but harsh conditions and attrition meant the existing fleet was hard-pressed to meet local needs. And a Pentagon plan to add $1 billion worth of inventory to the U.S.-bought Mi-17 fleet in Afghanistan was dead on arrival in Congress as early as 2013, despite pleas from U.S. field commanders and then Secretary of Defense Chuck Hagel that the Afghans could get up and running in the Mi-17 quickly. "They've been using it for years," Hagel said in April 2013 House testimony. "Easy maintenance, unsophisticated. We can get it pretty quickly. That's the one they want."

The Mil Mi-17s flown by the Afghan air force, shown, will be replaced by former U.S. Army Black Hawks.

But Sen. John Cornyn (R-Texas) publicly complained that year that the Pentagon's own research showed that the Boeing CH-47 tandem-rotor Chinook was a much more cost-effective helicopter for the mission in the long term. Sen. Richard Blumenthal (D-Conn.) took aim at the Army for mismanaging the program, run by the Redstone Arsenal's Non-Standard Rotary Wing Aircraft Office at Fort Rucker, Ala. "The Army's mishandling of this arms program, as well as the Afghan military's inability to maintain the helicopters, further underscores why this contract should have been canceled long ago," he said.

Blumenthal's criticism of the program was punctuated when the Defense Criminal Investigative Service opened a criminal probe into its conduct in August 2013. That investigation ultimately led to the 2015 conviction of its former director, Army Col. Norbert Vergez, on conflict of interest charges. Among other things, Vergez was accused of taking illegal gratuities from subcontractors involved in the program.

Blumenthal said recently that the Afghan requirement could grow to as many as 159 UH-60s. They will be upgraded to the UH-60A+ configuration with T700-GE-701D/CC engines and related components. —*M.H.*

FLIGHTSAFETY, AIR METHODS OPEN COLORADO LEARNING CENTER

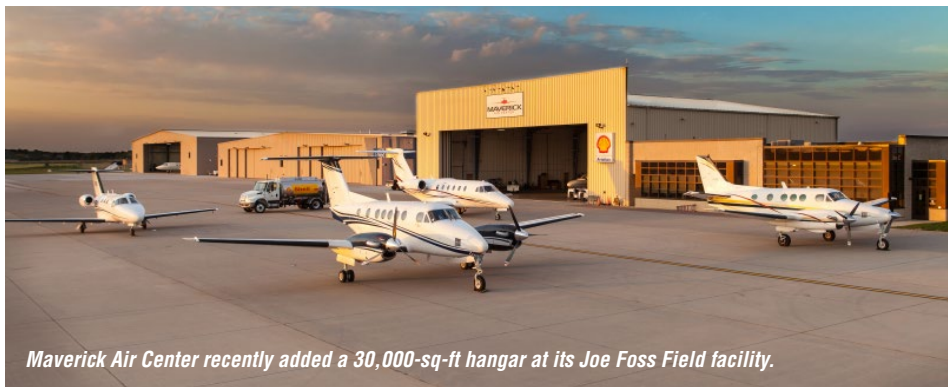
The Air Methods/FlightSafety International (Denver) Colorado learning center officially opened for business on December 18, when the company began single-pilot IFR training in an Airbus H135 Level-D simulator. This particular simulator was previously used by Air Methods at FlightSafety International's learning center in Dallas.

Plans in 2017 call for installation of three more Level-D simulators at the Colorado center: the Airbus AS350B3 in the second quarter, the Bell 407GX in the third quarter and the Airbus EC130T2 late in the fourth quarter. Air Methods says that these three simulators will be the first of their kind in the U.S., and the four together make up 75 percent of the company's fleet.

The new FlightSafety FS1000 simulators will be equipped with the Vital 1100 visual system, CrewView glass mirror display and electric motion control and cueing. Air Methods has two dedicated classrooms, offices and briefing rooms in the new learning center. By 2018, it estimates that 1,000 company pilots will come through the facility. —*M.H.*

Touching Bases by Curt Epstein

FBO and Airport News



Maverick Air Center recently added a 30,000-sq-ft hangar at its Joe Foss Field facility.

SIOUX FALLS FBO COMPLETES EXPANSION PROJECT

Maverick Air Center, one of two FBOs at South Dakota's Joe Foss Field Airport, has completed a $3.3 million expansion project at the Sioux Falls gateway, including a new 30,000-sq-ft hangar that takes the facility to 47,000 sq ft of aircraft storage space. The six-month project also added 50,000 gallons of jet-A storage to the fuel farm at the Shell-branded location, more than doubling its capacity.

The facility also offers a 5,000-sq-ft terminal with a pilots' lounge, conference room, customer lounge and flight-planning room. The additional space and fuel storage has allowed the company to partner with Minnesota-based aircraft charter, management and maintenance provider Charter First, which will base three of its aircraft at the Maverick facility, rather than have to reposition them there as it has in the past. In addition, the company will provide King Air and Citation maintenance.

EPIC FUELS, SIGNATURE TO ISSUE CO-BRANDED CARD

Oregon-based fuel distributor Epic Fuels and Signature Flight Support have signed an agreement to establish the Signature Flight Support Multi Service Card, which will be accepted at 8,000 locations worldwide. Slated to debut early this year, the new card will be accepted at all Signature locations in the U.S. and Canada, and at all Epic and UVair FBO Network branded facilities. A reciprocal agreement will see the Epic card accepted at all 132 North American Signature locations. Epic says the new Signature card will provide improved terms and credit lines for customers, along with greater convenience when purchasing fuel and ancillary services. "Our goal is to ensure that every aspect of the customer experience including payments is streamlined for flight departments and pilots to optimize their productivity," said Signature president and COO Maria Sastre.

SECOND FBO BEGINS OPERATIONS AT DUBAI WORLD CENTRAL VIP TERMINAL

Jetex officially opened its FBO within the Dubai World Central VIP Terminal last month. The flight support group is one of two FBOs already operating within the new facility, and a third tenant will be announced soon. In April, Jetex handled the first private flight to depart from the terminal—a Legacy heading to the Maldives.

The VIP terminal, which is also occupied by Falcon Aviation, is seeing growing volumes of business aviation traffic, which is transferring from the slot-restricted Dubai International Airport. Jetex occupies a 16,146-sq-ft portion of the new terminal. With the addition of 538,196 sq ft of dedicated ramp parking space, the DWC site is the largest FBO in the Dubai-based group's network. The new site offers 24-hour customs clearance, dedicated executive passenger and crew lounges, aircraft handling and ramp amenities, and concierge and helicopter transfers to major destinations in the UAE. A 53,820-sq-ft hangar is under construction and is expected to be available for aircraft storage and MRO this year, the company said.

MARATHON JET CENTER TRAFFIC ON THE RISE

With the opening of a U.S. Customs and Immigration facility in April, Florida Keys International Airport (MTH) is seeing more traffic, according to Marathon Jet Center, the half of the FBO provider that services turbine-powered aircraft. Since the return of customs service at MTH for the first time in three decades, the FBO has seen 100 international arrivals, and it expected that number to rise during the holiday season.

It currently offers concierge services and on-site car rentals, and its FBO terminal has a crew lounge and passenger lobby. The company plans to enhance the facility this year with the opening of a 12,000-sq-ft hangar and improvements to the terminal, which will expand office space and add a pilot snooze room, flight-planning room, kitchen, conference rooms, showers and individual work stations.

TAC AIR GOES ALL IN ON IS-BAH

With all 14 of its locations having achieved accreditation under the IBAC International Standard for Business Aviation Handling (IS-BAH) audit, Tac Air became the first FBO chain to claim this distinction. The process requires a review of an individual location's safety management systems, emergency procedures, organizational structure, security procedures, training protocols and operations. Registration to IS-BAH is granted to those establishments that demonstrate conformity to the industry's best practices through an external audit.

"The International Business Aviation Council congratulates the entire Tac Air team for demonstrating such a strong commitment to building and maintaining a culture based on safety management and risk mitigation," said Terry Yeomans, IBAC's IS-BAH program director. "We'd rather be better than lucky," noted Christian Sasfai, Tac Air's vice president and COO.

SIGNATURE DEBUTS LONDON-AREA FBO

Signature Flight Support officially unveiled its $33 million FBO complex at London Luton Airport at the end of November with a themed gala charity casino event benefitting a local elderly-support organization. The company now has a 48,437-sq-ft hangar capable of sheltering a pair of bizliners at the same time, a dedicated ground service equipment bay and 75,347 sq ft of parking ramp with secure vehicle access. The 16,920-sq-ft terminal provides a covered arrivals area and offers conference rooms, catering facilities, a full bar and a slate of crew and passenger amenities.

"We are delighted to officially open the new Signature Luton facility, which is ready to welcome customers from around the world," said company president and COO Maria Sastre, who was joined at the event by BBA Aviation chairman Sir Nigel Rudd and BBA CEO Simon Pryce. "Our relationship with London Luton Airport is exemplary and their support of this project was essential to its success."

SIGNATURE'S PANAMA FBO GOES LIVE

Signature Flight Support has extended its FBO network into Central America with last month's opening of a location at Panama's Tocumen International Airport. The newly built 7,500-sq-ft facility offers a lobby, on-site customs and immigration facilities, pilots' lounge, conference room, flight-planning area, showers, duty-free shop and coffee bar.

The flight-handling company offers 23 FBOs in Brazil through a partnership with Lider Aviation. Two other facilities in Bogota, Colombia, and Toluca, Mexico, are in the final stages of transitioning to Signature Select status.

ATLANTIC EXPANDS AT NEW YORK AIRPORT

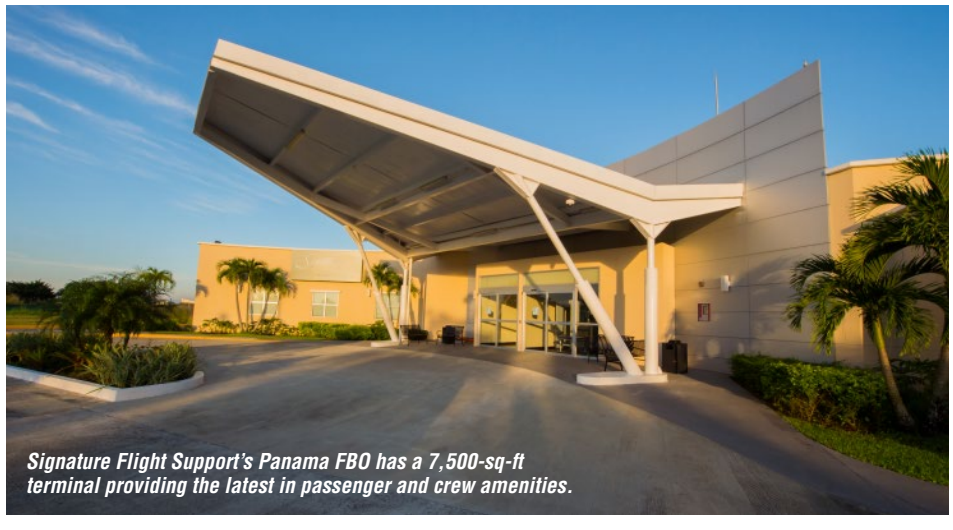
Atlantic Aviation has expanded at New York Stewart International Airport with the acquisition of the former GE hangar. The 100,000-sq-ft structure provides 60,000 sq ft of heated space for sheltering aircraft up to a BBJ or ACJ, a conference center, weight room, snooze rooms, gated security entrance and 100 dedicated parking spaces. The addition of the hangar brings the location to 200,000 sq ft of aircraft storage space. The purchase also adds 60,000 sq ft of heated concrete apron and 70,000 sq ft of ramp to Atlantic's footprint.

The hangar is currently being marketed to short- and long-term tenants as well as stand-alone flight departments, according to Tim Bannon, the service provider's vice president for the Northeast region. "This acquisition in Newburgh, N.Y., is an excellent option for folks wishing to hangar aircraft in the New York City area," he noted.

AIR ELITE WELCOMES CHINA'S DEER JET TO THE NETWORK

World Fuel Services has extended the reach of its sponsored Air Elite FBO network into China with the announcement that Deer Jet, the largest Asia-Pacific business aviation company, has joined the group. Deer Jet is the only company to operate a chain (eight locations) of dedicated FBOs in the country. Air Elite now encompasses 62 FBOs.

"The addition of our new Air Elite FBO members in an emerging market like China truly reflects the diversity of this network and our desire to build Air Elite as a global standard in FBO service," said John Rau, World Fuel Services' executive vice president for global aviation and marine. Last year the two companies expanded their



Signature Flight Support's Panama FBO has a 7,500-sq-ft terminal providing the latest in passenger and crew amenities.

eight-year relationship with the signing of a memorandum of understanding, which paved the way for Deer Jet to begin accepting World Fuel's Avcard at all of its locations for payment of fuel, ground handling and maintenance.

"By joining Air Elite Diamond Service Network, we add a new milestone to the enhancement of our services, strengthening our competitiveness in China's business aviation industry," noted Li Zheng, the company's executive vice president.

GAMA UNVEILS SHARJAH GROWTH PLAN TO RIVAL DUBAI

Gama Aviation has unveiled plans for a major business aviation facility at Sharjah International Airport. Slated to open in the middle of next year, the site will offer an alternative to congested Dubai International Airport (DXB) and closer access to the center of Dubai than Dubai World Central (DWC). The UK-based group revealed architectural drawings for the purpose-built complex that will offer space for commercial tenants as well as passengers and crew of its own aircraft management and charter operations.

Billed as the first integrated facility of its type in Sharjah, the new facility will consist of a 328-ft-long hangar (with an option for a second), plus 215,000 sq ft of apron parking space. Over the past 12 months, Gama, has seen a 12-percent increase in the volume of traffic it handles at its existing Sharjah operation. It attributes the uptick to slot restrictions at DXB and to the fact that Sharjah is significantly closer to Dubai's financial district than DWC.

BRISTOL FBO IN UK ADOPTS NEW IDENTITY

Bristol Flying Centre, the lone business aviation service provider at the UK's Bristol Airport and the parent company of Centreline Air Charter, has rebranded itself as Centreline across its entire FBO, aircraft management, maintenance and flight training businesses.

"It is important that Centreline retains its established values of being a boutique, customer obsessed company, but at the same time develops a new and modern identity," said company CEO Tanya Raynes. The facility provides on-site security screening, two passenger lounges, two crew lounges and a customs arrival area. The location conducts fueling from its own refuelers.

SONOMA FBO ADDS NEW HANGAR

Sonoma Jet Center, one of two aviation services providers at California's Charles M. Schulz-Sonoma County Airport, has completed construction of a 21,000-sq-ft hangar for corporate aircraft. Capable of sheltering the latest big business jets, the addition brings available hangar space at the Signature Select location to 30,000 sq ft. The new building, adjacent to the existing FBO, has office and workshop space, gym with showers, meeting spaces and lounge areas as well as direct roadside access and a gate to accommodate rampside vehicle access.

Demand for hangar space is growing in the San Francisco Bay area. "Many business jet clients…have asked for more hangar space with us," said company president Josh Hochberg. "Building a new corporate hangar was simply the next logical step in expanding the range of services we can offer." The facility recently achieved certification under the International Standard for Business Aircraft Handling (IS-BAH). It has also introduced an aircraft detailing division.

FARNBOROUGH AIRPORT JOINS WORLD FUEL NETWORK

UK business aviation hub TAG Farnborough Airport is the latest FBO to select World Fuel Services as its fuel provider. Under the agreement the Miami, Fla.-based company will provide technical support, sales and marketing services and training and credit processing for the London-area facility.

"TAG Farnborough Airport is delighted to have appointed World Fuel Services after a competitive tender," said TAG Farnborough CEO Brandon O'Reilly. The location, the first airfield in the UK, will now participate in the company's FlyBuys rewards program through the Avcard. ❑

CHARTER NEWS NOTES

> During the past year, **TAG Aviation Europe has added 20 aircraft** owned by 17 clients to its management fleet. Six of the aircraft are available for charter. The newly added aircraft types range from a single-engine turboprop to private airliners.

> **ExcelAire** of Ronkonkoma, N.Y., **added a GV to its charter fleet**.

> **Wing Aviation has placed into service a GIV-SP** based at Addison Airport in Dallas.

> **IJM Mena is marking its one-year anniversary**. The company manages three aircraft based at Bahrain International Airport, two of which—a Legacy 600 and Challenger 604—are available for charter.

> **Jet Aviation added a Global 6000 to its managed fleet** in the Middle East, which now stands at 20 aircraft. The Global 6000 joins an ACJ, four other Bombardier jets, a BBJ, two Citations, three Falcons and eight Gulfstreams.

> **Two operators have joined the Air Charter Safety Foundation**: Worldwide Jet Charter and Part 91 operator American Electric Power.

> **GI Aviation** was issued a UAE General Civil Aviation Authority air operator certificate and **plans to begin operations in the Gulf** (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE) with a PC-12NG. The company's second PC-12NG is scheduled to arrive this month. ■

PROFILE: John H. Batten International Airport

KRAC is home to 100 aircraft, 13 of them turbine-powered, ranging from a pair of Falcon 900s to a King Air 200 to a Sikorsky S-76.

PRIVATELY OWNED AIRPORT OFFERS MIDWEST HOSPITALITY

Since its founding in 1939, what is now John H. Batten International Airport (KRAC) in Racine, Wis. has always been a privately owned venture. The airport welcomed its first flight on the eve of WWII and was then used to train army pilots and ground crews before being returned to its civilian owners after the war.

In 1950, companies that used the airport, known then as Racine-Horlick Field, formed a consortium and purchased it from its former owner, along with a substantial neighboring farm with an eye to expanding the airfield. John Batten, CEO of a local equipment manufacturing company, was viewed as the driving force behind the project.

The group's first order of business was the construction of a new runway, relegating the former runway to taxiway status. Today the main runway at KRAC, one of the largest privately owned facilities in the country, is 6,600 feet long and able to accommodate 757s.

Airport owner-operator Racine Commercial Airport Corp. reports that the site sees 47,000 operations a year. That traffic is largely business-based, with a steady tempo year round. Unlike many locations, it tends to slow around the holidays as the local flight departments scale back their activity as well. The airport is open from 7 a.m to 5 p.m. daily (with after-hours callout available for a fee).

Crew and Passenger Services

The airport is one of four Customs entry points in the state. It had on request clearance beginning in 1986 and an agent based onsite since 2011. This past May, the airport opened a dedicated $1.2 million U.S. Customs and Immigration facility, paid for by a mix of private and public funds, to process the 300 international arrivals each year. "I market to people from say Dallas or St. Louis who go to Europe and try to get them to make a tech stop here on the way home," said David Mann, general manager of the FBO, airport manager and vice president and general manager of the company that runs it. The opening of the facility, which can also handle cargo, has prompted the addition of "International" to KRAC's name, and the FAA expects to catch up with the title change by April, Mann told **AIN**.

About five years ago the airport installed an incinerator to handle international trash from arriving patrons. As the only such facility in the area, the airport has turned the garbage into a cash cow as the Racine airport now also handles the international refuse from Milwaukee, which formerly trucked it to Indianapolis for disposal.

KRAC is home to 100 aircraft, 13 of them turbine-powered, ranging from a pair of Falcon 900s to a King Air 200 to a Sikorsky S-76. Most of the larger aircraft belong to corporate flight departments, with all but two housed in corporate hangars. The remainder, as well as all transient aircraft, are stored in three heated community hangars totaling 60,000 sq ft. With 450 acres on the airport, ramp parking is never an issue.

The Phillips 66-branded facility pumps half a million gallons of fuel a year from its tank farm, which stores 40,000 gallons of jet-A and 12,000 gallons of avgas.

The current 6,800-sq-ft, two-story FBO terminal, built a quarter-century ago, has consistently been upgraded and renovated. It features a pilots' lounge with showers, snooze room, recreation room with pool tables, a 10-seat A/V-equipped conference room, crew cars and onsite car rental. The company has also arranged crew privileges with several local gyms.

Local Flavor

At the FBO, the person who handles your fueling might also be the same one who arranges your hotels and ground transportation, according to Mann. "We're not big enough to say you can be a CSR and not do anything else," he said. "I have to have the flexibility to be able to work them in different positions." That flexibility must suit the NATA Safety 1st trained staff of nine well, as Mann has not had to hire a new employee in 14 years. His most senior staffer began working at the airport four decades ago.

Wisconsin is known for its Scandinavian heritage, and Racine in particular offers the kringle, a large, ring-shaped, filled pastry that is found nowhere else in the U.S. As part of their hospitality, Mann's staff makes sure always to have fresh kringles on hand. "Especially if we've got people coming in from Europe to clear customs and get some fuel, we try to put a kringle on the airplane to make them feel welcome," he noted.

When it comes to addressing the needs of flight crews, Mann has a leg up. A former corporate pilot, he can easily put himself in their shoes. "I know what I wanted when I landed at an airport, and what I try to provide here is what I would want if I was flying into an airport," he said. —*C.E.*

PRELIMINARY REPORTS

RUNWAY OVERRUN TAKES OUT ILS

Beechcraft King Air 100, Oct. 30, 2016, Jeffersonville-Clark Regional Airport, Ind.—A Beech King Air 100 was damaged during takeoff when it ran off the end of 5,500-foot-long Runway 18 at Jeffersonville-Clark Regional Airport (KJVY) after an aborted takeoff. The pilot, copilot and eight passengers were not injured.

The pilot reported that the airplane's flight controls and engines were operating normally during the pre-takeoff check, and the elevator pitch trim was positioned correctly. The airplane did not accelerate as expected during the takeoff roll and the stall warning sounded at rotation so he aborted the takeoff. The airplane went off the end of the runway.

The pilot told NTSB investigators that he did not apply the brakes or reverse the propeller pitch. The left wing hit the runway ILS antenna, and the left main gear and nose gear collapsed. Once the airplane had come to rest, the pilot opened the cabin door and assisted the passengers in evacuating. There was no post-crash fire.

ASTAR CRASHES NEAR SOCHI, RUSSIA

Airbus AS350B3e Ecureuil, Nov. 1, 2016, Sochi, Russia—One person died and five were injured after an Airbus AS350B3e Ecureuil on a commercial sightseeing trip crashed into the courtyard of a house near Sochi in south Russia. The helicopter was damaged beyond repair.

ROTOR HUB ASSEMBLY COMES UNHINGED FROM S-92

Sikorsky S-92, Nov. 10, 2016, Western Australia—The Australian Transport Safety Bureau (ATSB) is investigating a main rotor failure on a Sikorsky S-92, VH-ZUQ, at Broome Airport, Western Australia, that happened during start-up. The crew noticed unusual engine vibrations and shut down the engine. They found part of the rotor hub assembly detached from the helicopter. Subsequent inspection revealed the main rotor blade stops had been sheared off the hub assembly. As part of the investigation, the ATSB will interview the crew and seek to identify the cause of the failure.

CHALLENGER LANDING GEAR COLLAPSES

Bombardier Challenger 300, Nov. 14, 2016, Marcos A. Gelabert International Airport (MPMG), Albrook, Panama—No one was hurt, but the airplane was substantially damaged when the landing gear of a Challenger 300 collapsed during landing at Marcos A. Gelabert International Airport (MPMG), Albrook, Panama. The airplane is registered to Delaware Trust Company Trustee of Wilmington, Del. VMC prevailed at the time of the accident, although the airplane was operating on an IFR flight plan on a local flight.

AIR AMBULANCE CRASHES ON TAKEOFF

Piper Cheyenne II, Nov. 18, 2016, Elko, Nevada—An air ambulance Piper Cheyenne II carrying a cardiac patient and medical personnel crashed into a parking lot of Barrick Gold near Interstate 80 shortly after takeoff from Elko Regional Airport, Nev., killing all four on board.

The turboprop twin, bound for a Salt Lake City hospital, was in its initial climb in VMC a half-mile from the runway when it turned left 30 degrees and stopped climbing. A witness told the NTSB the aircraft then made an abrupt left bank and descended out of his line of sight before crashing into a parking lot and bursting into flames. The resulting fire burned oxygen on board and led to several secondary explosions that set nearby vehicles on fire. No one on the ground was injured.

All major structural components of the airplane were located within the wreckage. Detailed examinations of the airframe and engines are pending, and the cause of the crash remains under investigation. ❑

FACTUAL REPORT

CHALLENGER CRASHED AFTER DOWNWIND LANDING IN ASPEN

Bombardier Challenger 604, Jan. 5, 2014, Aspen, Colo.—A Challenger 604 arriving from Tucson, Ariz., with a Mexican national crew hit the runway while attempting to land for the second time at Aspen-Pitkin County Airport/Sardy Field (KASE), destroying the airplane, killing the copilot and seriously injuring the captain and passenger. The airplane was registered to the Bank of Utah Trustee and operated by Vineland Corporation Company of Panama under Part 91. VMC prevailed. KASE is a high-altitude, terrain-limited airport and the aircraft was on an instrument flight plan.

Aspen airport Automated Surface Observation System (Asos) located east of the touchdown zone of Runway 15 reported the wind from 320 degrees at 14 knots gusting to 25 knots, with variable direction from 280 to 360, visibility 10 miles in haze, scattered clouds at 4,700 feet agl, with a ceiling broken at 6,000 feet during the accident approach. Peak wind was from 320 at 26 knots at 12:04 p.m.

An urgent pilot report over Aspen at 12:05 p.m. MST from a Learjet 35 crew reported low-level wind shear with a 10-knot loss of airspeed on a two-mile final.

Performance data for the 604 indicated that the crew was operating the aircraft beyond published performance parameters for a tailwind component, and that the crew was aware of the shifting tailwind after performing its first missed approach. The CVR transcript indicated they were hoping the wind would subside on the second attempt to land.

Runway 15 at KASE begins at an elevation of 7,680 feet, and slopes upward with a 1.9-percent gradient, which creates extreme visual illusions for pilots. The aircraft's descent angle for the last nautical mile of flight was approximately four degrees and its airspeed was about 140 knots. During the last minute of flight the wind was variable from 280 degrees to 360 degrees at 14 knots, gusting to 25 knots, meaning they may have experienced a 21-knot crosswind and a 12-knot tailwind. The indicated peak wind was practically a pure tailwind.

According to the report, neither pilot had logged experience with the unusually steep approach into the sloping Runway 15 at KASE, a mountain valley airport that is often the site of rapidly changing wind conditions. ■

FINAL REPORT

ATC TRAINING AND A BUSY PATTERN CAUSED CONFUSION AND A MIDAIR

North American Rockwell NA265-60SC Sabreliner and Cessna 172M, Aug. 16, 2015, Brown Field Municipal Airport (KSDM), San Diego, Calif.—A combination of ATC error and the inability of the pilots of two aircraft to see each other was the cause of the midair between a Cessna 172M and an experimental North American Rockwell NA265-60SC Sabreliner near San Diego, Calif., according to the NTSB. Five people died in the accident.

The privately owned Cessna was on a Part 91 personal flight, while the Sabreliner was registered to and operated by BAE Systems Technology Solutions & Services. Both aircraft were operating in the Brown Airport (KSDM) traffic pattern in VMC.

KSDM's airport traffic control tower had all control positions combined to one position staffed by a local controller (LC) who was conducting on-the-job training with a developmental controller (LC trainee). The LC trainee was transmitting instructions for all operations under close supervision. As traffic increased, the LC trainee made a mistaken transmission, at which point the qualified LC took over. The LC trainee remained in the tower to observe operations.

In the two minutes after the handoff the LC made several errors. He confused an aircraft to the left of the Sabreliner and heading to the northeast with the Cessna 172M, which was between the Sabreliner and KSDM, on a closer-in right downwind leg. The LC instructed the pilot of Cessna 172 N6ZP, which he thought was the Cessna on right downwind, to make a right 360-degree turn over the airport and rejoin the downwind. Despite the fact that, at that time, N6ZP was 2.3 nm northeast of the airport and was departing the area, the pilot of N6ZP acknowledged the instruction and initiated a right turn.

The Sabreliner was instructed to turn base and cleared to land on Runway 26R. The LC said that after he cleared the Sabreliner to land, he looked up to ensure that the airplane was turning base and noticed that the Cessna on downwind (which he still thought was N6ZP) was continuing on its downwind track and had not begun the turn that he had issued. He contacted the pilot of N6ZP, who replied that he was turning. The Sabreliner CVR has its pilot commenting, "I see the shadow but I don't see him."

The LC transmitted, "November eight five Uniform" to the Cessna 172M; this was the first ATC transmission with the pilot in almost six minutes and the first communication between the LC and N1285U. The correct pilot acknowledged the transmission, "eight five Uniform." The LC then asked the pilot if he was still on the right downwind leg. The pilot of N1285U did not respond. The LC and the LC trainee then witnessed the midair.

Witnesses on the ground noted that neither airplane appeared to make any corrective action before the collision and stated that after the collision, the smaller airplane broke apart, while the larger airplane lost a wing, nosed down and struck the ground.

The wreckage was located in a large open area a mile-and-a-half northeast of KSDM and consisted of two primary debris fields, one for each airplane.

The LC said that, at that time, he had four issues to resolve, one of which was the potential conflict between the Sabreliner and the Cessna on the right. When the pilot of N6ZP acknowledged the turn, the LC believed that the pilot of the Cessna to the right of the jet had received the instructions and that the potential conflict would be resolved. The LC then instructed the jet pilots to turn base and cleared them to land on Runway 26R. When the LC was asked what caused him to realize that the Cessna was N1285U and not N6ZP, he said it dawned on him through a process of elimination. The LC trainee said that when the Cessna on the right did not start the right turn, he suggested to the LC that the intended aircraft might have been N1285U. The LC indicated that, in retrospect, he should have issued a traffic alert; however, the moment he realized that the jet was turning into N1285U, it was too late.

The NTSB reconstructed the airplanes' flight paths using radar data and examined the ability of the Cessna and Sabreliner's pilots to see and avoid the other aircraft. Position and orientation information for both airplanes was estimated on the basis of the radar data, combined with models of each airplane's aerodynamic performance. Investigators determined that the pilots might have been able to see each other at different points in the minute or two before the midair if they had known that the other aircraft was in proximity. By the time the aircraft were 0.1 nm apart, window posts in both aircraft might have obscured the view.

The absence of Tcas, ADS-B or FIS-B information in the cockpit and a lack of a timely traffic alert to both pilots by a controller using standard phraseology contributed to this accident. The NTSB also attributed the accident to human factors in high-workload ATC environments. ■

The material on this page is based on the NTSB's report (preliminary, factual or final) of each accident or, in the case of recent accidents, on information obtained from the FAA or local authorities. It is not intended to judge or evaluate the ability of any person, living or dead, and is presented here for informational purposes.

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Canada: Toronto, Vancouver, Calgary China: Beijing Colombia: Cartagena Puerto Rico: San Juan

Completion & Refurbishment

by James Wynbrandt

Lufthansa Delivers Outfitted BBJs to Royal Jet

Completion specialist Lufthansa Technik (LHT) has redelivered two Boeing Business Jets (BBJs) in as many months to Abu Dhabi-based charter operator Royal Jet. The 34-passenger jets have identical interiors and layouts (the color palettes differ), designed by New York's Edése Doret, with a bedroom, two full bathrooms and two lounge areas. Carbon fiber is used extensively throughout the cabin. A highlight of the interiors is the "starry sky" composed of some 15,000 points of fiber-optic light, running across the ceiling throughout the cabin. The outfitting has carpeting from Tai Ping, leathers from Townsend, Ultraleather from Tapis and quartz and carbon-fiber flooring from F/List. The aircraft are outfitted with Ka-band antenna systems supporting a digital mobile phone network (GSM) and high-speed connectivity, with LHT's integrated "Niceview mobile" flight information system.

Jet Aviation To Complete BBJ 777s

Jet Aviation's Basel completions center has taken delivery of the first of two green BBJ 777-300ERs for completions commissioned by Boeing on behalf of an Asian government, representing the company's first BBJ 777 head-of-state completion project. David Longridge, president of Boeing Business Jets, noted Jet Aviation has a "demonstrated capability to fit exceptional widebody interiors that combine beautiful design and craftsmanship with cutting-edge engineering and technology." With a cabin area of 3,641 sq ft (338 square meters) and a range of 9,220 nm (17,075 kilometers), the BBJ 777-300ER is proving popular in the widebody market for its "capacity for unmatched comfort and range on long-haul flights," Longridge said.

Greenpoint To Design Spike SSBJ Interior

Under a recently signed memorandum of understanding (MOU) with Spike Aerospace, Boeing completion specialist Greenpoint Technologies will provide interior design, engineering and technology services for the Spike S-512 supersonic business jet, currently in development. Spike Aerospace president and CEO Vik Kachoria said the interior "will reflect modern comforts for the next generation to conduct business faster than the speed of sound."

According to Greenpoint executive vice president Bret Neely, "The S-512 supersonic interior fits perfectly" with his company's pioneering capabilities, exemplified by recent completions of a head-of-state 787-8 and 747-8. Under the MOU, the companies will conduct a study of interior engineering and design to define the possibilities and develop photo-realistic renderings of interiors "that capture the excitement of the supersonic vision," the companies said.

Boston-based Spike aims to have the S-512 airborne in the 2020s.

Flight Display Systems Rebrands

The former Flight Display Systems, creator of the "do" suite of wireless cabin IFE systems, has changed its name to FDS Avionics, a moniker that "better describes our broad portfolio of products and services in in-flight entertainment, cabin management, and special mission video systems."

The rechristening was announced at the NBAA Convention, where the Georgia-based company also introduced Glass Cabin, an app for use in conjunction with the recent 3-D upgrade to FDS's do Capsule

moving map. Glass Cabin enables users to "see" outside the cabin in any direction a smart device is aimed, and incorporates in and out pinch zoom. FDS's current product line includes the do Capsule, a wireless server; the Edge series of monitors; and do 360, a subscription entertainment service. Textron Aviation will install the do Capsule in Citation X+s and King Air 350s, according to FDS; the company declined to provide further details about the agreement.

Bizliners Get Pac Lie-flat Seats

Pac Seating Systems recently certified, delivered and installed eight different fully motorized custom lie-flat sleep seats on private airliners, among them a 747-8, a BBJ and an ACJ319. The sleep seats come in single, double and triple configurations and incorporate more comfortable foam

densities than the harder cushions used in commercial sleeper seats, according to the Palm City, Fla.-based company. Most seats can be outfitted with motorized or manual privacy dividers and motorized up/down arms. Designers and completion centers can also specify custom surround cabinets, allowing a customer's motif to be carried through an entire cabin. Custom entertainment systems, meal tray designs, reading lights and plating can also be specified. Pac is producing five more new seat models for the 777 and 787-8, with delivery expected in this year's first quarter. ■

Compliance Countdown by Gordon Gilbert

Within 6 Months

▶ **Jan. 9, 2017** COMMENTS DUE

EASA Proposal To Reduce Runway Excursions

A Notice of Proposed Amendment (NPA) from the European Aviation Safety Agency aims to reduce runway excursions by addressing several performance requirements for commercial air transport operations. The NPA proposes standards for runway surface condition reporting, airworthiness standards for landing performance computation at time of arrival, an in-flight assessment of landing performance at time of arrival, and it also reduces required landing distances for Part 135 and 91K business aircraft operations. The proposed changes are intended to improve harmonization with corresponding FARs and to ensure alignment with ICAO recommendations. Comments are due on Jan. 9, 2017.

▶ **Jan. 17, 2017** COMPLIANCE DUE

OSHA Fall-protection Rules

New rules from the Occupational Safety and Health Administration that tighten the requirements to help prevent falls from ladders and raised work platforms go into effect Jan. 17, 2017. Aimed primarily at the construction industry, the rules also apply in part to workers in hangars and aircraft outfitting, refurbishing and painting facilities.

▶ **Feb. 2, 2017**

Australian ADS-B Mandate

The Civil Aviation Safety Authority of Australia is implementing new regulations and aircraft equipment mandates to align the nation's operations with global standards set by ICAO. The new rules contain a number of equipment mandates that culminate on Feb. 2, 2017. After that date IFR-rated pilots and aircraft must comply with ADS-B equipment and operational requirements to fly in Australia.

▶ **April 24, 2017**

Part 135 Rotorcraft Radio Altimeters

Under new Part 135.160, rotorcraft must be equipped with an operable FAA-approved radio altimeter, or an FAA-approved device that incorporates a radio altimeter, after April 24, 2017. Deviations from this requirement can be authorized for helicopters in which radio altimeters cannot physically be installed in the cockpit. The request for deviation authority is applicable to rotorcraft with an mtow no greater than 2,950 pounds. The radio altimeter mandate is contained in the final rule upgrading private, air-taxi and air ambulance helicopter operations, published on Feb. 21, 2014.

▶ **April 30, 2017**

Estimated Finish for Southern Calif. ATC Redesign

From November 2016 through April 2017, the FAA will phase in the Southern California Metroplex (SoCal Metroplex) Project, which involves replacing dozens of conventional ATC procedures with new satellite-based procedures. Before publishing the procedures, however, the agency will conduct public meetings to inform people about the changes. Dates for these meetings will be announced on the FAA's NextGen Community Engagement webpage for the SoCal Metroplex project. The project will affect instrument arrivals and departures for 21 airports in Southern California.

Within 12 Months

▶ **Dec. 7, 2017 and Jan. 30, 2020** NEW

Expansion of Datalink Communications in North Atlantic

Phase 2 of the North Atlantic datalink mandate began with Phase 2a in February 2015, at which time flights within the North Atlantic Tracks (NAT) between FL350 and FL390 must be equipped with Fans 1/A controller-pilot datalink communications (CPDLC) and ADS-C systems. The program expands to these altitudes in the entire ICAO NAT region on Dec. 7, 2017, and to all flights in this region above FL290 on Jan. 30, 2020, a month sooner than the previous revised date.

▶ **Jan. 1, 2018**

Deadline for European 8.33-kHz Spacing

Starting Jan. 1, 2018, aircraft might not be able to operate in any EU member states' controlled airspace unless they are equipped with communications systems that have 8.33-kHz voice-channel spacing Eurocontrol says extending 8.33 kHz below FL195 down to ground level is important, as "Europe has a known shortage of voice communication frequencies." The 8.33-kHz requirement for higher altitudes in controlled airspace has been in effect for some time. According to Eurocontrol, the consequences should this shortage of com frequencies not be addressed are "significant: there will be more air traffic delays; it will be harder to implement safety improvements; and we will lose flexibility in introducing operational enhancements."

Beyond 12 Months

▶ **Nov. 8, 2018**

ICAO Adopts 15-min. Position Reporting

The International Civil Aviation Organization Council adopted a tracking standard for certain international flights that requires crews to report their aircraft's position at least every 15 minutes. It will become applicable Nov. 8, 2018. The new requirement will be made formal as Amendment 39 to Annex 6—*Operation of Aircraft*, Part I. The new standard is the outcome of recommendations stemming from the disappearance of the 777 operating as Malaysia Airlines Flight MH370 while en route from Kuala Lumpur to Beijing, China, on March 8, 2014. The search for the 777 continues.

▶ **Dec. 31, 2019**

Taiwan ADS-B Compliance Delayed

The Republic of China has postponed for three years—to Dec. 31, 2019—compliance with ADS-B OUT equipment within the Taiwan FIR above FL290. China is forced to delay compliance because too few aircraft are equipped to render the original ADS-B plan achievable. However, the new deadline for Taiwan essentially coincides with the Jan. 1, 2020 U.S. mandate for ADS-B OUT compliance. The deadline for Europe's ADS-B OUT mandate remains June 7, 2020.

▶ **Jan. 1, 2020**

U.S. ADS-B OUT Mandate

ADS-B OUT equipment must be operational starting Jan. 1, 2020, in aircraft that fly in the U.S. under IFR and where transponders are currently required, namely class A, B and C airspace. ❑

Global Jet Capital appointed **Bill Boisture** chairman. Boisture, an operating partner at Global Jet investor AE Industrial Partners and previous executive director of Global Jet, has 35 years of industry experience, leading Gulfstream, NetJets, SimuFlite and Beechcraft. He succeeds **Shawn Vick**, who took the role of CEO at Global Jet.

Aloft AeroArchitects appointed **Robert (Bob) Sundin** president and CEO, as well as a member of the board of directors. Sundin joins Aloft from Dassault Aircraft Services, where he was president. **John Martin**, who has been president and CEO, moves to the role of chairman. Martin has served as president and CEO of Aloft (formerly Pats Aircraft Systems) since 2008.

Seeker Aircraft named **Ed Lundeen** president. Lundeen previously served as executive v-p of business operations for Eclipse Aerospace and also has served as supply deputy division leader for Los Alamos National Laboratory.

John Owen has joined *Executive AirShare* as CFO. Owen previously was v-p for the national executive search firm EFL Associates and also has served as CFO for the supply chain management company OrTran.

Mente Group has reinforced its management team, bringing on board four seasoned business aviation executives. The company named **Richard Emery** as COO; **David Coppock** as managing director for the Central and Western U.S.; **Jim Lewis** as v-p of sales and marketing for Northern California, the Pacific Northwest and Mountain regions; and **Dan Dunn** as managing director. Emery has 25 years of experience managing aviation organizations and has worked with Gulfstream, Bombardier and Hawker Beechcraft. Coppock joins Mente from SmartTray, where he was COO. He has also served as v-p of sales for Hawker Beechcraft, regional sales director for Gulfstream and as a sales demonstration pilot for Bombardier. Lewis brings 40 years of aviation experience to his new role, previously serving as regional sales director at Embraer, and before that was sales director for Gulfstream. Dunn previously was v-p at Jetcraft and v-p of Key Air.

John Sell joined *Jet Edge International* as senior v-p of flight operations. Sell has 20 years of aviation experience, previously serving as director of flight operations for Flexjet, Part 135 chief pilot for Million Air Dallas and captain for U.S. Steel.

Nav Canada appointed **Alexander (Sandy) Struthers** executive v-p of finance and CFO, responsible for accountability of the organization's capital and operating programs. Struthers previously held the roles of CFO, COO and chief information officer for Hydro One.

Amanda Applegate has become a partner at *Aerlex Law Group*, and **Sarah Northcraft Spann** has joined the firm as a transactional attorney. Applegate, who joined Aerlex in 2011, has served as an aviation attorney for two decades and previously served with NetJets. Northcraft Spann also served with NetJets and its affiliate company Executive Jet Management, handling both fractional and whole-aircraft transactions.

Nomad Aviation appointed **Andreas Pfisterer** senior v-p for aircraft management and accountable manager. Pfisterer previously was director of operations for ExecuJet Europe and also has served as a pilot and manager with Swissair and a flight inspector with the Swiss Federal Office of Civil Aviation.

The *Aerospace Industries Association* elected Boeing chairman, president and CEO **Dennis Muilenburg** as chairman of the AIA Board of Governors for 2017. In that role, Muilenburg succeeds Lockheed Martin chairman, president and CEO **Marillyn Hewson**. Raytheon chairman and CEO **Thomas Kennedy** will become vice chair.

TAG Aviation Europe restructured its maintenance service operations with several new appointments. **Cyrille Pillet** was appointed v-p of maintenance operations. **John-Paul Williams** is commercial manager for TAG Farnborough Maintenance Services. **Greg Hoggett** was named COO of TAG Aviation UK.

Tony Ciaravino has joined *Journey Aviation* as v-p of marketing and client services. Ciaravino previously spent three years holding sales roles with Wyvern and has also served as a charter sales account representative for Solairus Aviation.

Jet Aviation appointed **Edgar Guerreiro** manager of its FBO in Geneva. Guerreiro, who has 20 years of experience in hospitality and aviation, joined the company's MRO and FBO facility in Geneva as purchasing manager in March. He succeeds **Joao Martins**, who has taken the role of general manager of the company's Zurich operation. Martins has held management roles with VistaJet and NetJets Europe.

Vickie Mahoney joined *ExcelAire* as v-p of business development, based in Teterboro, N.J. Mahoney, who has 25 years of sales and marketing experience, was most recently v-p of sales for First Flight.

Falcon Aviation named **Pauline Smith** FBO manager. Smith has 25 years of industry experience, most recently as head of commercial services and terminal manager for Marshall Aerospace.

Hawthorne Global Aviation Services named **Coleman Jamison** to the advisory board of its recently acquired FBO at Tuscaloosa Regional Airport in Alabama.

Western Aircraft promoted **Jay Reeder** to turboprop regional sales manager. Reeder, who joined Western Aircraft in May 2015, previously served as the material operations coordinator for EuroTec Vertical Flight Solutions and as v-p Reeder Flying Service.

Pentastar Aviation appointed **Scott Brooks** to the newly created position of avionics director. Brooks has 30 years of business aviation experience and previously served as principal regional sales manager for Rockwell Collins.

Baines Simmons, the aviation safety consultancy division of Air Partner, appointed **John Nicholas** as a principal consultant. Nicholas previously spent 18 years with the UK Civil Aviation Authority, where he held roles including head of technical services, head of shared services, head of applications and approvals and head of licensing policy and standards.

Allan Mann was appointed senior director of safety at *Wheels Up*. Mann has 30 years of aviation industry experience, including serving as v-p of operations and director of operations at Reynolds Jet Management, manager of two general aviation airports, and head of two FBOs.

Elliott Aviation named **Bill Reeves** director of maintenance services. Reeves, who originally served as an A&P mechanic at Elliott Aviation from 1986 through 1989, is rejoining the company from Cessna/Textron Aviation in Milwaukee, where he was manager of aircraft maintenance.

Air Partner appointed **Joe Halanen** as emergency planning division manager, based at Air Partner's UK headquarters at Gatwick.

Cutter Aviation named **Michelle Hoover** HondaJet regional sales manager for Southern California, Southern Nevada (Clark County) and Hawaii.

Columbia Helicopters hired **Mark Johnson** as v-p of human resources. He has held a series of HR positions with Wacom, Standard Insurance, Tektronix, SRSM, Serena Software and WebTrends.

Otto Wright has joined *Axis Jet* as director of business development. Most recently general manager of KaiserAir in Oakland, Calif., Wright has held a number of senior roles with Jetex Flight Support, Far East Russia Aircraft Services, Nextel Communications and Sun Microsystems.

Kenneth Parzygnat has joined *JetLease Capital* as director of aircraft finance. Parzygnat has 20 years of finance experience focusing on private equity, hedge funds and family offices.

Professional Aircraft Accessories hired **Jack Turnbill** as senior v-p of business development.

Pentastar Aviation named **Barry Tilson** director of maintenance. Previously Tilson was an MRO maintenance sales representative and service manager at TechnicAir and Landmark Aviation in Grand Rapids, Mich., and also served as director of maintenance at Northern Air in Grand Rapids.

Raluca-Ana Anghelache was appointed manager of safety, learning and development for the *European Business Aviation Association*. Anghelache has previously held roles within the Air Safety Unit of European Commission DG Move, at Eurocontrol, as well as at the Advisory Council for Aviation Research and innovation in Europe. ❑

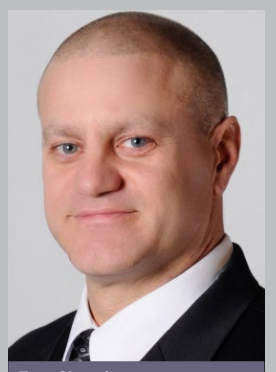
Awards & Honors

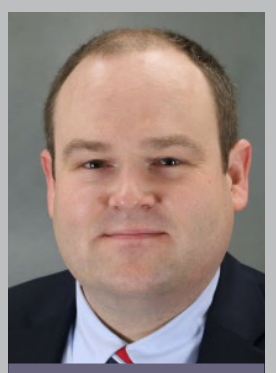
National Air Traffic Controllers Association (Natca) president **Paul Rinaldi** was named the recipient of the Air Traffic Control Association's (ATCA) Glen A. Gilbert Memorial Award. Considered ATCA's highest honor, the Gilbert Award recognizes the lifelong achievements of an individual in the field of aviation. Rinaldi, the first person to be elected president of Natca for three terms, is being honored for his "exemplary career-long commitment to the betterment of the national airspace system," ATCA said, adding that he has helped establish an unprecedented path of collaboration between Natca and the federal agencies and organizations with which the union works." ■


Robert (Bob) Sundin


John Sell


Andreas Pfisterer


Tony Ciaravino


Jay Reeder

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AIN Calendar

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JANUARY

SECURITY CONFERENCE…January 24-25, Hilton West Palm Beach, West Palm Beach, FL. Info: www.nbaa.org/events/security-conference/2017/.

REGIONAL FORUM…January 26, Palm Beach International Airport, West Palm Beach, FL. Info: www.nbaa.org/events/forums/2017PBI/.

FEBRUARY

EBAA SHORTAGE OF SKILLS WORKSHOP… February 3, Brussels, Belgium. Info: www.ebaa.org/en/events-62/ebaa-upcoming-events.aspx.

▲ **SCHEDULERS AND DISPATCHERS CONFERENCE**…February 7-10, Fort Worth, TX. Info: (800) 783-9000; www.nbaa.org.

LEADERSHIP CONFERENCE… February 14-16, Hyatt Regency, Miami, FL. Info: info@nbaa.org; www.nbaa.org/events/leadership/2017/.

OPPORTUNITIES IN BUSINESS JETS… February 22, Grand Hotel Excelsior, Valletta, Malta. Info:www.quaynote.com/conference/opportunities-business-jets-2017/.

MARCH

BUSINESS AIRCRAFT FINANCE, REGISTRATION & LEGAL CONFERENCE…March 5-7, Hyatt Regency Coconut Point Resort, Bonita Springs, FL. Info: (202) 783-9451; www.nbaa.org/events/finance-registration-legal-conference/2017.

ACSF SAFETY SYMPOSIUM…March 7-8, NTSB Training Center, Ashburn, VA. Info: (888) 723-3135; www.acsf.aero/symposium/.

▲●◆ **HELI-EXPO**…March 7-9, Dallas, TX. Info: (703) 683-4646; www.rotor.org.

▲ **AEA INTERNATIONAL CONVENTION & TRADE SHOW**…March 13-16, New Orleans, LA. Info: www.aea.net/convention/2017.

INTERNATIONAL OPERATORS CONFERENCE… March 13-16, Atlanta, GA. Info: (800) 783-9000; www.nbaa.org.

REGIONAL FORUM…March 23, Fort Worth Meacham Airport, Fort Worth, TX. Info: www.nbaa.org/events/forums/2017FTW/.

INTERNATIONAL BRAZIL AIRSHOW (IBAS)… March 29-April 2; Galeão International Airport, Rio de Janeiro, Brazil. Info: +55 11 3032-5633; www.sators.com.br.

APRIL

▲ **SUN 'N' FUN**…April 4-9, Lakeland, FL. Info: www.sun-n-fun.org/.

AERO FRIEDRICHSHAFEN GLOBAL SHOW… April 5-8, Friedrichshafen, Germany. Info: www.aero-expo.com/.

▲◆ **ASIAN BUSINESS AVIATION CONFERENCE & EXHIBITION**…April 11-13, Shanghai Hawker Pacific Business Aviation Service Centre, Hongqiao Airport, Shanghai, China. Info: www.abace.aero.

MAY

MAINTENANCE CONFERENCE…May 2-4, West Palm Beach, FL. Info: www.nbaa.org/events/maintenance-conference/2017/.

AIRPORT SOLUTIONS CONFERENCE…May 3-4, Centro Banamex, Mexico City, Mexico. Info: www.airportsolutions.com/mexico/.

BUSINESS AVIATION TAXES SEMINAR… May 4-5, Marina del Rey, CA. Info: www.nbaa.org/events/taxes-seminar/2017/.

AAAE CONFERENCE & EXHIBITION… May 7-10, Long Beach Convention and Entertainment Center, Long Beach, CA. Info: www.aaae.org/annual2017.

▲ **AUVSI'S XPONENTIAL**…May 8-11, Kay Bailey Hutchinson Convention Center, Dallas, TX. Info: www.xponential.org/xponential2017/public/enter.aspx.

▲●◆ **EUROPEAN BUSINESS AVIATION CONVENTION & EXHIBITION…**May 22-24, Palexpo Convention Center, Geneva, Switzerland. Info: (202) 783-9000; www.ebace.aero/2017.

JUNE

FLIGHT ATTENDANTS/TECHNICIANS CONFERENCE…June 12-15, Long Beach, CA. Info: www.nbaa.org/events/fa-ft/2017/.

2ND ANNUAL CARIBBEAN AVIATION MEETUP CONFERENCE…June 13-15, Saint Maarten. Info: cdrbud@caribavia.com; www.caribavia.com/.

▲●◆ **PARIS AIR SHOW**…June 19-25, Exhibition Center of Le Bourget, France. Info: visiteurs@siae.fr; www.siae.fr/.

JULY

ASA ANNUAL CONFERENCE…July 9-11, Hyatt Regency, Reston, VA. Info: www.aviationsuppliers.org/annual-conference.

▲ **EAA AIR VENTURE**…July 24-30, Oshkosh, WI. Info: www.eaa.org/en/airventure.

SEPTEMBER

REGIONAL FORUM…September 7, Morristown Airport, Morristown, NJ. Info: www.nbaa.org/events/forums/2017MMU/.

OCTOBER

▲●◆ **NBAA BUSINESS AVIATION CONVENTION & EXHIBITION**…October 10-12, Las Vegas Convention Center, Las Vegas, NV. Info: (202) 783-9000; www.nbaa.org.

BOMBARDIER SAFETY STANDDOWN… October 31-November 2, Hyatt Regency Hotel, Wichita, KS. Info: (316) 946-7876; www.safetystanddown.com/.

NOVEMBER

▲●◆ **DUBAI AIRSHOW**…November 12-16, Airport Expo, Dubai, UAE. Info: +97 1 4286 7755; www.dubaiairshow.aero.

◆ Indicates events at which **AIN** will publish on-site issues or distribute special reports.

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