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Hurricane IRMA

Florida airports, FBOs slowly return to normal

by Curt Epstein

Scarcely had the country digested the scenes of devastation coming out of Houston in the wake of Hurricane Harvey, when another monster storm developed in the Mid-Atlantic. Category 5 Hurricane Irma, packing winds of 185 mph, spun through the Caribbean, wreaking havoc with Barbuda, Anguilla and the British Virgin Islands before veering north of Puerto Rico and striking the Turks and Caicos Islands and Cuba en route to the U.S. mainland. Along its path, it turned some tropical paradises into acres of wreckage. The region depends heavily on tourism, which in turn attracts private aviation clients, and its damaged FBOs will no doubt have to endure a downturn as they rebuild along with the shattered tourism infrastructure.

On St. Maarten, like most of the island, Princess Juliana International Airport suffered extensive damage, and as of press time, there was no time frame for the reopening of the General Aviation Terminal (GAT), which houses Signature Flight Support affiliate Arrindell Aviation and one other FBO. The facility had no power or water,

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Hurricane HARVEY

Industry pulls together to save lives after Harvey

by Norval Kennedy

Biblical rainfall in the U.S. from Hurricane Harvey in late August prompted large-scale relief support from throughout the general aviation community focused on South Texas. Ferocious wind destroyed aircraft along the Gulf Coast, and the rain flooded Houston and surrounding communities. Military and civilian aircraft from all parts of the country descended into airports to provide relief; FBOs supported rescue operations while airports were closed to airline traffic.

With aircraft ranging in size from a Falcon 900C to taildraggers and a B-25, pilots, owners and support personnel rallied to help save the lives of people and pets. Among the earliest relief efforts was a collaboration between Sky Hope and NBAA's Humanitarian Emergency Response Operator (Hero) program. Janine Iannarelli, president of aircraft brokerage Par Avion in Houston, worked with Sky Hope's Robin Eissler of Georgetown, Texas, and Dan Hubbard, NBAA's senior vice president of communications, as they collectively organized inter- and intrastate relief missions.

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After several difficult years, the charter market appears to be rebounding, as operators enhance their products and offer customers new options. **page 20**

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Gulfstream G650
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Last month lawmakers were facing another extension of the agency's authorization, as they continue to negotiate on a spinoff of the ATC organization. **page 12**

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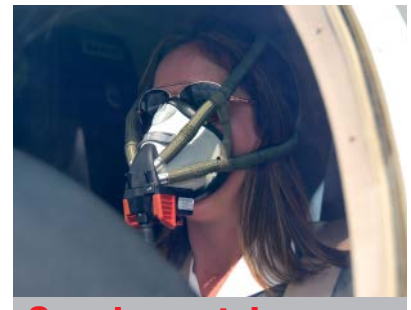

Supplemental oxygen

The FARs require Part 91 pilots to wear oxygen masks above 41,000 feet. It's no secret that many elect not to follow the rule. One pilot studies why non-compliance with this rule is accepted and how that can change. **page 70**

LEGACY® 450
BY EMBRAER

The revolutionary Legacy 450 truly transcends previous perceptions of mid-light capabilities. A remarkable union of technology and design, this aircraft flies faster and farther than any other jets in its class. The Legacy 450 delivers an enviable performance, including capability of taking off and landing on shorter runways. This is the only jet in its category with full fly-by-wire technology, and the advanced Rockwell Collins Pro Line Fusion™ platform puts pilots in complete control in a cockpit environment with superior ergonomics and space. Up to nine passengers enjoy the smooth flight experience in the largest-in-class stand-up cabin with unmatched luxury, comfort and style. The jet's ultra-quiet environment is perfect for working or relaxing. Welcome to the Legacy 450 - a new-generation aircraft that is a true reflection of the heights that can be reached when your mission is to rethink and redefine what's possible.

WOW, WHAT AN AIRCRAFT!

"Smart Air has been operating the first Legacy 450 in Europe for many months. We receive very positive feedback from customers using the aircraft as a charter. They are extremely pleased with the comfort.

My favorite elements are the quietness in the cabin, craftsmanship quality, the astonishing cockpit from a quality and technology standpoint, the fly-by-wire as a true added value in terms of comfort and safety. Pilots enjoy flying this aircraft. These are remarkable features that are not present in other similarly priced aircraft.

I now realize that my customer experience with Embraer is far better than what I experienced with other OEMs because we remain customers even after the aircraft delivery. The teams are very invested in customer satisfaction. They have a true willingness in accompanying the customer and ensuring his satisfaction throughout the aircraft operation.

The capability of the aircraft to land in Saint-Tropez/La Môle is an important time saver. The landing is done in very safe conditions. The technical data after certification were far better than preliminary data. Those are good surprises when we take the risk of being the first customer on an aircraft not yet certified without any validated performance. It is very nice, as a consultant company, to be able to go back to our customer and say that the choice we recommended is by far exceeding the reality that existed when the decision was made."

-Stéphane Ledermann, Founder & President, Smart Air

Watch Stéphane's story and request more information at
EmbraerExecutiveJets.com/Stephane

Rethink Convention.

EMBRAER
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As we go to press

ASSOCIATED AIR CENTER TO SHUT ITS DOORS AT YEAR-END

Associated Air Center (AAC), a pioneer in the private airliner completions business, is closing at the end of the year, just shy of its 70th anniversary. AAC parent StandardAero announced the plans on September 20, saying current and future volumes of work aren't sufficient to support the costs necessary to run the facility. It plans to help the 170 AAC employees find positions within other business units or provide outplacement assistance and services. AAC will continue business as usual as it completes existing contract obligations, warranty services and projects already under way. The private airliner market has been experiencing a lull. Since early 2016, Airbus Corporate Jets delivered only one aircraft and Boeing Business Jets handed over seven bizliners. This compares with the delivery of four ACJ variants and 11 BBJ variants in 2015.

40,000 U.S. GA AIRCRAFT HAVE ADS-B OUT

Some 40,000 general aviation aircraft flying in the U.S. have ADS-B OUT equipment installed, the General Aviation Manufacturers Association (GAMA) said. The FAA estimates that 100,000 to 160,000 GA aircraft will need to be equipped with ADS-B OUT before the Dec. 31, 2019 deadline. "It is essential that operators who haven't yet done so make a plan for equipage to avoid having their aircraft grounded and losing its residual value," said GAMA president and CEO Pete Bunce.

GE TRIMS FLIGHT DEPARTMENT

After operating aircraft for nearly 75 years, General Electric has ended operations of three Challenger 605s in favor of buying charter. A company-owned HondaJet in Europe and two Leonardo AW139s reportedly remain, but with a sharply reduced aviation staff. Earlier this year, GE's new CEO, John Flannery, disclosed that he was preparing to make $2 billion in cuts at the company's headquarters and in other areas that do not produce revenue or profit, among them the firm's helicopter and jet operations. A company spokesperson told **AIN**, "As part of that effort, we are reducing the Corporate Air Transport [CAT] services and will use charter companies as needed." GE "intends to sell the aircraft."

FIVE YEARS ON, G650 STILL 'TOP OF MARKET' BIZJET

Some 250 Gulfstream G650/650ERs have been delivered since the G650 achieved FAA type certification five years ago last month. With a nonstop range of 7,000 nm, the aircraft established a position at the top end of the business jet market, which it retains today. "Gulfstream leadership was prescient, identifying a 'top of the market' opportunity that it was uniquely positioned to seize," said JetNet iQ managing director Rolland Vincent. "The G650 is a transformational aircraft for Gulfstream." Gulfstream president Mark Burns said, "The G650 set a new standard in business aviation" for its range and payload, low cabin sound levels and four-zone cabin. "It has redefined what business jet operators could expect from their aircraft," he said.

LANDSBERG PICKED FOR NTSB BOARD

The White House has selected Bruce Landsberg, a safety expert with a deep knowledge of the general aviation industry, to become the newest member of the NTSB. The Trump administration intends to formally nominate Landsberg to a five-year term on the NTSB beginning Jan. 1, 2018, as well as to a two-year term as vice chairman. If confirmed by the U.S. Senate, he would fill the final slot on the board, providing the NTSB with a full complement of five members. Landsberg has had a long affiliation with AOPA, leading the AOPA Foundation and Air Safety Institute (ASI) as executive director and then president for 22 years. Currently a senior safety advisor for the association and the ASI, he has also served as the industry co-chair of the FAA's runway safety program.

SPIKE FLIGHT IMMINENT

Spike Aerospace, which is developing the S-512 supersonic business jet, is expected to begin flight-testing a demonstrator aircraft by the end of last month. The SX-1.2 is an unmanned scaled proof-of-concept aircraft that will help validate the control and stability of the S-512 at low speeds. According to Spike, the SX-1.2 will pave the way for a series of successively larger and faster aircraft, leading ultimately to a supersonic demonstrator. The Boston-based company intends to have the Mach 1.6 S-512 flying by early 2021, with customer deliveries starting in 2023.

GOGO DATA TO GO GLOBAL NEXT YEAR

Gogo Business Aviation is expanding its broadband connectivity products and services beyond North America via high-throughput Ku-band satellites that provide global coverage. The new service is expected to be available for business jets in the second half of next year and promises "streaming-class internet." The onboard system for business jets will come with a tail-mounted antenna and hardware.

AOPA on FBO pricing: stop unfair practices

by Kerry Lynch

The Aircraft Owners and Pilots Association (AOPA) is continuing its battle against FBO pricing, filing Part 13 complaints with the FAA against three airports where there are Signature Flight Support facilities and publicly calling out two other locations for FBO practices there.

Seven pilots joined AOPA in filing the complaint against Illinois' Waukegan National Airport (UGN), North Carolina's Asheville Regional Airport (AVL) and Florida's Key West International Airport (EYW). AOPA cited "egregious pricing" at Signature FBOs at those airports and noted that Signature controls all transient ramp space and fuel services at the three airports, effectively giving the chain a "monopoly position and significant power over access to a public airport."

The association expressed the belief that "each FBO has failed to fulfill its responsibility to protect the airport for public use through reasonable and fair pricing" and instead engaged in "egregious pricing practices under minimal oversight and in violation of standards designed to protect reasonable access to public ramp space."

The FAA has the authority to ensure airports meet their grant obligations, including reasonable and nondiscriminatory pricing, AOPA added. Among the pricing complaints were fees assessed when aircraft land at facilities for simple drop-offs without a need for any services.

"Of the hundreds of complaints AOPA has received over egregious FBO pricing, Waukegan, Asheville and Key West are three of the top five airports most complained about," AOPA said. "The other two airports rounding out the top five are Heber City, Utah (36U), and Rochester, Minnesota (RST)."

While AOPA has not filed a Part 13 complaint against Heber City, it has expressed its concerns to city officials there. The association also fought to convince officials at Jackson Hole, Wyo., to add a second FBO to create competition there. The association further views this round of Part 13 complaints as a starting point for its efforts.

AOPA gave notice earlier this year that it was ready to take on FBOs over pricing. The association also had quietly met with the FAA before airing its grievances publicly and has written articles in *AOPA Pilot* expressing its concerns.

Dissenting Perspective

But the AOPA effort has drawn the ire of the National Air Transportation Association. Earlier this year NATA president Martin Hiller had called the effort "particularly disappointing as it continues a pattern of contradictory assertions designed to alleviate industry concerns while it pursues an economic regulatory agenda" and added, "While AOPA claims to support FBOs and the free market, there is no recognition that some locations require different pricing models."

Of the Part 13 complaints, NATA expressed further dismay at their timing. "This action is disappointing, coming at a time when the general aviation community is confronting a serious effort to privatize our nation's air traffic control system," Hiller said. "General aviation, as we know it in this nation, is under a real threat. We need to stand united right now and not be concerned with distractions like this."

NATA also wrote letters to local FAA airport district offices and the Illinois Department of Transportation expressing concerns about the informal Part 13 complaints.

"The assertions made in these complaints reflect a misunderstanding of a number of key points related to the economics of aviation businesses: the pricing of aeronautical services, industry consolidation and the airport sponsor-tenant relationship," said NATA executive v-p Bill Deere in letters sent to the FAA Orlando and Memphis Airports District Offices and Illinois DOT. "The FBO services market is and remains a very competitive industry. Those within the aviation industry fully understand that FBOs compete vigorously with each other on price, service and quality of facilities." Deere further questioned the interpretation of grant assurance requirements in the Part 13 complaints.

Signature Flight Support, meanwhile, said it is aware of the complaints filed against the airports, and added it is "committed to fair and transparent pricing, which supports the high levels of service and safety at all of the airports we serve."

The FBO chain noted that it invests its own capital to build, renovate and maintain the facilities and said, "We will continue to invest in ramp construction, maintenance and repair at all of our facilities and will continue to work closely with the airports we serve to ensure consistent service for all aviators as well as remain in compliance with the FAA, all regulatory authorities and airport requirements and conditions."

President and COO Maria Sastre said of the AOPA articles published earlier this year: "When you liken FBOs to public utilities, it becomes a matter of concern to all of us in the general aviation business community." She noted a number of factors that play into pricing, such as economic, airport and regulatory requirements, and said, "To suggest regulatory intervention in pricing, as AOPA does, will not bring back the conditions of a previous era and instead potentially [will] accelerate the decline of general aviation in America."

Call for FAA Oversight

But AOPA believes it is time for the FAA to get involved and points to language in the agency's dismissal of a Signature Part 16 complaint involving its forced departure from John Wayne Orange County Airport in Santa Ana, Calif. The FAA had noted it is an airport sponsor's right and responsibility to consider FBO pricing.

"The FAA really hasn't exercised proper oversight in this area for a long time," said AOPA general counsel Ken Mead. "These kinds of pricing practices have put airports in violation of grant assurances and at risk of losing federal funding. It's the responsibility of the FAA and airport sponsors to ensure the terms incorporated in each lease are upheld, especially when they are accepting federal grants."

AOPA asks that the FAA "exercise its investigative oversight authority and take appropriate action to ensure Signature's pricing complies with" each governing body's grant assurances.

"Our members have spoken and they're tired of being forced to pay for services they don't want, ask for or need," said AOPA president and CEO Mark Baker. ❑

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NEWS BRIEFS Compiled by Chad Trautvetter

CAE Tapping Data To Improve Training

Flight training provider and simulator manufacturer CAE and Tech3Lab have partnered in a research project to analyze the pilot user experience during simulator training. The goal is to apply the research to improve pilot performance. According to CAE, "Biometrics, neuroscience and big data analysis will be used to study behaviors in a training context and identify high-performance factors." CAE vice president of technology and innovation Marc St-Hilaire said the research "could revolutionize training" and that "this will allow us to optimize pilot training and improve passenger safety as a whole."

First New Dornier Seastar Rolls Out

Dornier Seawings has rolled out the first new-production $7.21 million Seastar twin-turboprop amphibian at Oberpfaffenhofen, Germany. The new-generation Seastar features new propellers; Honeywell Primus Epic avionics; a stern hydrothruster for improved water maneuvering; corrosion-resistant landing gear with nosewheel steering; and a revised 12-passenger cabin layout with air conditioning. First flight is scheduled for the first half of 2019, followed by type certification in 2020.

North American Bizav Flying 'Sizzles'

Business aviation flight activity in North America "sizzled" in August, climbing by 5.2 percent year-over-year, according to Argus. This is the largest month operations-wise since May 2008, it said. The gains were fueled by a 10.9-percent year-over-year uptick in Part 135 charter activity. Part 91K fractional flying also posted a 7 percent gain and, for the first time in several months, Part 91 activity was in the black, rising 0.9 percent. Large-cabin jet activity continued to dominate the aircraft categories, climbing 7.2 percent year-over-year in August, followed by light jets, up 5.5 percent; midsize jets, up 4.8 percent; and turboprops, up 4.5 percent.

Nokia Fielding European ATG Network

Nokia's air-to-ground (ATG) connectivity network will begin operation in Europe later this year, and the company is targeting airlines and business aviation operators. The initial network will cover 30 countries and offer LTE-equivalent speed, with throughput capability of 75 Mbps. Thorsten Robrecht, Nokia's vice president of advanced mobile networks, claims that his company's ATG network will be the "world's first and only home-like Internet experience on board." Nokia's ATG system will require dual antennas on the aircraft. Thales is manufacturing the airborne equipment for the Nokia system, which will require 300 base stations to cover all of Europe.

BP Ties Up with Online Broker Victor

BP divisions BP Ventures and Air BP have formed an alliance with online air charter marketplace Victor and have also committed to investing $10 million in the charter broker platform. Air BP has also inked an agreement to be the preferred fuel supplier for flights arranged through Victor at Air BP locations. Through its cooperation with Air BP, Victor will further develop the digital platform, which allows operators to participate in a "more streamlined charter quote, booking and settlement process."

NBAA Schedules 2018 Regional Forums

NBAA's 2018 regional forums will be held on January 24 in West Palm Beach, Fla. (PBI); June 21 in White Plains, N.Y. (HPN); and September 6 in San Jose, Calif. (SJC). The forums are designed to bring together local business aircraft owners, operators, manufacturers and customers to discuss issues affecting the region.

UTC to buy Rockwell Collins, form $23B systems business unit

by Sean Broderick

United Technologies' (UTC's) agreement to buy Rockwell Collins for $30 billion will create a business unit that combines Collins's avionics, communications and interiors specialties with the extensive UTC Aerospace Systems (UTAS) portfolio. It also gives UTC more muscle to resist supply-chain cost reduction pressures that aircraft manufacturers have been exerting on suppliers.

The deal, announced September 4 and approved by both boards, is expected to close next year. UTC will combine Collins with UTC Aerospace Systems (UTAS), creating Collins Aerospace Systems. Collins CEO Kelly Ortberg will be the unit's CEO, with UTAS president Dave Gitlin adding the title of COO.

A combined Collins/UTAS unit would generate $23 billion in 2017 revenue—75 percent from commercial business and the remainder from defense work. Sales would be split 60 percent and 40 percent between OEM and aftermarket, respectively.

UTC says the unit's breadth and scale will lead to more internal efficiencies, generating $500 million in internal savings within four years, by streamlining administrative and some procurement functions. Customers stand to benefit as well, the company says.

"Our suite of capabilities will also provide greater options to meet customer demand for integrated systems and ultimately reduce weight and cost," said Greg Hayes, UTC CEO. "Our customers, both the airlines as well as the OEMs, are always looking for cost reductions, are looking for innovative solutions and services. The combination of Collins with our Aerospace Systems business gives us the scale to both innovate and reduce costs to meet the needs of those customers."

Connectivity Enhancements

Among the most fertile areas for collaboration is connectivity. Collins has a long history of developing onboard connectivity, such as sensors and servers needed to move data on and off aircraft. Its 2013 acquisition of Arinc gave it air-to-ground capabilities as well as some significant ancillary services, such as airport information systems. UTC's major systems, among them engines, have been incorporating more sensors and related features designed to drive efficiencies, particularly in predictive maintenance. Mix in the former B/E Aerospace, an interiors specialist, and the combined entity has deep expertise in all areas of the aircraft, and each has significant data-related upsides as operators seek more insight into the condition of their equipment.

Collins's strategy in leveraging its B/E Aerospace purchase offers insight on possible UTC/Collins directions. Collins has an extensive dealer network selling avionics packages, while B/E Aerospace, which is heavily involved in both business and air transport cabins, does not. When discussing a Collins cockpit display system upgrade package on a business aircraft earlier this year, Collins began talking about products its new interiors business had.

"The dealer had no idea that there is another set of certified seats, and other interior products we can add to that package, like lighting and galley inserts," Collins's Ortberg told reporters in May. "The package went from a flight-deck upgrade to an aircraft upgrade."

Capitalizing on long-established customer connections that UTC and Collins has could lead to similar, incremental opportunities, ranging from onboard data management to developing software that link Collins avionics and UTC systems.

Hayes said that the UTAS and Collins product lines have "a couple of hundred million dollars" of overlap—much less than the $8 billion to $10 billion that last year's proposed UTC-Honeywell merger faced. "There is not a big divestiture risk…You're not seeing consolidation in individual systems," he noted.

While this may please regulators, others have concerns. Shortly after the deal was announced, Boeing said it intends "to take a hard look at the proposed combination," expressing doubt that the tie-up "would be in the best interest of—or add value to—our customers and industry."

Continues on page 66 ▶

NEXTANT FLIES FUSION-EQUIPPED CHALLENGER 604

Nextant Aerospace has flown a Challenger 604 outfitted with a Rockwell Collins Pro Line Fusion retrofit cockpit with touchscreen displays, the company announced last month. The avionics retrofit is one of the components of its remanufactured 604XT, which was announced in May at EBACE. However, Nextant is also offering the retrofit as a standalone product for Challenger 604 operators and early last month announced that Texas billionaire Toby Neugebauer is the launch customer for the 604XT.

At press time the Fusion-equipped 604 had made two flights and will continue with flight-test protocols before the aircraft is flown to the NBAA Convention in Las Vegas for the first public showing of the new cockpit. The company also plans to announce more details about the 604XT program at the show.

"The cockpit performed flawlessly," said Nextant vice president of flight operations Nathan Marker. "The Pro Line Fusion cockpit not only addresses pending regulatory and obsolescence requirements that the Challenger is facing, but also provides the flight crew with the absolute latest in forward-fit technology. The touch-interactive technology is intuitive and the overall integration provides exceptional situational awareness for the flight crew." —*C.T.*

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Nextant Announces 604XT Customer

Texas businessman Toby Neugebauer is the launch customer for Nextant Aerospace's 604XT avionics retrofit, which features the Rockwell Collins Pro Line Fusion flight deck. Neugebauer selected the standard avionics configuration, which will address pending regulatory requirements such as ADS-B OUT and TCAS 7.1. FAA and EASA approval is expected in June next year. More details about what cabin, aerodynamic and/or engine upgrades will be part of a more comprehensive 604XT program are expected at the NBAA Convention this month.

Pre-owned Bizjet Market To Stabilize

Prices of pre-owned business aircraft will continue to stabilize because of the buying off of an oversupply of aircraft, according to Leading Edge president Joe Carfagna Jr. and Guardian Jet co-founder Mike Dwyer. Carfagna said that the market will see an uptick in prices "very soon. Currently, we are in a unique place where values are low and used airplanes are starting to dry up. In my opinion, a five- or six-year-old airplane having half the value of a new one is uncharted territory for this industry. I don't think it will remain that way over the long haul."

Bizav Ops Mark Gains in Europe

Business aviation traffic in Europe jumped 8.8 percent year-over-year in August, marking the 10th consecutive month of growth, according to data from EBAA. Not since 2007 has the region experienced 6-percent growth in business aviation traffic through the first eight months of the year, EBAA added. The Southwest airspace block, or FAB (Spain and Portugal), remains among the healthiest regions for traffic, up 11.5 percent so far this year, EBAA said, while traffic in Croatia has jumped 12.5 percent.

Bizav Financing Attractive Again

Global Jet Capital expects more private-equity firms and hedge funds to enter the business aviation finance sector soon to diversify their portfolios and reduce their exposure to equities and bonds. The company also believes that the price of midsize to large-cabin business jets is beginning to stabilize following several years of falling valuations, further raising the appeal of business aviation financing to private-equity firms and hedge funds. With growing volatility in the financial markets, "Private-equity firms and asset managers are increasingly looking for ways to invest their funds in a way that offers low correlation with equities and bonds, but which also provides a strong income. Business aviation finance offers exactly this," said Global Jet Capital COO Dave Labrozzi.

FBO Replies To Pricing Complaint

OK3 Air, the lone aviation service provider at Utah's Heber City Municipal Airport-Russ McDonald Field, has issued a written response to an AOPA member who contacted the FBO to complain about its pricing. The facility was one of several recently highlighted by the organization over what it deemed "egregious FBO pricing." In the letter, OK3 pointed out that the company's pricing is determined by market conditions. "AOPA's argument that FBO prices are not reasonable unless they conform to the standards governing rates and charges by airport sponsors is without precedent," the letter stated. "Grant Assurance 22 cannot be read to require that aviation services be provided at a price acceptable to the AOPA membership."

TSA moves forward on crucial issues for bizav

by Kerry Lynch

While the senior leadership of the Transportation Security Administration (TSA) has turned over under a new administration, the business and general aviation community has continued to make progress on several key initiatives, such as improvements in the Alien Flight School Program and airport security guidelines, working in tandem with staff at the agency.

On August 10, David Pekoske formally stepped into the role of TSA Administrator, succeeding Peter Neffenger. Since his swearing in, Pekoske has begun initial outreach to international regulators, meeting with European Union officials in mid-September. That outreach is extending to stakeholders, and is anticipated to include the business and general aviation community in upcoming months, industry advocates say.

While that means another education effort for industry leaders, who want to make sure he understands the scope and diversity of business and general aviation, those industry leaders have remained engaged—and seen results of that engagement—within the ranks of the career agency staff. Some of this work has been accomplished through the industry/government Aviation Security Advisory Committee (ASAC).

The ASAC had been reactivated in the past decade, but was codified under the Aviation Stakeholder Participation Act of 2014, which directed the TSA to consult with an advisory committee on security matters. That put in place a structure that ensured industry has a voice and a means for regular communication with an agency that has undergone considerable churn over the years.

The committee represents a spectrum of industry, including general aviation, and has met at least quarterly, most recently on September 8, to discuss issues and make recommendations. The TSA has been incorporating a number of those recommendations.

Flight-training Initiatives

Chief among them are many of the ASAC recommendations surrounding the Alien Flight School Program, which was established shortly after 9/11 under the purview of the Department of Justice to create a vetting process for foreign students seeking flight training in the U.S. That program was shifted to the TSA and has been altered over the years to make it more workable. But the program still encountered problems, such as paperwork bureaucracies and delayed processing times.

The ASAC recommended that the TSA take a risk-based approach to the program, which would require rulemaking, and seeks to "modernize" the program with lessons learned since 9/11 and address industry best practices. Other proposals would clean up, strengthen and streamline the program, such as tightening coordination over visas and updating

David Pekoske, TSA Administrator

record-keeping requirements of wet and dry leases. Those recommendations were made in July last year, and the TSA has since been working to implement them, the committee reported. Some might take longer if they require rulemaking, but by May, the committee said in meeting minutes, "the turn-around time for vetting of Alien Flight School applicants has improved and is now down to a few days."

Recommendations in the Works

Beyond flight training initiatives, the subcommittee and the TSA have issued updated guidelines for users at and operators of general aviation airports. First assembled shortly after 9/11, the guidelines were in need of an update to take account of advancements in technologies and the addition of security programs/protocols.

The final document was formally released in July, providing a series of best security practices and recommending security enhancements based on the general aviation community's analysis of perceived threats, areas of vulnerability and risk assessments. While they are not regulatory, the guidelines provide an array of options, ideas and suggestions such as providing a means to identify risks and determine security needs. The committee is also mulling improvements to the Twelve-Five Standard Security Program and the Private Charter Standard Security Program.

Outside the ASAC, industry has collaborated with the TSA separately, through industry meetings and participation in other working groups.

Discussions have continued around improvements to the DCA Access Standard Security Program (DASSP), including either the outright elimination or a prototype program to replace the requirement for an armed security officer to be on board, the single biggest roadblock for business aircraft access to Ronald Reagan Washington National Airport. The TSA has coordinated closely on this, but industry leaders recognize that the DASSP program involves multiple security agencies and layers of approval.

Also, business and general aviation organizations worked with the organization on adjustments to temporary flight restrictions, among them the one that hampered traffic in Palm Beach, Fla., during President Trump's visits to Mar-A-Lago.

While still concerned about the restrictions involving those TFRs, business aviation leaders noted that the TSA was open to suggestions, and this resulted in the addition of a few gateways, as well as longer operating hours for vetting flights that were to fly into Palm Beach International Airport.

Business aviation advocates say dialogues continue in this area. However, one area that continues to languish is the Large Aircraft Security Program (LASP), which has been in the works for years. The original version of the program generated an outpouring of opposition, and for years the TSA has been working to develop an improved version. Industry leaders are on board with the development of a new, workable program because they believe it could provide a basis for access during security emergencies.

But with the regulatory review and the push to slow the proliferation of regulations under the new administration, few expect the LASP to make much progress any time soon. Nonetheless, the industry is encouraged by some of the progress made on security issues. In the past it had felt its issues were treated as the "crumbs on the floor" at the agency. But in recent years leaders have been much more encouraged by the interaction business aviation has had with the agency, even in a time of changeover. ❑

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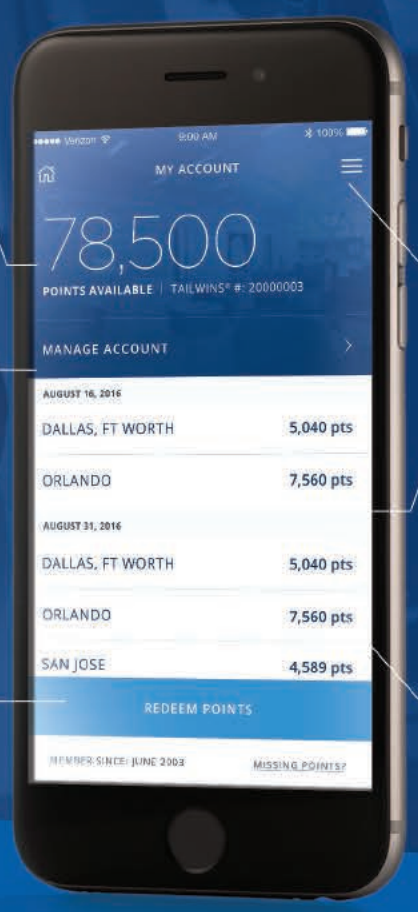

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NEWS BRIEFS Compiled by Chad Trautvetter

Bizav Flights Spiked for Solar Eclipse

Business aviation flight activity in the U.S. was up by 28.2 percent on August 21 as people clamored to fly into airports in the path of totality for the solar eclipse, according to Argus. There were 10,606 business aircraft flights that day, compared with a year-to-date Monday average of 8,276 flights. Argus said the top-five "totality airport" destinations were Tennessee's Nashville International (BNA), up 182 percent from its Monday average; Casper/Natrona County International (CPR) in Wyoming, up 555 percent; Charleston Air Force Base/ International in South Carolina (CHS), up 85 percent; Wyoming's Jackson Hole (JAC), up 70 percent; and Columbia Metropolitan (CAE) in South Carolina, up 231 percent.

Surf Air Furthers European Rollout

Surf Air continued expanding in Europe with the addition of London to Zurich service on September 25. It introduced the all-you-can-fly membership-based model to Europe this summer, beginning with a flight from London Luton Airport to Ibiza, Spain, using an Embraer Phenom 300 operated by FlairJet. Surf Air followed that a few weeks later by adding a route to Cannes. Plans call for service to Geneva and Milan by year-end. In Zurich, the company will run daily flights. Monthly cost for unlimited flights to the Swiss city is £3,150. Surf Air credits an already "robust membership base" in Europe and demand for the addition of the Swiss city.

Gulfstream Flies Fifth Flight-test G600

Gulfstream's fifth, and final, flight-test G600 made its maiden flight August 29 from headquarters in Savannah, Ga. Registered as N600G, the twinjet took off from Savannah/Hilton Head International Airport at 3:07 p.m. for a nearly three-hour flight, reaching 51,000 feet and a speed of Mach 0.85. Outfitted with the first production interior, N600G serves as a cabin testbed and will conduct function and reliability testing before the G600 enters service later next year. As of late August, the five flight-test G600s had logged 180 flights and 790 flight hours.

VistaJet Direct Offers Empty-leg Flights

VistaJet has launched VistaJet Direct, a digital membership offering priority access to one-way and empty-leg flights at preferential rates. For a $10,000 annual fee, VistaJet Direct members can request bookings on all available VistaJet aircraft before they are offered to the charter market. Bookings via the VistaJet Direct smartphone app are guaranteed and come with all of the company's typical services: sole use of a jet, a cabin hostess, catering and in-flight amenities. Through the app's geo-location feature, members can receive a push notification when a flight near them or from their favorite cities is available. The app offers fixed pricing and lets customers request flights through the app, order catering and arrange other ground services.

Advent Offers $3K Rebate for eABS

Advent Aircraft Systems has launched a "Get Ready for Winter" promotion for the eABS anti-skid braking system for the King Air B200/B300 and PC-12. It is offering a $3,000 cash rebate to operators that purchase eABS by October 31 and have the system installed by year-end. Not including installation costs or the rebate, eABS costs $55,890 for the King Airs and $50,604 for the PC-12. The installation typically takes one to two weeks. The eABS system is certified in the U.S., Canada, Europe and Australia for both aircraft types. Advent's eABS is also certified in the U.S., Canada and EASA for the Eclipse EA500/550. The company said it is working to add more business aircraft.

House vote possible on ATC privatization plan

by Kerry Lynch

White House officials are hopeful that the U.S. air traffic control reorganization proposal will be brought to the House floor for a vote this month, and a key official expressed optimism that the measure will pass. "The vote count in the House is looking very, very good," D.J. Gribbin, special assistant to the President for infrastructure policy at the White House, told the Airlines for America (A4A) Commercial Aviation Summit last month.

House Transportation and Infrastructure (T&I) Committee Republican leaders had initially hoped to bring the measure to the House floor in late July as part of a comprehensive six-year FAA reauthorization bill. But controversy surrounding the independent ATC measure pushed a vote beyond the August break. After an intense lobbying campaign through August, the T&I Republican leaders were encouraged once more by prospects of bringing the bill to the floor.

Gribbin, the keynote speaker at the A4A conference on September 13, added that while this idea has been around for a long time, at "no other time in history have so many things lined up in favor of this proposal," with the backing of the administration, the Department of Defense, the chairman of the T&I committee, the airlines and the controllers' union.

But the senior Democrat on the T&I Committee, Pete DeFazio (D-Oregon), has been skeptical about a dramatic shift in opinions on the bill. "It doesn't seem to me that things have changed much," he had said shortly after returning from the August break. Even if the bill were to progress in the House, DeFazio expressed doubts about chances of long-term passage, given Democratic opposition and opposition in the Senate. "It's very unlikely," he said.

Proponents in recent months have intensified their lobbying efforts and their rhetoric against opponents. During his speech, Gribbin reiterated arguments supporting the proposal, including the need for improved procurement and a more efficient system, and said that administration officials have tried to address key business and general aviation concerns by protecting access and including exemptions for user fees. The response, Gribbin claimed, is, "We just don't like it."

Other supporters, including those backed by A4A, also took aim at opponents, specifically the business aviation community. Some of these claims painted the industry as against ATC modernization, and a few others resurrected the argument that business aviation does not pay its fair share into the system.

Modernization Has Industry Buy-in

NBAA is among the organizations bearing the brunt of this criticism. Pete Sepp, president of National Taxpayers Union, said, "Rather than work toward a future that benefits everyone, NBAA is clinging to the past."

But NBAA said the claims confuse modernization with ATC privatization. NBAA president and CEO Ed Bolen told **AIN** that reform backers have pushed the message "that somehow privatization and modernization are connected. They are not." Bolen added that, looking back over the years, "the reality is…the general aviation community, including NBAA, has been very much at the forefront of making NextGen a reality. GA has made modernization a top priority for several years."

He also reiterated progress being made by the FAA in NextGen technologies and said GA has taken advantage of the NextGen infrastructure. "We were early adopters of GPS," he said, adding that as a percentage of the fleet, the community is "vastly ahead" of the airlines on equipage. The challenge facing NextGen, he added, is airline equipage, yet the airlines "continue to push this idea of taking over the ATC system."

Efforts to pit ATC reform opponents as against modernization "distract from the real motive, which is to promote ATC privatization, a risky scheme long pushed by the big airlines," Bolen said separately in an opinion piece.

But NBAA emphasizes that the association is only one part of the opposition to the bill. In fact, NBAA joined four other associations in emphasizing to lawmakers the scope of the opposition. The five associations wrote lawmakers, urging them to strip the ATC measure from the comprehensive FAA bill. The ATC reorganization proposal still lacks consensus, drawing substantial support not just from GA groups but also from consumer groups, conservative mayors "and countless others," they said in the letter to both House and Senate transportation leaders. "We believe that progress on modernization should continue by implementing targeted solutions to identified challenges and strongly support striking [the ATC proposal], to allow completion of comprehensive, bipartisan, long-term FAA reauthorization."

While both proponents and opponents continue a full-scale push on the issue, they each touted recent studies from government watchdogs as bolstering their arguments. Proponents of the ATC measure pointed to a Transportation Inspector General report calling the FAA's NextGen benefits estimate "overly optimistic," noting that capabilities have not yet been implemented and face challenges. The report further questioned the lack of alternative outcomes.

Opponents, meanwhile, highlighted a Government Accountability Office study that found the FAA is incrementally implementing and addressing risks associated with NextGen, and that recent cost estimates are "within range" of estimates from a decade ago.

"This GAO study is among several that break through the host of dubious allegations being made by the airlines and their supporters about the need for ATC privatization," Bolen said. "Equally important, the GAO and other congressional watchdogs are joined in raising serious concerns about this risky idea by consumer groups, 100 U.S. mayors, 100 business leaders, think tanks on the political right and left, members of Congress from both political parties and a majority of American citizens."

As another showdown over ATC loomed, lawmakers last month were turning their attention to another short-term extension of the FAA's authorization, which was set to expire on September 30. At press time, the length of the extension was still up in the air, with the Senate, House Democrats and the general aviation industry all favoring a six-month extension to provide NextGen and airport funding continuity. House Republicans, however, had remained quiet over their stance on length of time. They were believed to have preferred a shorter time frame, which would keep pressure on for passage of a more comprehensive bill. ❑

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NEWS BRIEFS Compiled by Chad Trautvetter

Pilatus PC-6 Production To End

Pilatus Aircraft will stop building the PC-6 Turbo Porter unpressurized turboprop single in early 2019 as it turns more attention to the PC-24 twinjet. The Swiss OEM has produced 500 Porters at the Stans headquarters since 1959, making it a contender for the longest continuous production run in the aviation industry. Fairchild produced 100 more Porters in the U.S. under license. Support will be provided to existing PC-6 customers for "at least" the next 20 years, according to Pilatus. Employees on the PC-6 production line will be assigned to the PC-12 or PC-24. Pilatus will accept orders for the PC-6 through the middle of next year.

Gogo Antenna Nods Clear Way for 4G Network

Gogo Business Aviation obtained supplemental type certificate and parts manufacturer approvals from the FAA for dual-directional antennas that, with the Gogo Avance L5 system, will connect to the new Gogo Biz 4G network. Through the 4G network, the Gogo Avance L5 system provides high-speed in-flight data speeds that support streaming. Efforts are under way for multiple STCs that will pave the way for installation of the Avance L5 system on 40 business jets, Gogo said, adding that existing STCs should facilitate installation on the majority of other aircraft. Avance L5 is designed to be "future ready" in anticipation of Gogo's Next Gen network that is scheduled to launch next year and anticipated to provide data speeds of up to 100 Mbps.

G280 Fleet Tops 100,000 Hours

The Gulfstream G280 fleet has surpassed the 100,000 flight-hour mark, a milestone reached within five years of the first model entering service. Some 115 G280s are in service and the fleet has achieved a dispatch reliability rate of 99.90 percent, the Savannah, Ga.-based business jet manufacturer said. The G280 can operate at challenging airports such as London City, Lugano and Samedan/St. Moritz in Europe. It has 3,600 nm of range at Mach 0.80, enough to connect New York with Paris, Chicago with London, and London with Dubai.

FAA Aligns NAT Ops with ICAO

Rules covering Part 91 operations of U.S.-registered aircraft over the North Atlantic have been updated to remove obsolete material and align with ICAO standards covering the North Atlantic Track (NAT) minimum navigation performance specifications (MNPS). Revisions to Part 91 are required because the ICAO NAT Region is transitioning from the decades-old MNPS navigation specification to a more modern performance-based navigation (PBN) specification. Last September, the FAA published a notice of proposed rulemaking requiring PBN specifications to operate in NAT high-level airspace by January 2020. Accordingly, the FAA proposed to remove all mention of MNPS in Part 91. The new rules go into effect on October 23.

Nav Canada Reduces Rates

Nav Canada, the private not-for-profit company that has been operating Canada's ATC system for two decades, has reduced charges. It will cut existing base rates by an average of 3.5 percent and implement a temporary one-year rate reduction of 0.4 percent. The company will also reimburse aircraft owners $60 million in a one-time 4.6-percent refund. The 3.5-percent average reduction to base rates and the 0.4-percent one-time rate reduction become effective for airlines on September 1. For general aviation charges, the reduction will be implemented on March 1 next year.

The winglets allow the Sovereign to climb to higher altitudes at heavier weights, says Winglet Technology.

Winglet Technology mod boosts Sovereign specs

by Kerry Lynch

With a supplemental type certificate (STC) secured, Winglet Technology is rolling out new "transitional" winglets for the Cessna Citation Sovereign and has already begun eying the next application for the technology—the Sovereign+. Winglet Technology obtained the STC on June 20, the culmination of a four-year development and certification program.

The result is "almost the equivalent of a new model," said Robert "Bob" Kiser, president and managing member of Winglet Technology. "We've taken an airplane that has spectacular takeoff and landing performance for its class and made it an entirely different airplane at altitude. The airplane will climb to higher altitudes at heavier weights and be faster than the legacy Sovereign. We've made the airplane much more operationally diverse in what it can do."

The retrofit of the transitional winglet dramatically cuts the time-to-climb to FL450, offers up to 35 knots additional speed at FL450, and extends range by 340 nm or allows up to 914 pounds' payload capability at equivalent range.

The winglets enable the aircraft to fly direct to FL450 in 28 minutes, rather than the step climb required on the non-winglet model, which takes about 73 minutes. In addition, the retrofit offers an mtow increase that will bring the Sovereign in line with the Sovereign+, with an additional 475 pounds of maximum takeoff weight and 200 pounds higher zero-fuel weight. The net effect of the weight increase, Kiser said, is extra useful load that "you can spend any way you want—by filling the tank or adding passengers."

Final results exceeded original targets of a 26-knot speed improvement at FL450, 305-nm range improvement and 350-pound gross-weight increase. Winglet Technology opted for a higher weight to ensure it matched that of the Sovereign+ and conducted a structural load analysis with the higher weights. The company also verified the improved performance through Textron Aviation's aircraft performance data.

Designed for Varied Conditions

Kiser said the gradual transition from the horizontal wing surface to the vertical winglet surface has improved the wing's aerodynamics. "The flow coming across a gentle transition has a tendency to perform better than an abrupt vertical design," he said, noting that a more abrupt change in surface direction causes the flow to "shock and separate at the transition. With the transitional winglet, we are trying to keep the flow attached over a broader range." This provides a wing that is "robust and handles a wide range of operating conditions" at higher altitudes and higher weight, he said.

The flight-test program involved 170 flying hours, as well as full-scale static testing on a wing. The Wichita-based company worked on the installation with Duncan Aviation and on early proof-of-concept flight-testing with Cessna. But the bulk of the flight-testing was done from Wichita Eisenhower Airport with the use of a customer aircraft that had the interior removed and was instrumented for the program. Cessna supplied a wing. "Once we got our hands on a wing to support full-scale static testing and secured an airplane, it went pretty quickly," Kiser noted.

Winglet Technology has already received significant interest from operators, Kiser said, noting that nearly 350 legacy Sovereigns are in service. The winglets will be offered through Textron Aviation's service center network, as well as Duncan Aviation, with a list kit price (not including installation) of $415,000. Duncan is offering an installed price of $495,000.

Winglet Technology is moving the design engineering team on to the next project, he said, which is anticipated to involve the Sovereign+. In addition to engine and avionics upgrades, the Sovereign+ has about nine feet more wingspan. The Winglet Technology project would involve removing that wing extension and adding the winglets. While the swap would shorten the span by three feet, Kiser said the result is expected to provide high-altitude benefits while preserving the short-field performance of the aircraft. He expects the Sovereign+ program to take less time than the Sovereign program, with completion in nine to 12 months once an aircraft is secured. ❑

ECLIPSE 700 TESTBED TAKES FLIGHT

Early last month One Aviation flew an Eclipse 700 testbed aircraft, an experimental Eclipse 500 fitted with an aerodynamically conforming version of the planned aircraft's larger wing. One Aviation test pilot Jerry Chambers reported that during the 1.3-hour flight the aircraft "felt solid, a testament to the engineering and build teams."

N990NE is the first of three planned testbed aircraft to test specific components for the Eclipse 700, a larger version of the Eclipse 500 with a new wing (for better performance and more fuel capacity) and a 14-inch fuselage extension. According to the company, subsequent testbeds will be developed for the Eclipse 700's Garmin G3000-based avionics and Williams FJ33-5A engines.

The September 1 flight came eight years to the day since Eclipse Aerospace took over operations in Albuquerque, N.M., to handle maintenance and upgrades to 260 aircraft manufactured by the former Eclipse Aviation. The company introduced the Total Eclipse refurbishment program and later resumed new aircraft manufacturing with the Eclipse 550. In April 2015, Eclipse Aerospace merged with Kestrel Aviation, developer of the K350 turboprop single, to form One Aviation. The new company announced Project Canada, which became the Eclipse 700 last year. —*R.F.*

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BARRY AMBROSE

Wheels Up is setting its sights on a 100-aircraft fleet by the end of next year and 10,000 members by the end of 2020. During the last four years in business, the membership company has built a fleet of 78 Beechcraft King Air 350is and Cessna Citation Excel/XLSs and is approaching 4,000 members.

Wheels Up lines up funding, on track for 100-aircraft fleet

by Kerry Lynch

Four years after launching the business, private aviation provider Wheels Up has built a fleet of 78 Beechcraft King Air 350is and Cessna Citation Excel/XLSs and is approaching 4,000 members. Shooting for a 100-aircraft fleet by the end of next year and 10,000 members by the end of 2020, the company is positioning itself to go public in the next year or two.

Wheels Up opened for business in 2013 with a firm order for 35 King Air 350is and options for up to 70 more in what had been the largest order for the twin turboprop. CEO and co-founder Kenny Dichter outlined a vision of building a membership-based private aviation transportation firm that would tap into the pool of airline passengers and could attract 1,000 members in the first few years, with a goal of 10,000 members eventually.

Kenny Dichter, CEO and co-founder

While those plans might have drawn some initial skepticism in the industry, the company has remained on track with its business plan, said Dichter. So far the company has taken delivery of 63 King Air 350is and 15 Citations. And on July 5, Gama Aviation, the company that operates the fleet, conducted the 100,000th Wheels Up flight, from Jacksonville, Fla., to Nashville, Tenn.

In addition to reaching that marker, Gama reported that Wheels Up flights continue to reach new heights, with 400 conducted in one week last summer and 100 passenger legs flown in a single day, also last summer. "Four years ago, Wheels Up was an idea, a PowerPoint presentation and a spreadsheet," said Gama Aviation president and CEO Thomas Connelly. "Now its flight operations have the same scale as a regional airline—it is fast approaching 6,000 flight sectors per month—with the continual drive to democratize private aviation."

The company is on pace to top 4,000 members by year-end, Dichter said, adding that it is tracking toward an anticipated run rate of $300 million this year.

Long-term Growth Plans

Dichter sees substantial opportunity for growth. In late June the company closed on a credit facility that "locked in our next 17 King Airs." The $90 million facility was with New York-based private equity firm KKR.

Dichter can see an initial public offering in 12 to 24 months. "Our Wall Street partners view the public market as the natural place for Wheels Up," he noted. The projected time frame of 12 to 24 months is "short, like tomorrow. We have to have all our ducks in order. It's a very exciting time for us."

Long-term, he sees potential for Wheels Up to be a billion-dollar business. This growth would be through both the King Air/Citation programs and through Flight Desk, which connects members with "partner" aircraft to provide travel options.

Dichter believes that 10 years down the road, the worldwide market for Wheels Up could require 1,000 aircraft.

The company sees growth through not only membership retention—"tracking toward a goal of 90 percent"—but also through attracting new customers into private aviation. About a third of new members come from the ranks of the airlines' customers, opening the door to an "addressable market" of 1 million to 1.5 million people in the business community, Dichter said. That market is both inside and outside the U.S. Wheels Up has been laying the foundation to expand the King Air program to Western Europe and hopes to have the timing firmed by the end of this year or early next year. But first, Wheels Up is expanding Flight Desk to Europe. Flight Desk currently has a run rate of $50 million. ❑

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Court rulings raise questions about FAA decision-making

You may have read reports that the FAA lost two significant legal cases in the last few months, one involving model aircraft drone registration and the other a petition for rulemaking on airline seat sizes. These losses and what the Court had to say left me wondering what—if anything—the decisions reveal about FAA decision-making.

Agencies lose cases, of course. But it's relatively rare because the legal standard for overturning agency decisions is high. The FAA is no exception to the high rate of success on appeal—it wins (or settles) the overwhelming majority of its cases—both those it prosecutes and those it defends. That's why these two recent decisions by the United States Court of Appeals for the District of Columbia seemed so significant to me. It's not just because the FAA lost, but because the Court of Appeals in both cases used particularly scathing language in its decisions.

The first case, decided in May this year, involved the FAA's decision to issue an emergency rule in December 2015 requiring hobbyists flying model aircraft to register their models and set up a timetable to do so: new owners before their first flight and those who already owned their drones by February. The FAA was particularly concerned about pilot reports of drones flying near airports or near aircraft. While many if not most of those reports could not be verified, the FAA remained highly concerned about the possibility of an incident or accident caused by a drone.

For reasons I find inexplicable, the agency decided that registration would help prevent the likelihood of an accident by "educating" drone owners via the registration process and holding them accountable if an incident or accident occurred, presumably by tracking them down by the registration number.

I didn't believe that the few minutes it took to register constituted education nor did I think tiny registration numbers (which could legally be put inside the aircraft's battery compartment) would lead to identification of the operator except in the rare case where a drone crashed, was found and the identification numbers survived.

Many legal experts viewed the rule as illegal for a number of reasons, among them the decision to issue it as an emergency rule without the typical notice and comment period required by law. Part of the FAA's justification was the number of drones expected to be given as gifts at Christmas that year. Surely, as many commenters pointed out at the time, the arrival of Christmas in December could not have been a surprise justifying emergency action.

Rule Violates Statutory Prohibition

But what did surprise many of us was the FAA's decision to ignore a specific Congressional requirement pertaining to the FAA and rulemaking related to model aircraft. And that is what the Court of Appeals focused on in its decision. The Court concluded: "In 2012, Congress passed and President Obama signed the FAA Modernization and Reform Act. Section 336(a) of that Act states that the FAA 'may not promulgate any rule or regulation regarding a model aircraft.' The FAA's 2015 Registration Rule, which applies to model aircraft, directly violates that clear statutory prohibition."

In its decision, the Court emphasized just how clearly the FAA had violated the law: "Notwithstanding that clear statutory restriction on FAA regulation of model aircraft, in December 2015 the FAA issued a final rule requiring owners of all small unmanned aircraft, including model aircraft, to register with the FAA."

John Goglia is a former member of the NTSB and currently a safety consultant. He welcomes your e-mails at gogliaj@yahoo.com.

And once more, "In short, the 2012 FAA Modernization and Reform Act provides that the FAA 'may not promulgate any rule or regulation regarding a model aircraft,' yet the FAA's 2015 Registration Rule is a 'rule or regulation regarding a model aircraft.' Statutory interpretation does not get much simpler. The Registration Rule is unlawful as applied to model aircraft."

'Vaporous Record'

On an issue near and dear to my heart—emergency evacuations in the event of an airline disaster—a consumer

Continues on page 80 ▶

Bizav groups weigh in on SMO case

by Kerry Lynch

The Aircraft Owners and Pilots Association and General Aviation Manufacturers Association have submitted amicus briefs backing a lawsuit NBAA and five other stakeholders filed in response to the FAA's Santa Monica Airport (SMO) settlement agreement. NBAA and the five stakeholders filed the lawsuit earlier this year with the U.S. Court of Appeals for the District of Columbia in an attempt to block the January 28 agreement between the FAA and city of Santa Monica over the fate of SMO. The agreement essentially permits the city to shorten the runway immediately and to close SMO in 2028.

NBAA and the stakeholders filed a brief in that case in August, charging that the FAA had disregarded statutory requirements in signing the agreement. In the amicus briefs, GAMA and AOPA agreed with that contention and outlined concerns about the national implications of such an agreement. The FAA requested an extension until October 23 for its response deadline.

Legal Precedent

"This case concerns continued access to a public-use airport, which cannot be considered in a vacuum," GAMA told the court. The case has "implications not only at Santa Monica Airport, but also more broadly for the National Airspace System and the aviation industry."

GAMA added that statutory and regulatory requirements are in place to protect the public interest in the national aviation system, pointing to the Airport Noise and Capacity Act (ANCA) of 1990, which established a national standard to phase out noisier aircraft and promote development of quieter aircraft.

"The decisions underlying the settlement agreement flout these regulatory requirements," GAMA said, adding, "For decades, these requirements have helped to preserve Santa Monica Airport in the face of efforts to restrict operations and/or close the airport. GAMA is concerned about the precedent this case sets not only at Santa Monica Airport, but also for other airports."

The legal framework governing the U.S. airport infrastructure reflects not only that airports have public value but also that airports are part of a national system rather than "local isolation," GAMA argued in its brief. It noted the importance of consistent application of airport noise regulations and said, "Allowing the city of Santa Monica to circumvent [such regulation] sets a dangerous precedent that threatens the stability of the national transportation system and continued progress in noise reduction."

AOPA also argued for the preservation of the public's right to enforce compliance with grant agreements, deed restrictions and other commitments. The city has accepted public funds and benefits for the airport, AOPA noted. This gives the public the right to seek enforcement of the assurances, and the FAA has the responsibility to investigate and enforce any alleged violation.

"The settlement agreement appears to negate this important public right and to effectively circumvent the FAA's mandated responsibility to investigate and enforce compliance with obligations," the association said. "The FAA cannot avoid the responsibility it owes to the public it serves by modifying the terms of grant and deed-based obligations in a settlement agreement." ❑

CHARTER MARKET REPORT 2017

BY JAMES WYNBRANDT

The industry is climbing

Charter activity is up worldwide, according to data and anecdotal reports, and appears to be gathering momentum. In the U.S., charter is leading a domestic business aviation resurgence, registering a 10-percent increase in the number of flights (543,449 compared with 493,431) and 12.7-percent boost in flight hours (765,196 compared with 679,018) in the first half of this year compared with the same period last year, lifting the overall gain in business aviation activity 3.9 percent. Part 135 activity grew five of the first six months, and more hours (119,696) were flown in the slowest month this year (February) than in any of the first six months of last year, according to the Argus 2017 Midyear Business Aviation Review.

"There are a lot of options for ways people can access private aircraft, and the Part 135 operators and brokerage community have done a really good job of marketing their products," said Joe Moeggenberg, Argus president, CEO and founder, adding, "the number of inquiries we're getting from people who have never used private airplanes before is on the uptick."

In June online charter marketplace platform Avinode reported handling a record 500,000 trip quote requests worldwide for the month, a milestone shattered in July with 624,000 requests, representing a YoY increase of almost 50 percent. "There is an optimism back in the industry," said Per Marthinsson, Avinode cofounder and executive v-p Americas.

Likewise, the second-quarter report of JSSI's Business Aviation Index, which tracks 2,000 business aircraft worldwide, including the fleets of major charter operators VistaJet, Delta Private Jets and Executive AirShare, is also "up significantly," said Neil Book, JSSI president and CEO.

Plenty of upside remains. "We're not seeing any slowing down," said Moeggenberg, and the activity level "is nowhere close to 2007 and 2008," added Marthinsson, referring to the busy years before the big recession.

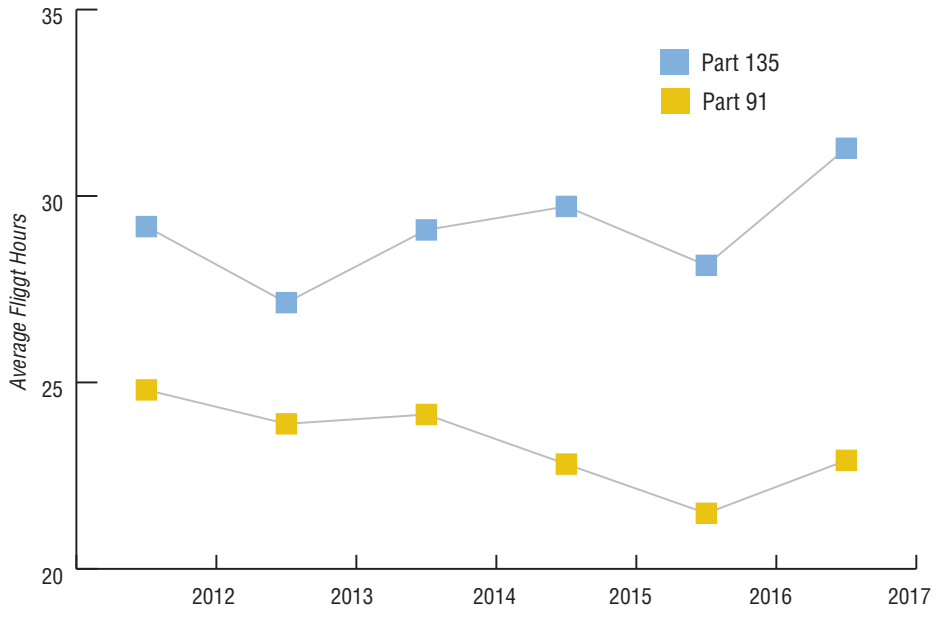
U.S. CHARTER MARKET

Domestic operators are building the utilization of their charter fleets by double digits. The top 25 Part 135 operators expanded their charter fleets an average of 5.4 percent in the first half of this year from last year (to 1,045 from 991). Meanwhile, flight activity jumped 15.8 percent, to 476,988 hours this year from 412,005 hours in the first half of last year. Thus, the average aircraft from the Top 25 charter fleets flew 456.5 hours in this year's first half compared with 416.2 hours in the same period last year.

Executive Jet Management (EJM), number two on the Argus Top 25 list this year with 51,782 charter hours on 137 managed aircraft, was among the double-digit growth achievers, said Ty Dubay, senior v-p, charter sales and customer experience. Dubay reports owners are flying more than previously, "However, it has not reduced their appetite for charter [revenue]. Instead, it has triggered the need for more management of the flight department—staffing, maintenance and inspection downtime—to support the higher total flight volume." On the sales side, EJM has hired a new national v-p of charter sales, responsible for all inside sales offices (Teterboro, Columbus, Cincinnati and Chicago), a new central region outside sales v-p, and is "actively interviewing" for an outside sales v-p for the NYC metro area.

Solairus Aviation (number seven on the Argus Top 25 Part 135 operators list) of Petaluma, Calif., with 50 of 120 managed aircraft on its charter certificate, has also seen owners' appetite for charter revenue grow over the past year, and has stepped up fleet utilization accordingly, said Paul Class, senior v-p, charter sales. "We recognize that Part 135 operations are

Q2 2017 Flight Hour Activity by Operator Type YoY



Source: JSSI

important to 25 to 30 percent of our owners, so we take Part 135 and third-party charter seriously." In the past year, the company's charter operations business has benefitted from fleet additions of super-midsize and large-cabin aircraft in Florida, Oklahoma and Chicago as well as Southern California. Solairus offers customized block charter arrangements but has no card or other plan offering.

With the addition of airplanes in the last annum, Jet Linx Aviation (number six on the Top 25 list) passed the 100 managed aircraft milestone this year. A 20-percent rise in revenue hours in the past year reflects the added lift. "If they flew 250 [charter] hours last year, they more than likely flew 250 hours [so far] this year," Jamie Walker, president and CEO, said of the fleet's aircraft. Ninety percent of the fleet is on the charter certificate and serves the company's charter access programs. The Executive and Club programs, with 1,300 members, charge a one-time fee of $17,500 and $12,500 respectively, providing access to the fleet at fixed hourly rates. Rates range from $3,500 per hour (round trip) on a light jet card to $8,500 per hour (one way) on a heavy jet.

Elliott Aviation, noted for its MRO services, is trying to build its charter fleet. "We desperately need more airplanes," said Brian Hahn, Elliott's v-p for flight services, who's brought seven aboard—two added to Elliott's certificate—since he joined the company early this year. "We field more calls for charter than we can handle," Hahn said.

A Des Moines-based Citation Excel is the next addition, and will bring the fleet total to 15, six available for charter. Elliott has also "overhauled our scheduling and quoting process, and added some schedulers and sales people on the charter side," and "reset the foundation for continued growth," Hahn said. Elliott offers a deposit-based block charter program, which covers brokered charter as needed.

FROM OPERATOR TO BROKER

Traditionally charter operators have focused on using their own fleets, quietly passing charter requests they couldn't accommodate to a close-knit circle of fellow operators. Now some have developed their brokerage arms into potent revenue sources in their own right. Priester Aviation has put "a strong emphasis" on its brokerage, now accounting for 30 percent of the Wheeling, Ill.-based company's charter revenue. "We've been building a relationship strong enough with our customer service

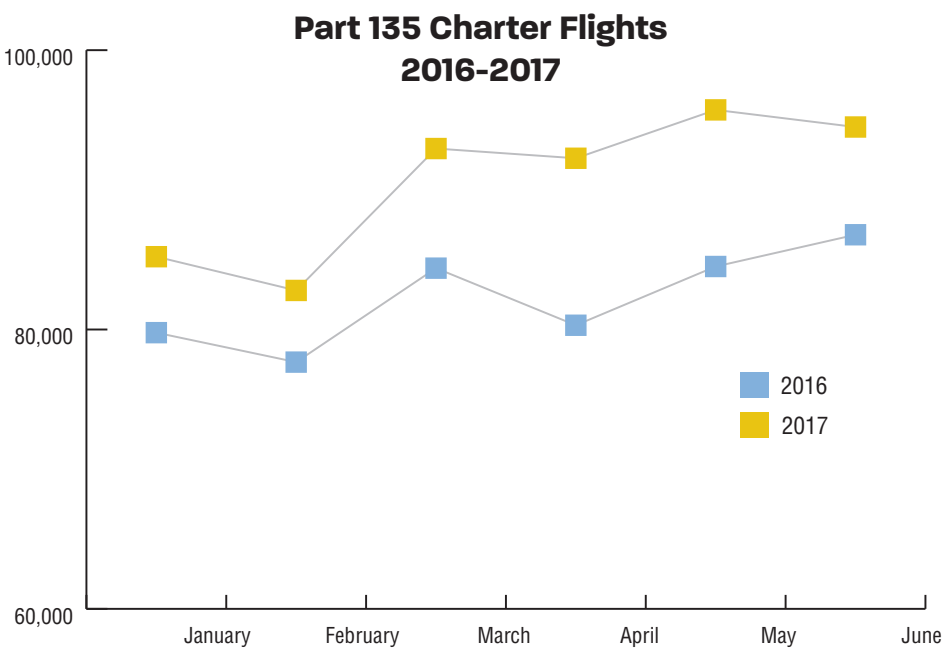
Continues on next page ▶

Solairus Aviation

Top U.S. Part 135 Operators in 2017

Rank	Operator Name	2017 Hours	2016 Hours	2017 Fleet Size	2016 Fleet Size
1	Gama Aviation	62,114	45,308	99	86
2	Executive Jet Management	51,782	48,024	137	139
3	XOJet	45,254	43,752	41	41
4	Travel Management Company	37,015	41,215	54	64
5	Delta Private Jets	36,510	36,825	70	69
6	Jet Linx Aviation	28,642	21,685	91	71
7	Solairus Aviation	22,472	16,815	48	47
8	Jet Edge	18,319	14,396	47	44
9	JetSuite Air	16,293	14,781	20	19
10	Corporate Flight Management	15,900	8,555	30	24

Source: Argus TraqPak



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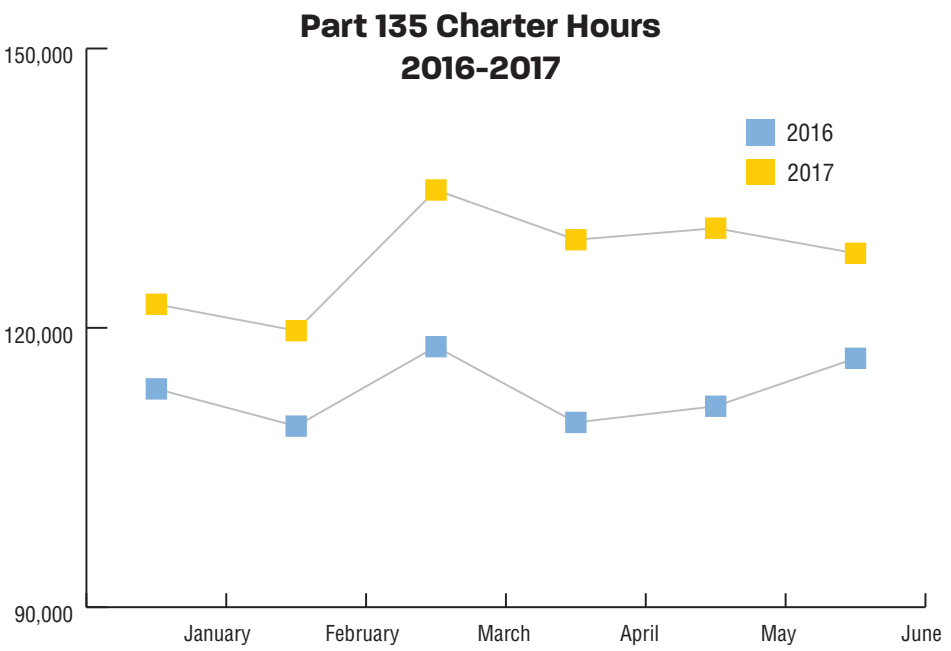

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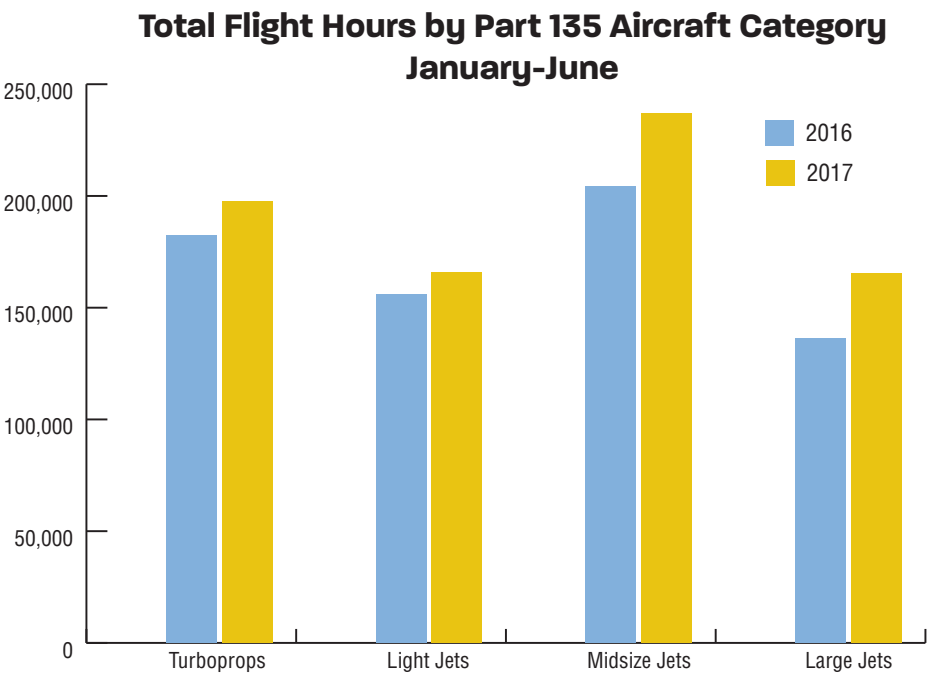


Source: Argus TraqPak

Climbing industry

▶ *Continued from preceding page*

that clients want to go with us" for arranging charter even when no appropriate aircraft from its own fleet is available, said Gary Gennari, senior v-p of retail charter sales.

Membership program Wheels Up established a Flight Desk brokerage arm in the spring last year and CEO-founder Kenny Dichter calls it "one of our fastest growing initiatives," saying, "We'll exit 2017 with a $50 million run rate on that business."

It's the same at membership program JetSuite, where charter brokerage "is probably the fastest growing, year-over-year" part of the business, said Cameron Gowans, v-p, sales and marketing. "SuiteKey members who like the JetSuite experience don't necessarily go outside JetSuite, and ask us to find an airplane for them" when an aircraft from JetSuite's fleet of light jets isn't suitable.

XOJet has also gone big on brokerage. Brad Stewart, president and CEO, calls the results "Fantastic. Through the middle of the year, we've done about $100 million annualized in brokerage business, versus between $200 and $250 million on fleet revenue. Three, four, five years ago we were an operator only, somebody brokerages put clients on. Now people are coming to us to manage their private aviation needs even when XOJet isn't the fleet operator."

Yet the operator/broker street is two-way. Charter broker Horizon Air Group of Dallas acquired Houston-based charter management company Starbase Jet in June—now rebranded as Horizon Jet Management—and is now a charter operator, as well as broker. Horizon founder and CEO Luis Barros and partners Randall Mize and Rob Rosenberg previously worked at Starbase, which had 10 aircraft under management at the time of acquisition. The charter fleet consists of a Legacy 600, Citation XLS and XLS+, Challenger 601 and CJ4. The company signed its first new management agreement, a Learjet 45XR based in Oklahoma City. Charter revenue will be split 85-15 with owners, "every penny that comes in because of that tail," says Borros. "This is the only way to do it and not lose our sanity."

EAST MEETS WEST

Two major charter operators have established transcontinental connections this year: Gama Aviation Signature expanding from its East Coast U.S. HQ to a West Coast presence with the acquisition of Landmark Aviation's charter/management business; and Van Nuys, Calif.-HQ'd Clay Lacy Aviation getting a foothold on the East Coast with its purchase of Key Air in Oxford, Conn. The rebranding of both Landmark and Key Air are complete.

"Now we're right across the board, East Coast to West Coast, we've got all major hubs covered," said Tracy Cassalas, director, charter services at Gama Aviation Signature, number one on the Argus Top 25 Part 135 Operators list. (Gama Aviation Signature, based in Shelton, Conn., is 20-percent owned by UK parent company Gama Aviation.) The Landmark purchase closed January 1. Gama, which operates the Wheels Up fleet, offers customized block-hour agreements but has no plans to create its own membership program. Meanwhile, July

Continues on page 26 ▶

Gama Aviation

International market builds

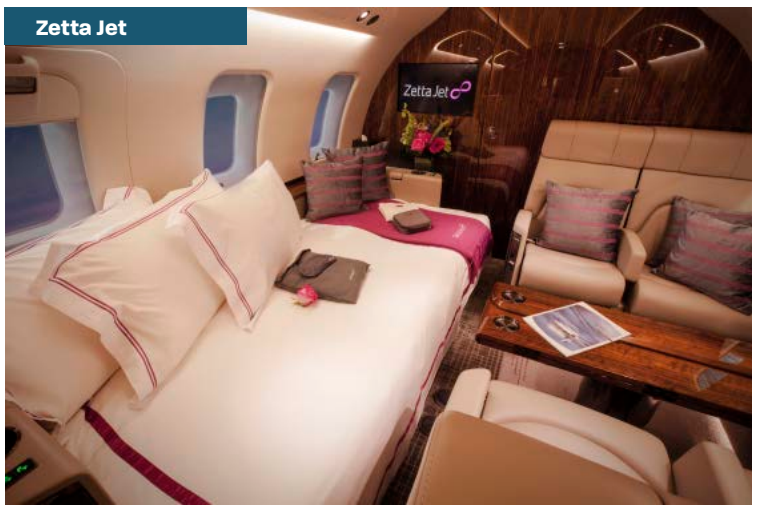
EUROPE

Austrian Citation Mustang charter operator GlobeAir reported that first-quarter activity jumped by almost one third, with average utilization of 157 hours per aircraft for a 31-percent increase YoY. The surge was "mainly driven by C-suite executives who understand the opportunity cost gained in saving time through efficient travel," according to Mauro De Rosa, chief marketing and sales officer. GlobeAir acquired two new jets, bringing its fleet to 16, the world's largest Mustang fleet, according to the company.

Geneva-based Global Jet has recently added a Global Express XRS, a new Legacy 450, a new G650 and an ACJ Elite 318 to its charter fleet. The last is the company's fourth ACJ available for charter of eight under management, said Bjorn Naberhuis, v-p of business development. The company will open a brokerage in Spain, where charter business is expanding, joining its current network of 12 offices.

Prague-based Time Air, operator of Europe's largest Nextant fleet, has launched the Greytscale aircraft management program, which provides "a significant charter revenue component," said Vaclav Stransky, director of aircraft management. ("All the airplanes are the same: white interior, gray exterior, so they can be swapped and we don't have any hiccup in operation," Stransky said of the Greytscale name.) Time Air replaced King Airs and Citation Mustangs with Nextants after first operating the remanufactured jets in 2012. "We came to the conclusion that for the mission we've been serving, it was the best for the money," Stransky said. Time Air's five managed Nextant 400XT/XTis each generate about 500 revenue hours per year. "We are able to guarantee to the owner that the only thing he's going to pay for is fuel; the operational cost will be covered by charter."

This summer the European market got a boost from Middle Eastern customers and lift. Oliver Hewson, Gama Aviation's commercial manager in Sharjah, United Arab Emirates (UAE), noted that the early arrival of Ramadan this year led many Middle Eastern aircraft owners and charter customers to spend the summer in Europe, making the Continent the charter nexus for the majority of the company's clients. Gama's UAE charter fleet offers a Legacy 600, two Learjet 60s (executive and air ambulance configurations) and a newly added Global Express.



Zetta Jet

Meanwhile, with the uptick in charter, the Baltic Air Charter Association has requested an "urgent review" from EASA of regulations governing flight cost-sharing apps, such as Skyüber, Wingly and FlightClub, concerned they could contribute to illegal air charter. The FAA has not approved such apps, but some app makers have filed suit to have the agency's prohibition reviewed.

ASIA

The Asian charter market "is holding up: it's not explosive, or double digit, but it's healthy and continues to improve," said Jeffrey Lowe, general manager of Hong Kong-based consultancy Asian Sky Group (ASG). Twenty percent of ASG's business comes from charter brokering. "To get a half decent margin" in a highly competitive charter market, ASG is packaging bespoke tours, handling all ground transport, hotels and special-event access arrangements. The offering kicked off last year with a deluxe tour for 10 friends aboard a Falcon 7X, and itineraries this summer included an excursion to East Africa for the Great Migration with a side trip to Europe for shopping and dining.

ASG also handled charter arrangements for the UK's Manchester United soccer club on its tour of China last summer, using an ACJ330, BBJ and two G550s—often at different times—to transport the 150-person contingent.

ASG also publishes regional reports on business aviation, and released its first charter report last year. An updated version is anticipated in next year's second quarter.

Malta based VistaJet "had a good strong first half in Asia and India," CCO Ian Moore reported, while China has become one of the company's fastest growing markets. The first six months of this year saw a 12-percent YoY gain in passenger departures and 14 percent more passengers arriving. In response, VistaJet launched a Chinese website and the WeChat booking service this year.

Gama Aviation has seen its fortunes in Hong Kong rise in the aftermath of the 2015 joint venture with the Hutchinson Group and now has three Global 5000s and a G550 for charter. But operating charter or other bizav flights remains challenging as the Hong Kong airport

Continues on page 24 ▶

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WHEELS UP

UP THE WAY YOU FLY

Customers embrace online charter model

Trip requests—that is, requests for a price quote sent from a broker to an operator, the foundation of Avinode's online charter marketplace—were up 112 percent YoY in the U.S. in this year's first half. That's a reflection of changing broker-operator interactions as well as stronger charter demand, said Per Marthinsson, Avinode co-founder and executive v-p Americas. Avinode is "getting a bigger share of wallet in terms of the way [brokers] resource" lift, as they rely less on direct telephone contact with operators. Marthinsson added that brokers' usual contacts might not have available lift because of the demand for charter, adding to the reliance on web-based sourcing. (Unique trip requests, a more reliable gauge of charter demand, climbed 41 percent this year compared with last.) One-third of operators respond within 45 minutes, "three to four times as high in the past," said Marthinsson. "We've come to the tipping point where they realize the value of responding quickly."


Jonny Nicol, Stratajet

Charter operator Air Hamburg reported at the annual Avinode Academy gathering this year that it received 680 requests in a single day, and quoted them all within 20 minutes of receipt via an automated Avinode quoting tool.

Paynode, a product Avinode bills as the "Paypal of air charter," launched last year, is now available in Mexico, and European roll-out is on the way. The big news is Paynode's forthcoming bank wire transfer payment capability. Credit card payments, which Paynode is now limited to, represent only 10 percent of charter transactions, Marthinsson said, as bank wires are less expensive.

In the past year Avinode has also improved its Trip Management product and pages, and created a new search interface that's "twice as fast" and allows real-time filtering of search results. Such efforts help keep Avinode the dominant platform, with few real would-be challengers.

But you don't call your flagship product "Rock Star"—even as a working title—without having grand ambitions, as with the relaunch of FOS, the widely used flight operations management tool, as a digital platform. Here the Rock Star name serves double duty as an anagrammatic allusion to Rockwell Collins and Stellar, who've teamed to engineer the transformation. "The tools that operators use were all written before the internet," said Paul Touw, Stellar's CEO and chairman. "We're rewriting the functionality of FOS into a cloud-based system."

Stellar introduced the in-development charter market platform at NBAA 2015, then last year partnered with Rockwell Collins to integrate its vision of a charter portal akin to a Kayak or Travelocity with the operations software used by the operators of some 6,000 registered business aircraft. The two companies are together investing about $50 million in the upgrade, Touw said. FOS handles flight planning, scheduling, customer relationship management, quoting and many other flight department functions. Some key modules will be released next year to all FOS customers, with upgrades and transitions continuing into 2020. The upgraded FOS will be "roughly in the same price range" as subscribers currently pay, Touw said.

Avinode has several hundred FOS clients, and interfaces with 30 scheduling platforms, and Stellar "would be welcome to interface with us," said Marthinsson.

Four UK-based platforms—PrivateFly, Returnjet, Stratajet and Victor—aiming to be Avinode alternatives continue to enhance their services in pursuit of the holy grail of real-time quoting and click-to-buy booking and the largest share of traffic in an expanding but highly competitive digital marketplace. At Victor, YoY online requests are up 120 percent, average value of trips booked is up 40 percent, and the highest-value trip this year was $553,000, founder and CEO Clive Jackson said, while the company "is aiming to join the $100 million table [in bookings] over the next 12 months." (Bookings in 2016 amounted to $39 million.) Victor's mobile app is used for 60 percent of transactions, and almost one-fifth of bookings have come from first-time private fliers.

At Returnjet, online inquiries from January through July grew "400 percent," now ranging from 3,000 to 5,000 per week, said aviation director Steve Westlake, noting that the company has added live instant quoting and payment capability. The highest-value trip booked this year is $820,000. Online traffic growth comes in part from younger brokers who have grown up with the internet and, thanks to sites such as Facebook, LinkedIn, YouTube and search engines such as Google, don't believe in the subscription model," Westlake said. Returnjet derives revenue from online advertising and sales of enhanced versions of its quoting services.

PrivateFly performed 1.5 million flight searches in the last year and enjoyed 51 percent YoY sales growth, with average spend per flight up 39 percent in the second quarter, said founder and CEO Adam Twidell. The fastest time from inquiry to takeoff in the last year was 29 hours, 57 minutes. In the U.S., half of flights were booked via mobile device, and 44 percent on desktop. U.S. business "grew 88 percent YoY, and we anticipate it being 50 percent of our sales by 2020," said Twidell. Average customer age is 39, and average number of passengers per flight is 4.6.

Stratajet, which launched a U.S. platform a year ago, is "focused on Europe" for the moment, founder and CEO Jonny Nicol said. Bookings are up 86 percent YoY and "hitting our internal targets and our high expectations," he said. ❑

Pilot Shortage

A crew shortage is affecting air charter. "Everybody's talking about this pilot shortage," said Argus president Joe Moeggenberg. "The situation is becoming very real and it is going to have an impact on the Part 135 industry."

The shortage is "all across the spectrum," said Jet Aviation's Don Haloburdo. "We're seeing the challenge we have hiring quality individuals for every aircraft added to the fleet, whether on the charter side or the Part 91 side." Where it previously took 30 days to find and hire a qualified flight crew, "it's taking 60 or 90, or even more time," he said.

"Airplanes getting delivered into the business aviation market are designed to go from New York to Beijing, LA to Tokyo," Haloburdo added. "The owner is going to take delivery and on the first trip is going to Singapore. Finding crewmembers who have the level of experience to accomplish those trips, that's not an easy bill to fill."

Salaries and job expectations are rising, with "a much stronger focus on 'What's the quality of life I can expect out of this,'" and "a lot more choosiness" among pilots, Haloburdo said. "It's driving salaries up significantly, but that's not doing anything to fix the problem. It's just making it expensive for owners."

This pain is likely to spread. "The salary and benefits that well qualified pilots can now command is on the uptick, and at some point that's going to have to be passed on to the consumer," said Moeggenberg. "Charter rates have got to go up."

"As an industry we're not doing anything," said Haloburdo. "This needs a 20-year solution to get the number of pilots the aviation industry is going to require, and there isn't a good solution out there."

Operators are finding, or will have to find, ways to adapt. Contour Aviation, the former Corporate Flight Management, has developed "our own in-house farm system" that can take an employee from ground handler to charter pilot, said CEO Matt Chaifetz. Contour helps employees obtain the required ratings, starts them "in the right seat of a Jetstream, and in a few hundred hours moves them to captain of a Jetstream, then into an Embraer" as they gain experience. One of the company's Learjet pilots started her career in ground ops, as did a Challenger 605 pilot.

Based in Smyrna, Tenn., Contour has also raised pilot salaries, with most "making 20 percent more than they were two years ago," and is "investing a lot in our culture: quarterly conference calls with different pilot groups to talk about what's going on in the company," said Chaifetz, "an open forum for everyone to ask questions."

This year Contour moved into new 13,000-sq-ft headquarters and opened an FBO in Cleveland, Tenn. —*J.W.*

Int'l market

▶ *Continued from page 22*

authority fine-tunes a restrictive landing slot access system, said Sergio Oliveira e Silva, general manager in Gama's Hong Kong office. This has led some aircraft owners in Hong Kong to use charter, turning the logistics of getting a jet in and out of the airport to a third-party provider, Oliveira e Silva said.

A struggle over international charter firm Zetta Jet has emerged, with current management filing for Chapter 11 bankruptcy restructuring in the U.S., while former management—but also still majority shareholders—say they have obtained an injunction in Singapore against that effort. Despite the bankruptcy filing, Zetta Jet plans to continue normal business operations.

Separately, Zetta Jet filed a lawsuit in the district court against Geoffery Cassidy, the former managing director. "The debt restructuring was necessitated by the company's recent discovery that its former managing director, Geoffrey [sic] Cassidy, had misappropriated funds from the company and committed other fraudulent activities," the company alleged in a statement. The board terminated Cassidy and installed Michael Maher as interim CEO and agreed to move forward on bankruptcy proceedings.

Meanwhile, Cassidy noted that he and another director, Li Qi, own a combined 64 percent share of Zetta Jet and that the bankruptcy filing "was done by the CEO, without the authority of the majority shareholders." The majority shareholders, he claimed, obtained an injunction from the Singapore High Court against company directors James Seagrim and Stephen Matthew Walter and Zetta Jet itself "to stop them, whether by themselves or through their agents, solicitors or special counsel, from carrying out any further steps in or relating to the Chapter 11 filings, until trial or further order." ❑

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▶ *Continued from page 22*

and August, traditionally slow charter months, have seen "a huge uptick in midsize jet activity," Cassalas said.

At Clay Lacy Aviation (number 12 on the Top 25), the last of the former Key Air fleet was boarded to its certificate in June. "We're really excited about having a presence on the East Coast," said Veriar Jenkins-Collins, v-p of charter, managed aircraft services. "It's been a dream of Clay Lacy Aviation."

Meanwhile Jet Aviation (number 11 on the Top 25 list) has solidified its transcon footprint since last year's purchase of large-cabin operator Avjet, "giving us brick and mortar" on the West Coast, said Don Haloburdo, v-p and general manager, Flight Services. Jet Aviation, which formerly had only an office at Van Nuys, also won the RFP at that airport to build a new FBO, slated for completion by next June, joining facilities at Burbank, Calif; Washington/Dulles; and the Teterboro, N.J. U.S. headquarters. In addition to ad hoc charter, Jet Aviation offers the Privileged Travel Card prepaid card with one-way pricing.

VistaJet

Clay Lacy Aviation

HIGH FINANCE

In a move to keep graduating heavy charter users in the fold while adding lift to the fleet, a mini movement among charter operators offering financing programs for customer aircraft acquisitions has gained traction.

Jet Linx has partnered with Global Jet Capital to create the just launched Sign & Fly operating lease, for aircraft already crewed and on the Jet Linx operating certificate. A Citation XLS is available. "We already have a number of clients pursuing the opportunity with our help and global capital," said Jamie Walker, Jet Linx president.

Wing Aviation has established an in-house finance department, using it to bring a PC-12, King Air 200, Citation Excel and Phenom 300 into the charter fleet, simultaneously reducing the fleet's age and expanding its diversity. "Our goal was to have one of every class," said president David Riddle.

Priester Aviation introduced a purchase/management/charter program last year to capitalize on low preowned aircraft prices and high charter demand, offering high-time charter customers the option of going to whole ownership with a turnkey charter revenue program in place. Recent fleet additions include a midsize and two super-midsize jets acquired by charter clients through the program and "the charter revenue component was absolutely a part of the decision process," said Gary Gennari, senior v-p of retail charter sales, adding that "more of those purchase deals are in the pipeline."

Priester Aviation

CARD PROGRAMS

Membership programs and shared shuttle flights may have stolen their "hot product" status, but jet cards remain a popular cabin access route for many charter customers for standalone or supplemental lift, and providers report activity in line with overall charter activity.

Sentient Jet, based in Braintree, Mass., is on track to sell $250 million in jet cards this year and is seeing 15 percent YoY growth in sales, said president and CEO Andrew Collins. Sentient Jet offers 25-hour jet cards for light, midsize, supermidsize and heavy aircraft, all in either Preferred or Select age ranges, starting at $124,825, with a one-year lock on hourly rates and 15-percent discounts for qualifying travel. Collins says the company is poised "to go well beyond the light and midsize cards and move up to super-midsize and large-cabin" cards, beginning "in the back half of the year."

Sentient also built on its Kentucky Derby relationship as official aviation partner, hosting a breakfast prepared by its first official brand ambassador, chef Bobby Flay, enjoyed by 100 clients and prospects.

NetJets launched the NetJets Elite Card, offering 25 hours of light jet lift on a Citation Encore/Encore+ or Excel/XLS, and guaranteed availability within 24 hours. The "all-inclusive pricing" is "the most seamless way to join NetJets," the company said. The Elite Card complements NetJets's 10-hour Marquis Jet Card, which provides access to the same aircraft. Like the Marquis Card, the Elite can be used on the NetJets Europe fleet at set inter-program exchange rates. An analysis by jetcards.org (*see sidebar*) finds the Elite card overall cost lower at the expense of premium charges for peak-day use and longer call-out time in comparison to Marquis.

Delta Air Lines subsidiary Delta Private Jets of Erlanger, Ky., offers both the Delta Private Jet card and ad hoc charter aboard its fleet of 70 Wi-Fi-equipped light to large-cabin jets. In July DPJ named Gary Hammes, formerly COO at Virgin Australia, president. No DPJ representatives were available to discuss activity and the company declined to provide updates about its programs or plans.

NEW OFFERINGS

Bowing to customer requests, Priester Aviation has introduced Centerline, a (currently) Chicago-centric one-way offering providing guaranteed lift for category aircraft at a set hourly rate, against a $100,000 deposit. Depending on the reception in the Chicago area, the company might expand Centerline to other Priester base locations such as Dallas and New York.

Hearing similar demand, Houston's Wing Aviation will inaugurate a card program to augment its block charter agreements. "A lot of folks want A to B.'Leave me there and pick me up.' They don't want to hear about additional charges. We're having to adjust to that," said president David Riddle. The card program—terms undisclosed—available to current block program customers is "in beta test," Riddle said. Initial roll-out is planned by year-end, and if it's well received the offering will be expanded.

Meanwhile, Malta-based VistaJet, known for its block-hour access program, which represents the bulk of its sales, introduced VistaJet Direct last month, an empty-leg phone app. A fee of $10,000 per year enables charter customers to see the location and availability of fleet aircraft and provides booking priority. "It's a great opportunity to fill [utilization] gaps in our fleet," said COO Ian Moore. Aggressively marketing these empty legs is especially important as VistaJet eliminated repositioning fees for its program members earlier this year. ❑

Drawing a Winning Jet Card

Trying to compare jet cards through their myriad differences–call-out times, peak days, surcharges, minimum age of unaccompanied children—Doug Gollan came to a conclusion: "Wow, this is complicated!" That insight led him to launch jetcards.org this April. The site compares 100 cards by 65 variables such as round-trip discounts, CPI adjustments, service areas and safety audit standards.

Card providers pay no fee for the listings. Basic access to the site and its spreadsheets is free to registrants, though Gollan reserves the right to market their contact information. A $250 annual subscription provides access to more comprehensive data; subscribers' contact information is not shared. Gollan plans to add 30 to 40 more cards next year. He said he's been "pleasantly surprised" at the number of paid subscribers (600 now). "If you're really serious about buying a jet card, $250 is a smart investment," he said. —*J.W.*

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INSTRUMENTS FOR PROFESSIONALS™

Relaxed Part 23 becomes reality

by Kerry Lynch

After a decade in the making and months of preparation, the new FAA rule that dramatically changes the approach to small aircraft certification formally took effect in late August. By industry and FAA accounts, implementation of the rule, which is more of a revolutionary than evolutionary change, has generally been smooth and numerous projects are in the works. In December last year, FAA Administrator Michael Huerta announced the release of the new Part 23, 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 moves the FAA to a "performance-based approach" and away from its long practice of establishing detailed prescriptive standards for new products. Under the new rule, which targets aircraft weighing 19,000 pounds or less and with 19 or fewer passenger seats, the agency establishes the performance objectives for new products and gives the manufacturer flexibility on how it meets those objectives. It also paves the way for the agency to work with industry and international regulators on consensus standards.

"With these performance-based standards, the FAA delivers on its promise to implement forward-looking, flexible rules that encourage innovation," the agency said in announcing the rule's implementation. "This regulatory approach recognizes there is more than one way to deliver on safety."

"Instead of telling manufacturers how to build airplanes, we're defining the safety goals we want to achieve and giving industry the freedom to come up with innovative solutions," Huerta explained to an audience during last summer's Experimental Aircraft Association AirVenture show in Oshkosh, Wis.

"This approach will allow us to get safety technologies off the drawing board and into airplanes more quickly. New technologies have the potential to kick off a revolution in general aviation."

Top-down Education Efforts

Huerta noted that the FAA has worked to educate its certification specialists about the new rule. "Our message is simple: we're not going to try to shoehorn new ideas into the same old box anymore. Instead, we'll be working hand-in-hand with manufacturers."

Since release of the rule, industry leaders and FAA officials have been holding training and educational sessions to prepare both the industry and agency for the changes ahead. In the months leading up to implementation, the FAA hosted 10 educational webinars for employees, conducted "beta-test" training and mock certification exercises and held workshops.

The agency also joined forces with the General Aviation Manufacturers Association on industry Part 23 rewrite training sessions that were held in Seattle, Dallas and Washington, D.C. last spring. Four hundred organizations and/or representatives attended the U.S. sessions, GAMA reported. Further sessions are planned for next year in Europe, Israel, China, Australia, New Zealand and Singapore.

The rule is already beginning to show results, according to the FAA. "We have numerous programs using the new Part 23," the agency said, noting that the projects have involved both new airplanes and modifications to older airplanes. ❑

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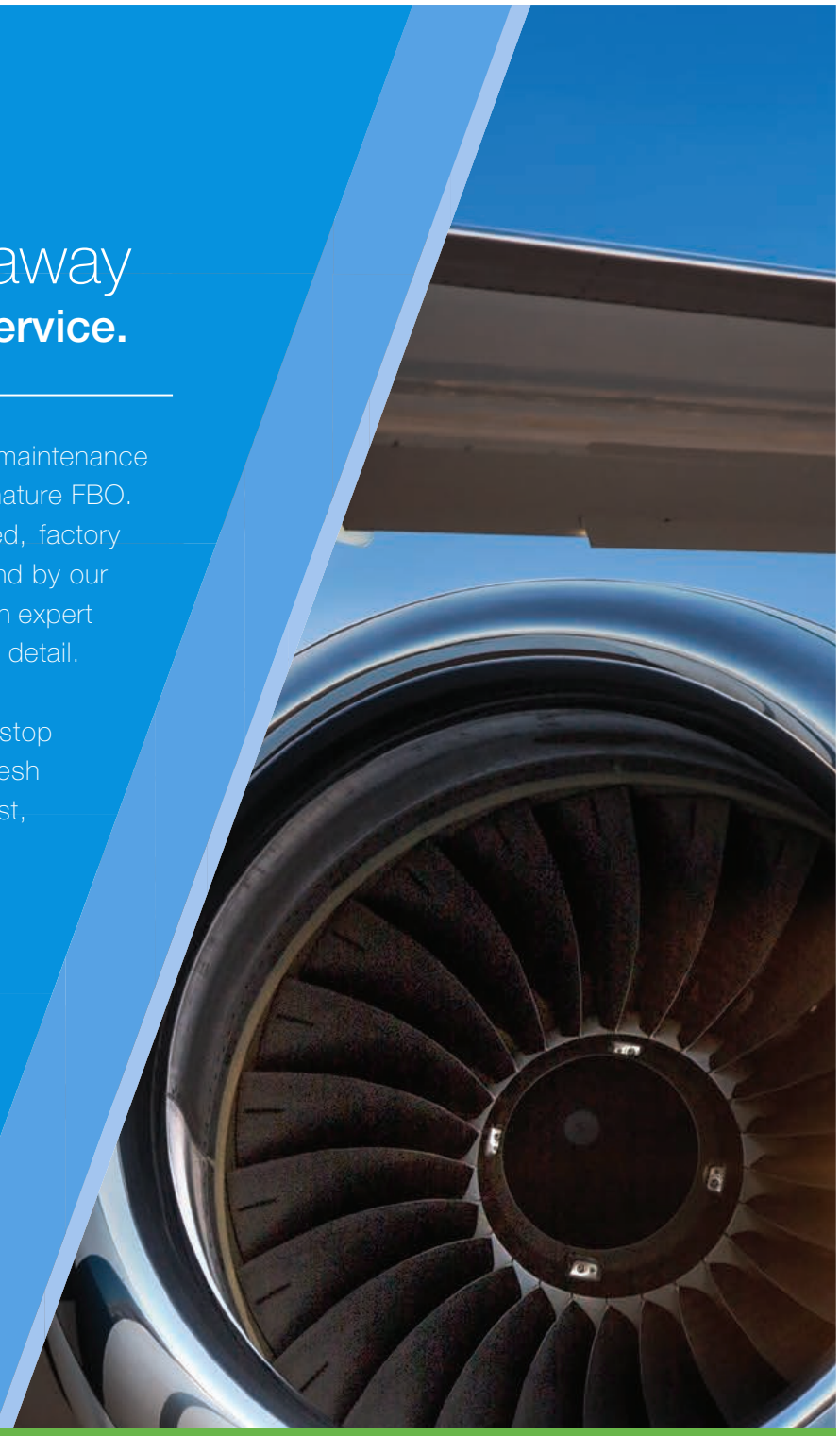

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City of Scottsdale mayor Jim Lane addresses the crowd at the Scottsdale Airport redevelopment project "wallbreaking" ceremony on July 12, 2017.

Bizav gets new home at SDL

by Kim Rosenlof

Business aircraft operators can soon enjoy upgraded facilities and new executive hangar space at Scottsdale Airport (KSDL) in Arizona. The city-owned airport celebrated a "wallbreaking" this summer to begin demolition of the current airport terminal and administration building as part of a $27 million redevelopment project that will provide a 24,000-sq-ft aviation business center and 67,000 sq ft of hangar and support space.

"This building was designed as a terminal, but that's no longer the vision here," said Scottsdale Airport aviation director Gary Mascaro during the ceremony. "As an airport with no scheduled service, we need to maintain our ranking as a premier general aviation facility. The redevelopment project will enhance this prime area, offering some of the largest hangars on the airfield and other amenities."

The project will create two 30,000-sq-ft hangars, each with direct runway access and 28-foot-high/120-foot-wide doors that can accommodate tall-tail jets such as the G650 and Global Express. Gemini Air Group, an aircraft management and charter company currently leasing space from KSDL FBO Signature Flight Support, will lease and operate the entire hangar complex and a private fuel facility. In addition to housing its Challengers, Global Expresses and Hawkers, Gemini will offer hangar space for lease with on-site maintenance service availability.

"We see a lot of owners wanting to move their aircraft from California to Arizona, and there was nothing left here at Scottsdale with doors high enough and wide enough to handle the larger jets," said Gemini owner Tim Carpay. "We have about 25,000 square feet already leased and another 35,000 square feet available."

Carpay expects to fill the hangars by the time construction finishes in May, which means that he might keep his Part 145 repair station in its current facility at Signature. Because Gemini will not operate as an FBO, tenants must lease hangar space for a minimum of six months to receive reduced fuel prices in accordance with airport regulations, said Carpay. ❑

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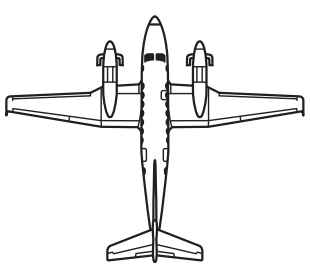

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Brokering a key issue at Air Charter Expo

by Liz Moscrop

New technology, cyber crime and how entrepreneurial charter brokers could turn Brexit to their advantage were among the key topics last month at the second edition of the Air Charter Expo (ACE'17) at Biggin Hill Airport south of London. Co-organizers BACA the Air Charter Association, Stansted News and the airport itself put together the one-day event, incorporating a conference, static park and trade show that attracted a record 800 attendees and 80 exhibitors.

Jeremy Cook, chief economist at World First, "gave our members a frank insight into the current state of Brexit and the global economy," according to BACA chairman Richard Mumford. "The apparent lack of progress and political posturing at the broad governmental level will have an impact on the ability of individual markets, among them the aviation sector, to reach a collaborative agreement on how to work together after the Brexit process is complete. BACA calls on negotiators on both sides to set aside their political ambitions and reach a pragmatic solution, so that those broad principles can flow through to the individual markets and business sectors."

The second edition of the Air Charter Expo attracted 800 attendees, 80 exhibitors and 20 aircraft on display.

Education Efforts

The association is rolling out an accredited brokerage rating in conjunction with Argus International, and Mumford urged brokers to sign up. A major concern for the charter industry is the advent of cost/flight-sharing apps that bypass the requirement for an air operator certificate and a professionally trained crew.

"BACA seeks to raise awareness among brokers, operators, airports and handlers so that they understand each others' challenges and better appreciate why sometimes it is difficult to provide exactly what is requested of them," Mumford explained. "The development of new business models, such as cost-sharing platforms and clubs that sell individual seats on aircraft, presents great opportunities to attract new customers to the business aviation market.

"However, it is vital that these new models be assessed and that the distinction between private and commercial operations does not become blurred. BACA is concerned that with limited resources and the impending Brexit, these and other important issues might not receive as much attention as might be ideal from regulators."

There were 20 business aircraft on display, including a Falcon 8X and an Avanti Evo. ❑

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Gulfstream G650ER

Flying the manufacturer's biggest and longest-range jet

by Matt Thurber

Just nine years after Gulfstream Aerospace unveiled its largest and longest-range business jet—the G650—and five years after certification, 250 G650s, 120 of them the ultra-long-range G650ER, are plying the world's skies.

To say that Gulfstream's timing could not have been better would be an understatement. The G650 tapped into a market that was shying away from smaller jets and eager for a large-cabin ultra-long-range jet that could connect city pairs never before considered.

The G650 also represents a transition for Gulfstream, into the realm of fly-by-wire (FBW) flight controls. While such a move was inevitable—every major business jet OEM has fielded or is developing FBW jets—the G650 is unusual because it's likely the only FBW Gulfstream that will ever feature the traditional yoke-operated flight controls. The new G500 and G600 are equipped with sidesticks, the control of choice for most FBW designs, but also noteworthy in that their sidesticks are electronically tied to each other and move together as if mechanically connected.

The G650 design of two yokes mechanically connected as in traditional flight controls is a lot like Boeing's FBW designs, thus far also employing yokes because Boeing's philosophy is that it helps pilots maintain situational awareness when they can see the other pilot's flight controls moving in concert with their own manipulation of the controls. The G500/G600 active sidesticks (a BAE design) also move in concert, thus maintaining the control-awareness philosophy.

There are advantages to FBW, independent of the type of cockpit control, and not just a smoother ride for passengers or better protection from exceeding certain flight parameters. For larger jets such as the G650, FBW allows designers to tune the handling of the airplane and give pilots something entirely different from what they might expect.

As a rough analog, after flying the G650ER and last year the G550, I was able to compare the handling of the two jets. The G550 has classic hydraulically operated controls, which does afford designers some latitude to improve handling, but the G550 is more work to hand fly, somewhat heavy on the controls and heavily dependent on trim to keep the workload comfortable. By comparison, I found the larger and heavier G650ER had much easier handling, something that I have also found with Embraer's FBW Legacy 450 and 500 and Dassault's FBW Falcon 8X.

G650ER Features

In most respects the G650 and G650ER are similar. In fact, the extra fuel in the -ER required no redesign of the wing as the fuel volume there was already able to accommodate an additional 4,000 pounds of fuel. The -ER's total fuel capacity is 48,200 pounds, but that extra 4,000 pounds doesn't benefit only range as it can also be used for added payload while carrying the 44,200-pound fuel load of the regular G650. All fuel is carried in the wings, and as in all Gulfstreams, the center of gravity won't move out of the forward or rear limit as the fuel load varies.

"Some customers buy the -ER and don't need maximum range, but they want the added payload," said Kevan Jackson, director of the G650/G650ER programs. "It gives them a lot more flexibility or reserves." No additional strengthening of the wings, fuselage or landing gear was needed for the -ER as the G650 had margin to accommodate the added weight, he explained.

While the G650 and -ER's Rolls-Royce BR725 engines share the same core as the BR710s in the G550, the BR725 has a larger fan and delivers 16,900 pounds of thrust at sea level ISA while operating 17 percent more quietly than the BR710 and with lower emissions.

The G650, like all Gulfstream jets, carries on the clean-wing tradition, with excellent takeoff and landing and high-speed performance achieved without the added complexity of leading-edge slats. Unlike those on many other heavy jets, Gulfstream wings also benefit aerodynamically from simpler single-slotted Fowler-type flaps, without all the hardware

MATT THURBER

A warm summer day in Savannah proved an ideal setting to demonstrate the capabilities of Gulfstream's G650ER.

and fairings that accompany more complex flaps systems.

Construction of the G650 is primarily traditional riveted aluminum, but Gulfstream has further developed the capability to more efficiently manufacture bonded structure, and that is how much of the fuselage and other components are made. "This all leads to a better cabin experience, longer range, higher speed and more quality and reliability," said Jackson.

The incremental improvements that brought about the G650ER make it Gulfstream's longest-range jet, and this performance doesn't come at the expense of speed. At Mach 0.85, the G650ER can fly eight passengers 7,500 nm. Speed up to Mach 0.90, and the range drops to 6,400 nm, 350 nm fewer than the max range for the G550, but the G550 does that at Mach 0.80. By comparison, the G650 can fly 7,000 nm at Mach 0.85.

"Most customers fly at [Mach] 0.90 or 0.91," Jackson said. But the flexibility the G650ER offers means that fuel can be traded for payload without compromising range. "It gives them a lot more flexibility or reserves," he said.

Cabin Accoutrements

At the maximum altitude of 51,000 feet, the cabin altitude in both G650 models is a low 4,850 feet, dropping to 3,290 feet at 41,000 feet, with 100 percent fresh air replenished every two minutes by the environmental control system. Eight windows on each side of the fuselage illuminate the interior, with more light available from windows that are 28 by 20.5 inches, 19 percent larger than the G550's. "It makes a difference," Jackson said, especially because even tall passengers don't have to bend down to look outside.

The G650/G650ER cabin is Gulfstream's widest and tallest, with a 102-inch width and 77-inch height. This compares to the G550 at 88 inches wide and 74 inches high. The new G500/G600 cabin splits the difference, with a width of 95 inches and height of 76 inches.

The cabin seating area is 47 feet 10 inches long, allowing buyers four zones to outfit to fit their needs. A variety of interior options are available, from a shower and special wardrobe/storage options in the lavatory to a forward galley opposite a crew rest area. The forward galley is illuminated with natural light from the windows. There is enough space for a real refrigerator with a freezer or a fridge-only option, and also for a stainless-steel appliance stack. The galley is fitted with a touchscreen control panel that can be used to manage all the cabin amenities from one location.

Gulfstream engineers have devoted a great deal of effort to silence jet cabins, and the G650ER's is extremely quiet, so much so, Jackson said, "that we sometimes have to be careful about conversations we're having in the cabin." Adding to the quiet are pocket doors for the lavatory and one that covers the opening for the main door during flight.

Like all other Gulfstream current-production jets, the G650 is equipped with the Gulfstream cabin management system. Passenger control units are available at each seat and on iOS or Android mobile devices, allowing passengers to adjust temperature, lighting, window shades and entertainment options. Gulfstream's CabinView is a customizable system for display of flight progress and points of interest as well as for delivery of passenger briefings. G650s now have optional high-definition external cameras, and these are a popular option, according to Jackson. Early G650s were available with standard-definition cameras.

Most G650 buyers are opting for Honeywell's JetConnex high-speed Ka-band satcom.

The G650ER's spacious interior allows for a variety of optional layouts and equipment, including a shower, forward or aft galley and crew rest area.

"A lot of business is conducted on these airplanes," he said. "[Broadband Internet access] is very important."

Like the G450/G550, passengers and crew can access the G650's baggage compartment in flight. The Gulfstream Aircraft Service Change for this feature was first approved by the EASA and is close to being approved by the FAA. Access is available anytime up to 40,000 feet, then for five minutes at 51,000 feet.

Technology Benefits

While many of the systems in the G650 and -ER build on the architecture of the G550, Gulfstream took advantage of the opportunity to improve some of the design features, at a systems level and the pilot interface.

For example, in the cockpit, pilots will find the cold start procedures faster than in the G550, thanks in part to more automation in the lengthy preflight systems tests procedures. There are fewer switches in the G650, and many features on the instrument panel have been relocated to improve ergonomics and make finding certain items faster during emergency situations.

Clicking on certain items on the electronic checklist pulls up the synoptic diagram for that system automatically, saving pilots a step.

Pilots can more easily see their respective wingtips from the cockpit, thanks to larger side windows. The airplane has a wingspan of 99 feet, 7 inches (about six feet longer than the G550's), so keeping visual track of the wingtips' position is vital.

From the outside, the G650 and -ER have a lower look about them, as the G650's trailing-link landing gear design puts the wing closer to the ground than the G550's. The Kollsman enhanced vision system camera is now positioned on top of the nose to give the proper view for displaying EVS imagery on the Rockwell Collins head-up display (HUD).

Gulfstream has upgraded to proximity switches on the landing gear instead of regular electromechanical weight-on-wheels switches. The proximity switches are more reliable and less prone to gathering contaminants that could render the switches inoperative at a critical time. All external lights are LEDs except for a brighter xenon landing light.

The main cabin door is closed by an electrically operated hydraulic pump powered by the forward emergency batteries, and it closes by draining the hydraulic fluid. It is much easier to open than the somewhat intimidating (for first-timers) traditional door, with none of the older Gulfstreams' primary and secondary door handles.

Fly-by-wire Flight Deck

The G650 cockpit is familiar enough that a G450/G550 pilot will feel instantly comfortable. There is nothing that overtly signals that this is a FBW airplane; the yoke looks completely normal, the tiller for the steer-by-wire nosewheel steering is just like that on the G550 and the avionics, while updated, look almost exactly the same.

There are subtle differences. Gone are the small standby displays (separate ones for attitude and heading) parked next to the landing gear handle on the G550. These are replaced by a clever doubling-up of functions by the standby multifunction controller (SMC) on either side of the G650's guidance panel. On the G550, these are called display controllers, and they are used for setting up the PFD and map, managing checklists, making HUD selections, baro settings and so on. The G650's SMCs do much of the same, but

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Gulfstream G650ER

▶ Continued from preceding page

their screens are larger and prettier, with color output instead of the G550's monochrome.

The biggest difference is a "standby" button on the bottom of the SMC's controls; pushing this turns the display controller into a big beautiful standby display with typical PFD layout. The advantage of this setup is twofold. Not only is the standby display now much easier to see because it is mounted just below the glareshield in the pilots' normal field of view, but it is much larger than the G550's standby displays.

Another handy button on the SMC is the "utility" function. This reveals softkeys for checking tire pressure, refueling, engine oil and hydraulic fluid levels and the cabin pressure control system.

The avionics are Honeywell's Primus Epic-based Gulfstream PlaneView II advanced flight deck, with the same four 14-inch displays as the G550. Eliminating the extra standby displays cleans up the tilt panel and leaves room for the control for a great new G650 feature: autobrakes. These are now standard on the G650 and -ER, and Gulfstream is offering free retrofits to owners of earlier G650s.

The G650 guidance panel is much the same as the G550's except for placement of the baro setting knob on the guidance panel instead of on the display controller panel. On the G550, I found myself occasionally grabbing the baro knob when trying to change a setting on the display controller, when I should have been using the setting knob that is mounted just below the baro knob. This resulted in me twisting the baro knob and setting an incorrect baro number a few times—something that also happened with my classmates—when I thought I was twisting the display controller setting knob.

The G650 guidance panel/SMC setup is much simpler and less prone to that ergonomic error, with a range/set knob clearly placed on the bottom right corner of the SMC. This may seem like a small item to complain about, but Gulfstream human factors engineers are clearly working to keep improving the product.

PlaneView II in most other respects was comfortably familiar in the G650, with synthetic vision available on both PFDs, the latest version of the Kollsman EVS II playing on the HUD and MFD, three FMSs, Honeywell's 3D digital RDR-4000 radar, ADS-B OUT, FANS and CPDLC (datalink communications). Gulfstream is also working on gaining approval for no natural vision landings under the FAA's new enhanced flight vision system regulations. "We're hoping to be first out the door [with EFVS approval]," said Jackson.

Fly-by-wire Controls

"This is truly a clean-sheet airplane," Jackson explained. Gulfstream took a conservative approach, opting for yoke controls that are mechanically connected, and waiting for the next-generation G500/G600 to install BAE active sidesticks that are electronically connected. This decision adds to making the G650 a comfortable transition for the G450/G550 pilot, and it underscores the FBW control philosophy that Gulfstream elected to adopt.

Like Boeing, Gulfstream chose the speed-stable platform, where the G650 essentially handles like a normal airplane with hydraulically actuated controls or just mechanical controls (cables, rods and pulleys). Pulling the G650 into a climb requires the pilot to change the trim to set the trimmed airspeed, which might require the FBW computers to adjust the moveable horizontal stabilizer to a new angle to relieve pressure on the controls during the climb. The pilot of the G650 is either flying in a trimmed condition or using trim to return to a trimmed condition or just accepting the control pressure perhaps temporarily in a maneuver that won't last too long, just like any conventionally controlled airplane.

Airbus, Dassault and Embraer fly-by-wire designs are flight-path stable, where the airplane remains in whatever flight path the pilot selects.

Because the G650 is a FBW airplane, there are additional benefits besides the weight savings of computers and wiring versus cables, pushrods and hydraulics. FBW allows engineers to extract more performance from the airplane while tuning the ride for passenger comfort. Built-in envelope protection helps pilots keep out of dangerous corners. Flight control surfaces can be manipulated by the computers to continually optimize aerodynamics for minimum drag, and in the G650's case this amounts to a 1 percent drag reduction, according to Jackson.

The speed-stable philosophy means that pilots transitioning into the G650 will not have to learn a new way to fly but can bring their muscle memory from previous conventional airplanes to the new airplane.

The FBW system architecture relies on two hydraulic systems, either of which can operate dual hydraulic actuators for each aileron, elevator and rudder control surface. Spoilers on each wing have a single hydraulic actuator. If both hydraulic systems fail, electric backup hydraulic actuators mounted on each aileron, elevator, rudder and outboard spoiler panel provide full backup control. A change on the G650 is using hydraulic dampening to protect flight control surfaces from gusts while parked, so there is no mechanical gust lock system as found on the G550 and earlier Gulfstreams, yet another

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MATT THURBER

Top: Tony Briotta, demonstration pilot, flew left seat along with senior international captain Scott Curtis for the leg from Savannah, Ga., to Columbia, S.C.
The new standby multifunction controller (bottom left) has a handy new utility page and opened up space to mount the autobrake controls on the tilt panel (right).

MATT THURBER

MATT THURBER

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Gulfstream G650ER

▶Continued from page 36

way the cockpit is less cluttered.

The FBW controls operate in four modes: normal, alternate, direct and backup. While normal mode feels, well, normal, there are some subtle features that adjust the control feel in this mode. During takeoff, for example, the FBW system adjusts control sensitivity to prevent overcontrol, and the pitch trim switch moves the stabilizer. Once the airplane is in the air, the controls transition, and the pitch trim switch adjusts elevator position while the stabilizer then moves to remove the load from the elevator.

In normal mode, angle-of-attack (AOA) is limited, and the stickshaker activates at AOA .94, and the FBW will not allow the airplane to stall, even if the pilot pulls the yoke all the way back. The FBW also prevents a high-speed excursion by limiting nose-down authority when exceeding VMO. Other protections: maneuver load alleviation, which prevents loads of more than 1.5 g by controlling aileron deflection; speed brake auto retract at high power settings; dynamic rudder limiting to prevent the pilot from overstressing the airframe by using the rudder incorrectly; and elevator split limiting, for protection against large torque forces when operating in split elevator mode.

Normal mode relies on all systems operating normally with two flight control computers, each of which has two separate channels. One channel can run the entire flight control system.

If the required air data or inertial data is not available or the flight control computers lose communications with the horizontal stabilizer control unit, the control system switches to alternate mode. In this mode, the autopilot and high- and low-speed protections become unavailable and the stickshaker activates at AOA .85 instead of .94 (but only if air data is still available). Pilots can attempt to reset the flight control computers in alternate mode using the flight control reset switch on the center pedestal.

If all four flight-control channels of the computers fail, the system reverts to direct mode. In this mode, the speed brakes won't automatically retract, the stickshaker won't work and the pilot can't revert to either alternate or normal mode until power has been cycled.

The same is true in backup mode, which is the worst case (and was tested extensively during the flight-test phase). In this mode, the mid-spoilers used for roll control are unavailable and the speedbrakes and ground spoilers do not work. The pitch trim switch on the yoke doesn't work, and pitch trim can be controlled, at one-third the normal rate, only via the backup trim switch.

Time To Fly

Demonstration pilot Tony Briotta and Scott Curtis, senior international caption, briefed our planned flight on a warm summer day at Gulfstream's Savannah, Ga. headquarters. The plan was for Briotta to fly left seat and Curtis right seat from Savannah to Columbia, S.C., while I flew jump seat, then switch so I would fly left seat back to Savannah.

Weather was typical heat-generated scattered thunderstorms that threatened to join up later in the afternoon and produce a tropical downpour, but for our flight there were no immediate threats. It took Briotta and Curtis just 10 minutes to run through the pre-start checklist, which was much faster than the process in the G550.

We took off from Savannah's Runway 10 fairly light, at 67,084 pounds, 36,516 pounds lower than the 103,600-pound mtow. Outside air temperature was 31 degrees C, and the FMS calculated our runway required at 3,335 feet to stop after a rejected takeoff or 3,184 feet to go. Briotta explained that I'd find it necessary to use the thrust reversers to slow our taxi as the BR725 generates a lot of thrust at idle. Curtis said that the G650's FBW "flight controls feel like the difference between a sports car and a luxury car. It's very responsive." It took just 24 minutes to fly to Columbia, and before I took the controls, Curtis explained that landing the G650 is different from landing the G550, in that the newer jet's nose doesn't need to be help up after touchdown. "You have to push the nose down," he said, "and it won't tend to slam down."

During the takeoff, Briotta explained that the airplane is "more responsive on the rotation. Most pilots tend to pull back too hard, and it jumps off the runway. Just pull back nice and smooth to nine to twelve degrees [nose up], and don't chase the flight director."

The biggest difference that I would probably notice between the G550 and G650 is that no matter how much it weighs, the G650 will handle the same, Briotta said. "You can be smooth or aggressive, whatever the weight."

One control that Gulfstream pilots should take care not to be too aggressive with is the nosewheel steering tiller; on the G650 it's just as sensitive as the G550's, with the ability to turn the nose up to 80 degrees. On takeoff, the rudder pedals provide up to 7 degrees steering, which worked just fine to keep the nose on the centerline. The G650ER's brakes were not at all grabby and help the pilot keep things smooth for the back-seaters.

On takeoff from Columbia's Runway 29, the BR725s accelerated the big jet quickly as the autothrottles smoothly advanced the power. At 107 knots I pulled the yoke back to rotate while trying to avoid letting the nose rise too rapidly as we accelerated past the 124-knot V_2 speed. The controls did indeed feel precise, and I was able to put the nose exactly where I wanted and trim for the climb with little extra effort.

It took just 15 minutes to reach FL430, and we leveled off at FL450 for a performance check. With fuel flowing through each engine at 1,480 pph at ISA -7 degrees C, speed settled at Mach 0.91.

Our route took us northwest nearly to Knoxville, Tenn., then southwest over Augusta, Ga., and back to Savannah. On the descent, Briotta demonstrated the high-speed envelope protection, which kept the nose from dropping as we sped up to VMO.

I slowed down at a lower altitude to get a feel for the G650ER's low-speed handling, and indeed it was crisp at any speed. As we neared Savannah, I steered around some building thunderstorms, carving pathways between the burgeoning cloudscape like a Red Bull racer turning to avoid hitting one of the raceway pylons.

We elected to hand-fly a visual approach to Runway 10, backed by with the glideslope information on the HUD, which I prefer to use whenever possible. I brought the big Gulfstream in a little high, but Briotta noted that when the flaps are fully out and gear down, "you can point the nose down and not pick up speed," and sure enough I captured the glidepath easily and held it solid right to the runway. The G650ER felt amazingly solid and responsive even on short final, and I was able to stick it on centerline and within the landing zone parameters that the FlightSafety instructors hammered into me during my G550 training.

After a barely perceptible touchdown of the main gear, I did as instructed and pushed forward—not too quickly—on the yoke, and the nosegear touched down gently. We had selected the autobrakes to the "low" setting, and once the nose was firmly planted, the brakes brought us to a smooth stop, aided by a touch of reverse thrust.

The G650ER exceeded my expectations in all respects, but mainly in the handling. This is among the largest jets that I have flown, and Gulfstream engineers have done a marvelous job making the G650ER a pleasure to fly. The precise handling at all speeds and in all configurations makes the G650 and G650ER the pinnacle of the Gulfstream flying experience. ❑

Gulfstream G650ER Specifications and Performance

Price (typically completed and equipped)	$67 million
Engines (2)	Rolls-Royce BR725 A1-12 16,900 lbs thrust
Avionics	Gulfstream PlaneView II (Honeywell Primus Epic)
Passengers (maximum)	3 crew + 19 pax
Maximum range (NBAA IFR, 200-nm alternate)	7,500 nm
High-speed cruise	Mach .90
Long-range cruise speed	Mach .85
Fuel capacity	48,200 lbs
Max payload w/full fuel	1,800 lbs
Ceiling (certified)	51,000 ft
Cabin altitude at max altitude	4,850 ft
Max takeoff weight	103,600 lbs
Takeoff distance (sea level, standard)	6,299 ft
Length	99.75 ft
Wingspan	99.6 ft
Height	25.7 ft
Cabin	Volume 2,138 cu ft
	Width 8.5 ft
	Height 6.4 ft
	Length 46.8 ft
Baggage compartment	195 cu ft
FAA certification (basis, date)	FAR Part 25, 2014
Number built (since 2014)	120 (July 2017)

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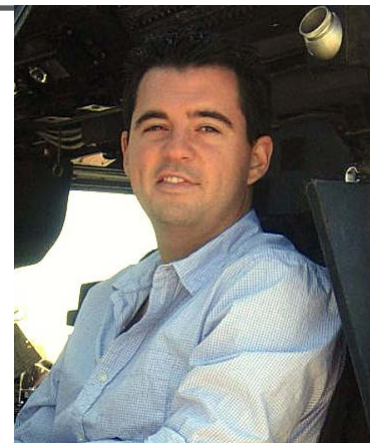
Airbus venture fuses satellite and drone data

Airbus has stood up a new U.S.-based division designed to fuse satellite and drone data into custom-tailored, client-specific packages with easy-to-use interpretation tools. "Airbus Aerial" set up shop earlier this year in Atlanta. The new venture is led by Jesse Kallman, a UAS industry expert with 12 years of experience at Georgia Tech, federal policy at FAA, commercial UAS at Airware and advocacy with groups such as AUVSI (Association for Unmanned Vehicle Systems International).

The company is small, employing 15 people in the U.S. and a handful in Europe, but it borrows extensively from Airbus's larger satellite division, which builds, launches and monitors satellites. "We are bringing in commercial drones and fusing it with that satellite data," said Kallman.

"Say you're a large insurance company and you want to understand what happens after a large tornado or hurricane you can work with Airbus Aerial to bring together satellite and drone data all in one cloud-based location so it is easier to run the information, easier to run the analysis on top of it. The ability to interface the layers and the ease of ordering [the data] is what's new.



Jesse Kallman

"We're trying to make it much simpler so that new types of businesses that haven't traditionally used this technology can use it and have developed proprietary software and interfaces to do so."

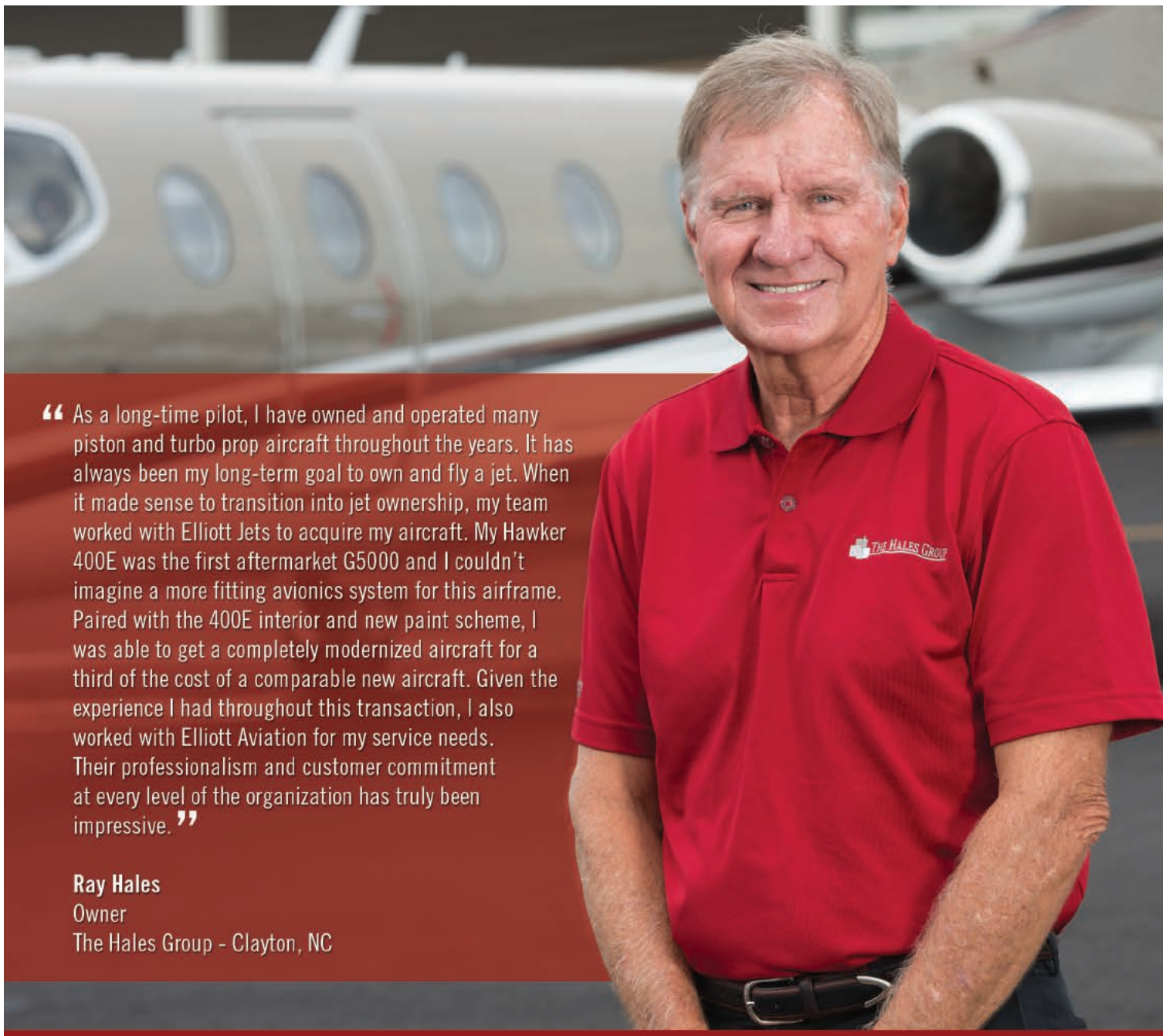
Data Analysis

Airbus Aerial doesn't build its own drones and it doesn't fly them. Rather, it subcontracts this part of the service to the provider with the hardware best suited to the job. "Everything is based off the [customer's] data spec," Kallman said. "Say an insurance carrier wants to know if there are hail hits on a roof. We know that satellites are out. We know it's going to be a drone. The size of the hail decides the resolution we need and the sensor we need, and therefore size of the drone.

"We work with the customer to determine the technology we need. Some customers use satellite data, some use drone data, some use both. We did a project in Colorado in May after a huge hail storm. We initially used a satellite to determine the [geographic] clusters of the damage and then sent the drones in to get the specific data."

To date, Airbus Aerial's customers have been from state and local governments, utilities, insurance companies and, to a lesser extent, agriculture. "In agriculture satellite data is able to solve quite a lot. In utilities and energy the deliverables are much clearer," Kallman said.

"A lot of our core business is software. We're hiring geospatial GIS [geographic information system] experts and people like that because that's the big challenge: How you take these massive volumes of information and distill down into what's relevant to them and make it easy to interface with." —*M.H.*



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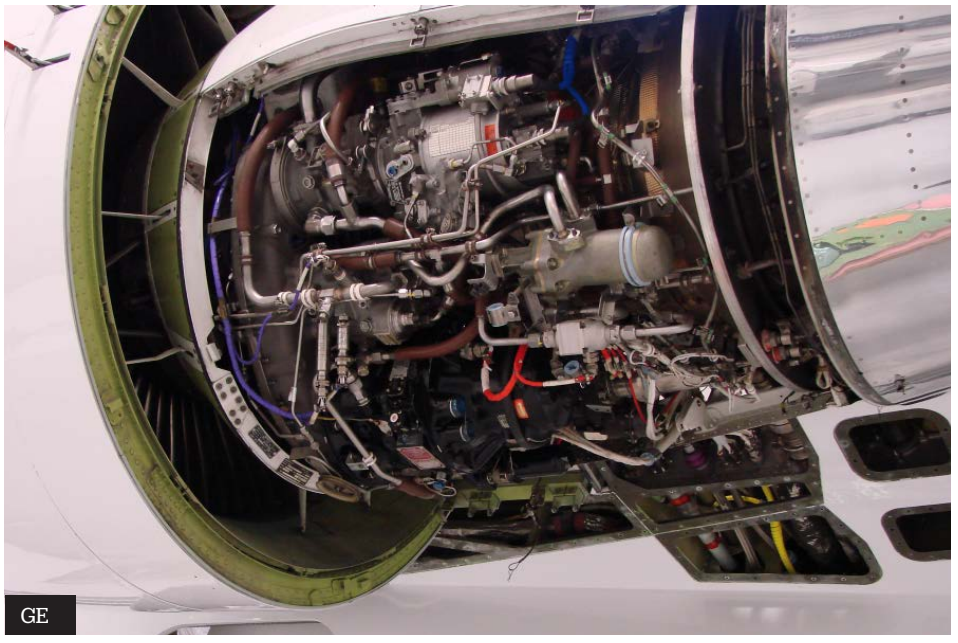
2017 Product Support Survey

Part 3: Engines

by Nigel Moll

The top three finishers are separated by just a tenth of a point each, as they were last year, but **AIN** readers again this year name GE as the best provider of support for the engines that power their business jets, in this case the CF34s found on 600-series Challengers and the Lineage 1000. GE slid slightly to an overall average score of 8.3 from its 8.4 first-place score last year. Rolls-Royce and Williams switched rankings this year, with R-R rising to second place (with the same 8.2 it scored last year) and Williams falling to third with a score of 8.1 (down from 8.3 last year). Pratt & Whitney Canada comes in fourth with 8.0 this year, up from 7.9 last year. Honeywell takes fifth place this year with 7.8, down from 8.1 last year, and CFE is last with 7.4, down 0.2 from 7.6 last year.

Among makers of turboprop engines, the rankings remain unchanged: Honeywell is still king of the hill with a score of 8.6 for support of the TPE331, down from 8.8 last year. Pratt & Whitney Canada keeps second place for PT6 support with 7.7, up slightly from last year's 7.6. Safran Helicopter Engines (the former Turbomeca) is last with 7.0, down from 7.3 last year. ■



GE

What have you done for me lately?

GE

GE has focused on expanding its customer support footprint outside the U.S. this year, "with a strong focus on Europe. We added a regional account leader role based in Munich. We also added a field service engineer in London to support the new BAS Biggin Hill facility. GE continues to take technical training to our customers and partners: this year we have conducted onsite training in Germany and London to strengthen CF34 technical capabilities in the region," according to Tom Hoferer, general manager of commercial service and support for business and general aviation at GE Aviation.

"We continue to expand partnerships to enhance customer support and AOG response. We recently added CFM56 support for Boeing Business Jets and Airbus Corporate Jets to our Aviall partnership agreement. This will allow us to improve AOG response with flight-line LRUs and critical material to our 24-hour target for material on dock. The expanded relationship will also provide dedicated spare engine support for our BBJ customers."

Last year GE introduced a program for CF34s on Challengers that combines retrofit of wireless quick-access recorders with prognostic engine analytics and flight operations quality assurance (FOQA) analytics from GE company Austin Digital. "The new analytics allow us to breathe digital life into the CF34 and, combined with our OnPoint program, bring predictive capability and enhanced reliability to the engine."

Honeywell

Honeywell launched the MyAerospace Technical Knowledge Center to provide 24/7 access so customers can quickly and efficiently troubleshoot aircraft with videos and informational articles. "Everything we are doing to improve technical service, parts support and AOG response is centered on reducing customer effort," according to senior director of customer and product support Paul David. "We are hosting 45 operator forums this year and expanding our customer and technical support presence in the field. We are listening to customers through our new customer connect program, through industry survey feedback and through our global customer committee to make significant enhancements to our communications and tools."

Honeywell customers can now sign engine or APU bailment agreements online. The smart flow rental worksheet is populated by the service center, and the rental bank will populate the smart bailment agreement (which has been upgraded with auto-fill pricing) and send for eSignatures, reducing the time it takes to ship a rental.

Launching this month, Honeywell's location-based direct access mobile application (free from the Apple App store and Google Play store) will help maintenance departments and technicians, pilots and operators get instant 24/7 access to technical and AOG support and quickly locate the nearest Honeywell-authorized service centers and dealers and get status on open orders.

Honeywell has recreated the MyAerospace portal to simplify online ordering and tracking processes, improve maintenance performance at repair sites and equip customers to manage repair and overhaul more efficiently. Using the improved self-service resource at any time, Honeywell customers can more easily order parts, book repairs and search for product information. As a result, says Honeywell, first-call resolution is "on the rise."

With the MyAerospace Portal updates that they specifically requested, customers can manage their orders with less effort and in less time using a customized search engine that remembers their history and preferences. They can monitor their shipments through graphs that group orders by status, allowing them to track repairs, spares and exchange orders; they can also view repair details, update shipping information and download certifications from a desktop or mobile device. Honeywell says it is reducing the number of steps required online by 20 percent, with

2017 Overall Average Ratings of Engine Manufacturers

	Overall Average 2017	Overall Average 2016	Ratings Change from 2016 to 2017
Turbofan			
GE	**8.3**	**8.4**	-0.1
Rolls-Royce	8.2	8.2	0.0
Williams	8.1	8.3	-0.2
Pratt & Whitney Canada	8.0	7.9	0.1
Honeywell	7.8	8.1	-0.3
CFE	7.4	7.6	-0.2
Turboprop/Turboshaft			
Honeywell	**8.6**	**8.8**	-0.2
Pratt & Whitney Canada	7.7	7.6	0.1
Safran Helicopter Engines (Turbomeca)	7.0	7.3	-0.3

Companies listed in order of 2017 overall average.

Honeywell

a 50-percent improvement in turnaround time.

The latest engine in the company's lineup, the HTF7700L for the Citation Longitude, was certified in August. The HTF7000 series has on-pylon standard maintenance and no hard time engine removals, reducing down times. With 3.4 million flight hours logged by almost 2,000 production engines, the HTF7000 is demonstrating what Honeywell claims is best-in-class dispatch reliability at "greater than 99.9 percent." The company is deploying more HTF7000 service technicians in the field. For minor maintenance, partners such as Duncan Aviation, Dallas Airmotive, Turbine Engine Specialists, Jet Aviation and StandardAero provide regional support. Dallas Airmotive Brazil has renewed its HTF agreement for line maintenance to support operators in that region; Honeywell Phoenix Repair and Overhaul and StandardAero Augusta provide heavy maintenance support. The StandardAero test cell in Augusta, Ga., will be on line this fall.

Pratt & Whitney Canada

P&WC has 62,000 engines in service with 12,800 customers, and in May this year it launched a digital engine services platform that provides preventative, data-driven maintenance management and consulting services. The service is being rolled out first to PW300 engine customers on P&WC's Eagle Service Plan (ESP) pay-per-hour maintenance program and will be expanded to the PW800 next. Supported by technicians and data analysts who examine fresh flight data from sources such as P&WC's Fast (full-flight data acquisition, storage and transmission) prognostics system, the service conducts daily reviews of customer data, so that requirements can be addressed proactively during scheduled maintenance.

Fast is now providing "near-real-time, high-density, full-flight data after each mission" for 2,000 P&WC engines on business jets, helicopters and regional airliners—a 50-percent gain in the past 12 months.

Recent enhancements to Fast: on-board event detection and crew alerts; automated power assurance checks on PT6C-67C-powered AW139 helicopters; and turbine creep counting on PT6A-140-powered aircraft. Half of all Q400s in use around the world are equipped with Fast.

In May, P&WC announced the availability of Fast on PT6A-powered King Airs, joining other types such as the Falcon 7X, ATR 72, Citation Latitude and Caravan EX.

After trials on 5,000 customer engines, P&WC has begun the commercial introduction of an oil analysis program that "provides high visibility into the health and proficient operation of the engine without intrusive inspections. It detects tiny metal traces within engine oil enabling the identification of deterioration of specific oil-wetted components such as gears, bearings and seals. The technology is now calibrated for the G200 (PW306A), Phenom (PW617), Caravan (PT6A-114/114A), TBM (PT6A-64/66D) and PC-12 (PT6A-67B/67P).

"It is worth noting that the PT6A is the only turboprop engine certified for single-engine instrument flight rules (SEIFR) for commercial passenger service in North America, Europe, Australia and New Zealand."

Some 20,000 users are enrolled on MyP&WC Power, and the company continues to add features and functionality to the portal; 16,000 maintenance crews, mechanics, service centers and operators access

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SURVEY RULES AND METHODOLOGY

As with **AIN** Publications' previous annual Product Support Surveys, the objective this year was to obtain from the users of business jets, turboprop airplanes and turbine-powered helicopters statistically valid information about the product support provided by manufacturers of business aircraft, avionics and engines over the last year and to report this information to our readers. The ultimate goal of the survey is to encourage continuous improvement in aircraft product support throughout the industry.

This survey was conducted via a dedicated website, created by **AIN** from the ground up to provide improved ease of use and to encourage greater reader participation. **AIN** emailed qualified readers a link to the survey website and also sent a postcard invitation with login credentials to the survey website.

The survey website was open from May 1 to June 9. Respondents were asked to rate their aircraft's engines and to indicate the region where these products are normally serviced. Respondents were also asked to rate, on a scale from 1 to 10, the quality of service they received during the previous 12 months in the following categories:

- **Factory-owned Service Centers**–cost estimates versus actual time, on-time performance, scheduling ease, service experience.
- **Authorized Service Centers**–same as above.
- **Parts Availability**–in stock versus back order, shipping time.
- **Cost of Parts**–value for price paid.
- **AOG Response**–speed, accuracy, cost.
- **Warranty Fulfillment**–ease of paperwork, extent of coverage.
- **Technical Manuals**–ease of use, formats available, timeliness of updating.
- **Technical Reps**–response time, knowledge, effectiveness.
- **Cost-per-hour Programs**–cost versus benefits, ease of administration.
- **Overall Product Reliability**–how the product's reliability and quality stack up against the competition.

Respondents were also asked to recognize individuals who have provided them with exceptional product support and service. The full list of these people is available online at www.ainonline.com/above-beyond-2017.

The 2017 **AIN** Product Support Survey aircraft results were published in the August issue, and the avionics results were featured last month. ■

2017 Average Ratings by Individual Engines

		Overall Average 2017	Overall Average 2016	Ratings Change from 2016 to 2017	Factory Service Centers	Auth. Service Centers	Parts Availability	Cost of Parts	AOG Response	Warranty Fulfillment	Technical Manuals	Technical Reps	Cost per Hour Programs	Overall Engine Reliability
Turbofan														
Rolls-Royce	AE3007	**8.5**	**8.5**	0.0	8.0	8.4	**8.5**	**7.8**	**8.8**	**8.8**	7.7	8.7	**8.5**	9.3
GE	CF34	8.3	8.4	-0.1	7.6	8.2	8.3	7.4	8.5	8.7	7.9	**8.8**	7.7	**9.5**
Pratt & Whitney Canada	PW500 series	8.2	8.0	0.2	7.6	7.7	8.4	6.6	8.6	8.6	8.2	**8.8**	7.4	9.3
Rolls-Royce	BR700 series	8.2	8.1	0.1	**8.5**	8.4	**8.5**	7.0	8.5	8.6	7.3	8.4	7.5	9.3
Pratt & Whitney Canada	PW600 series	8.1	8.4	-0.3	8.2	**8.6**	8.3	7.0	7.8	8.6	**8.6**	8.2	7.0	8.8
Rolls-Royce	Tay	8.1	8.4	-0.3	8.4	8.5	8.1	6.3	8.5	8.5	7.2	8.4	7.5	9.4
Williams	FJ44	8.1	8.3	-0.2	**8.5**	7.4	8.0	**7.8**	7.7	**8.8**	8.2	7.7	8.1	9.1
Pratt & Whitney Canada	JT15D	8.0	7.5	0.5	7.7	7.8	8.3	7.2	8.3	6.7	8.5	8.4	7.5	9.3
Pratt & Whitney Canada	PW300 series	7.9	7.8	0.1	7.4	7.9	8.1	7.2	7.8	8.2	7.8	7.9	7.5	8.9
Honeywell	TFE731	7.8	7.9	-0.1	7.1	8.3	8.3	7.0	7.8	7.9	7.7	7.8	6.7	9.0
Honeywell	HTF7000	7.8	8.3	-0.5	7.8	8.5	8.0	7.0	7.9	7.9	7.4	6.5	7.8	8.7
CFE	CFE738	7.4	7.6	-0.2	7.1	7.8	7.4	6.1	8.0	7.3	7.9	7.8	6.9	7.9
Turboprop/Turboshaft														
Honeywell	TPE331 turboprop	**8.7**	**8.9**	-0.2	**8.7**	**8.9**	**8.5**	7.1	**8.9**	**9.0**	**9.3**	**9.5**	8.0	**9.5**
Pratt & Whitney Canada	PT6T/B/C turboshaft	8.0	8.0	0.0	6.3	7.0	8.1	**7.2**	8.3	8.2	8.2	8.5	**8.6**	9.0
Pratt & Whitney Canada	PW200 series turboshaft	7.7	NA	NA	7.6	8.0	7.7	6.5	7.1	7.4	8.5	8.0	7.8	8.5
Pratt & Whitney Canada	PT6A turboprop	7.6	7.6	0.0	6.7	7.6	8.0	6.1	7.4	7.9	7.8	8.1	6.7	9.3
Safran Helicopter Engines (Turbomeca)	Arriel	7.2	7.5	-0.3	6.5	7.4	6.8	6.0	6.5	7.1	7.6	8.2	7.0	8.3

Companies listed in order of 2017 overall average. Ties listed alphabetically by manufacturer.

2017 Product Support Survey

Part 3: Engines

▶ Continued from preceding page

the 500 P&WC technical manuals available through MyP&WC Power every week. "Offline, we have transformed our parts distribution centers to provide 24/7 in-office spares support for engines and APUs. And we have made available 40,000 new and used P&WC engine parts for purchase online, which can be delivered anywhere in the world within 24 to 48 hours." P&WC has streamlined the administrative process to accelerate shipment times for rental engines.

Starting this year, P&WC's 100 field support representatives are equipped with a new system that allows for remote "virtual" collaboration with customers through a live, interactive audio-visual link. Called Onsight, the system makes for swifter diagnosis and resolution of issues in the field. These initiatives are among the topics covered in a company blog called Airtime, which provides technical maintenance tips and expert talk and is receiving several thousand views each month.

Pratt & Whitney Canada

One of P&WC's pay-per-hour maintenance plans covers 10,000 engines, and "data shows that the right plan can sustain the residual value of an aircraft—in some cases by $2 million after five years."

In the past year, P&WC made it easier for ESP Gold customers to upgrade their coverage to ESP Platinum. To drive availability and aircraft maintenance autonomy, all ESP Platinum customers with PW307A/D- and PW308C-powered aircraft are receiving a flyaway kit of key components that are replenished as they are used at no additional cost.

As the PW800-powered Gulfstream G500 approaches entry into service, "we have delivered an all-inclusive coverage plan centered on a preventive philosophy. Our PW800 ESP program, in which customers can enroll now ahead of aircraft delivery, provides proactive actions and service to maximize availability and retain residual value, and is backed by a worldwide 24/7 action team providing field support, engineering and operations specialists to ensure smooth and optimized flight operations."

In the past 12 months, P&WC has added three programs to the P&WCSmart maintenance service and enhanced several of the 30 existing programs, which guarantee fixed costs for major engine maintenance. The program offers engine upgrades, exchanges and flat-rate overhauls. For the second year consecutively the number of customers has tripled and customer orders have doubled.

Rolls-Royce

"Our strategy for 2017 focuses on enhancing the entire customer experience with R-R, and to do that we have developed exciting digital tools to streamline the customer interaction with us," according to Andrew Robinson, deputy senior v-p of services for civil aerospace and v-p of business aviation.

"Working with our Corporate Customer Council (C3), which links customers directly to the R-R teams responsible for delivering services, we have focused our initiatives on our global stores, lease engines, on-wing services, the authorized service center (ASC) network, technical publications, the customer portal and engine health monitoring (EHM). Some highlights:

"For globally distributed material, a store in Shanghai was added to our existing stores in Los Angeles, Atlanta, Pooler [Ga.], Indianapolis, the UK, Frankfurt, Dubai and Singapore. Inventory at all store locations has grown and our spares ordering process has been streamlined."

R-R added lease engines to the BR725 and Tay 611-8C pools, bringing the total lease pool to 162 engines stored in Los Angeles, Atlanta, Savannah, Indianapolis, New York, Amsterdam, Dubai and Singapore.

According to Robinson, "Complex engine-specific expertise is required around the world, which is why we expanded our investment in factory-trained on-wing specialists, who provide mobile repair and AOG recovery services, and in specialized tooling." This investment includes capability to perform engine manual repairs, boroblending techniques, and electrical harness and nacelle services. The on-wing team expanded its international capability to Luton, Dubai and Singapore, and there are now 55 dedicated business aviation technicians in 16 locations.

In AOG events and those requiring a mobile response team, "the specialist on-wing technicians are supplemented by our authorized service centers. Joining this network over the past year are Duncan Aviation in Lincoln, Provo and Battle Creek; Bombardier Biggin Hill; and TAG Aviation in Farnborough, UK. In our Embraer network we have added Embraer Fort Lauderdale, Mesa, Windsor Locks, Melbourne and Paris; and ExecuJet Tianjin. R-R has expanded the network's capabilities at Ruag for the BR710-A2, and at Jet Aviation Basel for the AE3007A. R-R now has 72 authorized sites around the world. The company has explored the art of the possible in the Internet of Things (IOT) arena by developing an authorized service center portal that simplifies and automates many of the business transactions between ourselves and our ASCs through a visually appealing and intuitive interface."

Safran

Rolls-Royce

R-R continues to work with OEMs to develop automatic downloading for engine health monitoring data, which "removes the burden of manually downloading and transmitting data monthly, while allowing us to be more proactive in monitoring your engines, and enabling us to identify trends before they may cause operational issues," said Robinson.

Safran

From its own customer satisfaction surveys, Safran Helicopter Engines (the former Turbomeca) recognized the need to implement online services to improve the efficiency of and access to the support it provides. "The customer portal and our range of web services now comes with a new layout to facilitate navigation and new features such as dashboards and easy-to-create requests," the company said. "Customers can now track online their asset's MRO status, AOG and standard exchange deliveries and the warranty process."

This summer the company launched Web-IETP on the portal, making interactive electronic technical publications available 24/7 on all types of tablet and operating system. "The main advantage of this new, user-friendly service is that it offers at any time the latest versions of each document. It also comes with an intuitive 3D graphic interface and enhanced cart functionalities."

Last month, Safran introduced a new engine health monitoring service. "Safran expert maintenance recommendations are available online, from any device. Many parameters are gathered automatically and continuously by an onboard system, designed by our data collection partners. Engine life can thus be extended, with early detection, prognosis analysis and maintenance plan customization for significant cost and time savings for the customer."

With 12 front offices, 100 field representatives and technicians, 100 customer support managers and representatives, and 40 certified maintenance centers worldwide "and continued investments, we have maintained our high level of performance and have achieved many remarkable results: 98 percent of AOG requests answered within 24 hours for the fifth consecutive year; 98 percent of standard exchange deliveries dispatched on time for the third year in a row; 97 percent of spare parts dispatched within five days for the last 18 months; average repair time for the Arriel and Arrius is now less than 50 days. The improvements are largely based on investments that ensure a leaner and more efficient process in all of our repair centers. New machinery has been acquired, and we have adopted processes that save time and money for our customers."

Safran says its Customer Councils and Top 5 Irritants process have been instrumental in driving improvement plans. "This year, our Customer Council meetings were conducted, as always, on each continent. Fifty irritants have been solved in collaboration with customers." One recent achievement is the resolution of leaks on the Arriel 1 fuel control

unit. By collecting operator feedback and detailed information on their experiences, Safran was able to analyze the root cause and propose different solutions that were then evaluated by customers. "For this specific issue, two new seals were developed and implemented, and the leaks have been significantly reduced."

Safran says mean time between failure has improved on average by 50 percent for the complete engine range over the last five years. "Our engine maintenance programs have been reconfigured to match the aircraft scheduled maintenance, meaning that customers are able to plan their missions and maximize availability. On the Arriel 1E2, around one third of the maintenance periodic limits have been removed and others have been extended. On the Arrius 2B2, maintenance has been reduced by 15 percent, on the Arrius 2F by 50 percent and on the Makila by 40 percent.

"In the context of the current market and economic conditions, it has been extremely important that our customer services provide flexibility and adapt to specific customer needs. For our civilian customers that own up to five helicopters, a new range of services was launched last year called 5Star Plans. Operators can choose from five levels of service, covering scheduled and/or unscheduled events. These plans are sold exclusively by our network of certified maintenance centers and distributors. In just six months, contracts have been signed all over the world."

For civilian operators with more than five helicopters, specific flexibility options help them sustain their operations and coverage during difficult times. For customers not under such contracts, Safran has introduced other cost-reduction measures, for example the use of repaired parts in maintenance, a choice that grew by 50 percent last year.


Williams

Williams

Williams trains mechanics in-house at its headquarters in Michigan. "We know our engines best, and we transfer the required knowledge to those who maintain them. All of our authorized service centers have personnel who have been trained at our facility," according to Steve Shettler, v-p of product support. The company notes that a growing number of owners and operators are taking an engine training course. "It's a condensed version of training to familiarize owners and operators with what is required to operate and maintain our engines. This helps them communicate with maintenance personnel when scheduled maintenance is needed, since they, too, are familiar with the maintenance items.

"Our maintenance videos—20 percent more of them since last year—walk through the tasks outlined in our maintenance manual, which helps refresh mechanics if some time has passed since they have done a given task. We always have technical advisors available to help with maintenance if further assistance is needed beyond the video."

The company enhanced its website to allow all customers to see open and complied service bulletins. "Customers can see which bulletins apply to their specific engine serial numbers. They can also pull up and view the actual service bulletin documents with the click of a mouse. Our TAP Blue maintenance program gives our customers reasonable and predictable operating costs, raising the resale value of the aircraft and providing owners with peace of mind and no surprises. Key program coverage: major and minor scheduled inspections; unscheduled repair; all Service Bulletins (mandatory, recommended and optional); foreign object debris (FOD) repair; corrosion repair; and forgiveness of minimum annual utilization." ❑

Swift final report on Icon crash

by Matt Thurber

On May 8, the first fatal crash of an Icon A5 light sport amphibious airplane occurred during a new-employee familiarization flight for a recently hired engineer. The NTSB took just one day shy of three months to release the final report on the accident. Most accident reports take a year or more to complete.

The precise path of the accident flight is known because the A5 is equipped with two sources of data; one is a flight data monitoring device that captures information from the flight data computer, and a second is part of the A5's 100-hp Rotax 912IS Sport powerplant's electronic engine control unit.

The data showed that the pilot and his passenger took off just before 9 a.m. in good VFR weather from Nut Tree Airport in Vacaville, Calif., in N184BA, A5 Serial Number 7, one of the company's training airplanes with 182.7 hours flying time logged since it was manufactured last year. Icon conducts pilot training at Lake Berryessa, about a 15-minute flight from the company headquarters and assembly facility at Nut Tree. The company has another flight training facility in Tampa, Fla.

The recorded data showed that after departing Runway 2 at Nut Tree, the A5 climbed to a GPS altitude of 3,700 feet while flying north toward Lake Berryessa, then began descending as it neared the lake. After crossing the shore near Monticello Dam, the A5 descended to 450 feet GPS altitude (the lake's elevation can range to more than 400 feet msl; its spillway is 440 feet msl).

Areas of Rising Terrain

Flying over the water, the A5 proceeded in a northerly direction, but then at 9:07:30 entered Little Portuguese Canyon. There is no outlet for this canyon, and the terrain surrounding the canyon rises steeply. According to the NTSB, "The areas of rising terrain that surrounded Little Portuguese Canyon varied between 780 and 1,420 feet msl. The accident site was located about 0.35 nautical mile (nm) from the tops of 1,200-foot-high ridges to the west, 0.36 nm from the 1,050-foot-high ridges to the east, and 1.34 nm from the 1,200-ft-high ridges to the north. In addition, Little Portuguese Canyon narrowed in width from about 700 feet at the opening to about 300 feet near the accident site and 240 feet near the farthest northern area of the canyon."

To fly to the more open area of Lake Berryessa, before entering Little Portuguese Canyon it would have been necessary to make a 90-degree turn to the left followed by a 90-degree right turn to fly into the wide open lake recreation area.

According to the NTSB, when the A5 entered Little Portuguese Canyon, it was at 450 feet GPS altitude and 54 kias, as logged by the airplane's recording devices. Twenty seconds later, power was added and the airplane climbed while turning slightly to the east, followed by a left turn to the west. The NTSB's depiction of the recorded data shows the A5 flying toward the right side of Little Portuguese Canyon then turning sharply left before hitting terrain on the left side of the canyon (as viewed from the entry to the canyon).

After reaching a maximum GPS altitude of 506 feet, the A5 descended. "The airplane struck terrain at 09:08:06 at 470 feet GPS altitude and 66 knots indicated airspeed," according to the NTSB.

CANADIAN AIRCRAFT TAX PROPOSAL RILES CBAA

The Canadian Business Aviation Association on September 6 submitted comments expressing concerns about a Canada Revenue Agency's (CRA) draft proposal extensively revising the formulas for determining the taxable value on personal use of business aircraft.

The CRA has proposed three different categories (depending on the circumstances of the individual and the flight) to assess the taxable benefit to individuals when they use a business aircraft for personal travel. Additionally, the CRA proposes that its revised policy be retroactive to any open audits, notices of objection or pending litigation.

After consulting its members, the CBAA said it rejects the application of the concept of a person who controls access and use of an aircraft as a gateway to taxpayer treatment for personal benefit valuations. The association also is against the proposed category three (applicable to individuals who control access to the aircraft) because it "overprices the value of the benefit received by the individual who controls access and use." The application of this proposed policy on a retroactive basis is also a sticking point for the CBAA.

However, the association believes that the policies described in category one and two (partial and full use of an aircraft for personal purposes) may be "workable in principle," but only without any requirement to determine who controls access and use of the aircraft as the gateway to this particular tax treatment." —*G.G.*

The data shows that at the time of the accident the power was at maximum, landing gear was up and the flaps were not deployed.

Low-altitude Maneuvering

"A witness, who was in a boat on Lake Berryessa near the entrance to Little Portuguese Canyon, reported seeing the airplane flying about 30 to 50 feet above the lake at what appeared to be between 30 and 40 mph," the NTSB wrote in its report. "The witness stated that the engine was running smoothly and that the airplane was level. The airplane passed by his position flying in a northerly direction and entered Little Portuguese Canyon. The witness reported hearing the engine 'rev up and accelerate hard' as the airplane approached the right side of the canyon 'in what appeared to be an effort to climb out of' the canyon.

"Subsequently, the airplane climbed to about 100 feet above ground level and then entered a left turn as it began to quickly descend. The witness stated that it appeared that the pilot attempted to make a 'U-turn in the air' just before the airplane flew beyond his field of view. The witness stated that he heard the sound of impact shortly after losing sight of the airplane."

The NTSB found "no evidence of any preexisting mechanical malfunctions that would have precluded normal operation [of the A5]."

In its final report, the NTSB wrote, "It is likely that the pilot mistakenly thought the canyon that he entered was a different canyon that led to the larger, open portion of the lake. Additionally, it is likely that, once the pilot realized there was no exit from the canyon, he attempted to perform a 180-degree left turn to exit in the direction from which he entered. Based upon performance information outlined in the Pilot's Operating Handbook for the accident airplane, the airplane's altitude above the water's surface and its indicated airspeed, and the ridge line elevations in the area adjacent to the accident site, the airplane would have not been able to climb out of the rising terrain that surrounded the area, which led to his failure to maintain clearance from terrain."

The probable cause of the accident was: "The pilot's failure to maintain clearance from terrain while maneuvering at a low altitude. Contributing to the accident was the pilot's mistaken entry into a canyon surrounded by steep rising terrain while at a low altitude for reasons that could not be determined."

Although the NTSB doesn't release identities of those involved in accidents, Icon Aircraft founder and CEO Kirk Hawkins issued a statement following the release of the final report (the pilot and passenger names had been released shortly after the accident). At the controls of the A5 was Jon Karkow, lead engineer on the A5 program and well known in the aerospace industry for his 21 years working at Scaled Composites. The passenger was Cagri Sever, who had recently been hired by Icon.

"I want to thank the NTSB for its professionalism and thoroughness in this process; this is an important step in reaching closure for the families of Jon and Cagri as well as the Icon team after such a traumatic loss. Jon and Cagri were both extraordinary individuals and are missed tremendously.

"Cagri had recently joined Icon as a star engineering leader from Ford Motor Company. Jon was a legendary aircraft designer, test pilot and unsung hero in aviation. He was a founding member of the Icon team, the lead aero engineer on the A5 and a core part of Icon's DNA. The A5 reflects not only his genius, but it also represents his love for flying in its purest form. It was his final gift to aviation. The Icon family is committed to carrying the flag forward in Jon and Cagri's honor." ❑

On static display at Marrakech were a Gulfstream G550, a Challenger 650 and a Citation M2.

MEBAA's Morocco event spurs North African bizav

by Peter Shaw-Smith

The government of Morocco recognizes the value of business aviation and is using its influence to create a friendly environment for the industry. That was the message delivered last month at the MEBAA Morocco Conference in Marrakech. Zouhair El Aoufir, CEO of the Office National des Aéroports (ONDA), gave the 100 participants at the conference a detailed overview on the outlook for bizav and airports in the kingdom, as the Moroccan government throws its weight behind the future of business aviation.

"Being an air junction between Europe, Africa, North and South America, and the Near and Middle East, Morocco enjoys a privileged situation and an undeniable competitive advantage, which makes it a serious candidate for the development of business aviation," El Aoufir said. "ONDA has therefore mandated an international firm to study the development potential of this activity and also recommend the necessary investments as well as the best model for its realization and management."

Among those investments is opening Tit Mellil Airport as a business aviation airport in 2025. As yet there are no bizav operations at Tit Mellil Airport. It is serving as a training facility, Ali Alnaqbi, chairman of the Middle East Business Aviation Association (MEBAA), initiator of the conference and airshow, told **AIN**. He said he hopes the facility, located between Rabat and Casablanca, some 25 minutes from Casablanca city center, will come into operation sooner than 2025.

In addition, work is under way to complete nine FBOs in Morocco at its main airports in Casablanca, Rabat and elsewhere, after ONDA issued 10 authorizations in the past two years, among them five for Jetex Flight Support and four for Swissport Maroc, with Jetex expected to complete work by the end of next year and Swissport claiming that construction of its FBOs will be complete by the end of October next year.

"This is our agreement with ONDA, but we are already active [in temporary facilities]," Christophe de Figueiredo, director general and CEO of Swissport Maroc, told **AIN**. "Although we operate all over the globe, this will be the first time that we open four FBOs in one country."

Both Jetex and Swissport will operate FBO facilities at Casablanca, the capital Rabat and Marrakech. "In Casablanca we need to refurbish the existing building. In the meantime, we will use a temporary lounge. In Marrakech, we are reviewing the architects' plans. In Tangier we are alone, [while] Jetex is alone in Agadir and in Dakhla," said de Figueiredo.

El Aoufir said the volume of bizav activity in Morocco is "relatively low" at 11,450 movements in 2015 and forecast a fall to 10,600 movements this year, apparently attributable to the exit of local air taxi and charter players from the market in the past two years.

Adel Mardini, CEO of Jetex Flight Support, said that the Moroccan market consists of a number of wealthy individuals who keep aircraft for their own use, without putting them out for charter. "You can see many private individuals [in the market]. There are many AOC holders in Morocco and this will be good for our business. [There are] not really [charter operations in Morocco]."

Asked if there is an element of risk in opening FBOs in Morocco given the lack of charter opportunities, he said: "The business is already there. Marrakech alone has 4,000 movements."

Fleet Expectations

Official data provided by WingX show that the leading aircraft OEMs by departures in Morocco recently have been Cessna, Dassault, Beechcraft, Gulfstream and Bombardier. Top five aircraft in the kingdom by departures are the Citation III/VI/VII, with 381; Citation Excel/XLS; King Air 350; Falcon 900; and GV/G550. Honeywell's 2016 Business Aviation Middle East and Africa assessment put the total size of the regional fleet at 4 percent of the world fleet. Average age of business jets in the region was 17 years.

In terms of activity by airport, Morocco's top five business aviation airports today are Marrakech Menara, Rabat-Salé, Casablanca's Mohammed V Airport,

Continues on page 69 ▶

DEDICATED TO HELPING BUSINESS ACHIEVE ITS HIGHEST GOALS.

NBAA

HE FLEW THROUGH FOG ALMOST

AS THICK AS AN FAA

REGULATIONS BOOK.

Rear Admiral Richard E. Byrd didn't know what was coming – heck, he couldn't even see the ground. But his goal was to reach the North Pole. And he found a way to make it happen. That's the attitude we admire at NBAA. It's why we've compiled hundreds of resources for our members. So whether it's higher profits, greater efficiency or more customer visits, we monitor the conditions so you can keep your sights set on your goals. Because business aviation enables people to reach places they otherwise couldn't. And at NBAA, we enable business aviation.

Join us at nbaa.org/join.

Changing Cuba regs raise travel concerns

by Kerry Lynch

Business aviation travel from the U.S. to Cuba has gone fairly smoothly since U.S. regulations were relaxed in recent years, but the newest round of upcoming regulatory changes might be dampening interest in flights there.

(At press time, details were sketchy about the impact of Hurricane Irma on the island nation, which was battered for many hours as the eye of the storm headed west along its northern shore en route to Florida.) In June the White House announced plans to tighten restrictions for U.S. travel to and business with Cuba; some of the restrictions had been eased in recent years. "The new policy channels economic activities, including most travel-related transactions, away from the Cuban military monopoly, Grupo de Administración Empresarial [GAESA], while allowing American individuals and entities to develop economic ties to the private, small-business sector in Cuba," the White House said.

The policy is further designed to "enhance travel restrictions" to better enforce the ban on U.S. tourism travel to Cuba. One change is that travel for non-academic education purposes will be limited to group travel. "The self-directed, individual travel permitted by the Obama Administration will be prohibited," the White House added.

Sponsored Travel

Business and general aviation travel expert Cuba Handling released a fact sheet on the announced changes, noting, "The primary objective of the proposed new regulations is to limit or eliminate direct financial transactions between U.S. travelers to Cuba and entities owned or controlled by the Cuban military."

Existing agreements and travel plans remain intact, but with the elimination of the individual "people to people" licensed travel, individuals may no longer organize their own itineraries and contacts, Cuba Handling advised. They must use a sponsoring organization—such as a handling organization—and that organization must ensure that the traveler's activities in Cuba meet the regulations.

Commercial and private air travel requirements are essentially unchanged, but the itineraries and content requirements for the travelers will change. The final regulations have yet to be released, and Keith Foreman, a master mission advisor for Universal Weather and Aviation, said it is too soon to tell whether this will have a notable effect on business and general aviation operations from the U.S. to Cuba.

But Foreman did say that travel in recent months "has slowed significantly." He cited a couple of reasons: "Travel to Cuba is more expensive than I think most realized. That, as well as the novelty of travel there wearing off… has contributed to a reduction of flights there."

But he also said the June 16 statement is "probably a contributing factor" as well, and added, "We are still waiting for the release of the new regulations and will be better able to judge the impact it will have."

The new regulations are anticipated in upcoming months.

Aside from the uncertainty surrounding the restrictions, Foreman said, general aviation operations have been conducted fairly flawlessly. And when the Obama Administration had eased the process for certain travel to Cuba, private flights from the U.S. spiked, notably last year. ❑

New. Business Turboprops 2017

by Mark Huber

Financial drag appears to be slowing several new business turboprop programs, with the development/certification schedules sliding to the right year-over-year. While the demand for business jets has fluctuated over the past five years, demand for new business turboprops has been remarkably steady, according to data from the General Aviation Manufacturers Association (GAMA), with sales of new turboprop singles averaging 475 aircraft between 2012 and 2016 and sales of twins averaging 119. But when you break down those numbers, most of the sales are highly concentrated within a small group of OEMs, and that makes entry into the market by new players difficult.

Run the numbers and you'll see why. In any given year, aerial application aircraft built by Air Tractor and Thrush account for about one-third of turboprop single production. Take that away, and you're left with 250 to 300 new turboprop singles a year. Five OEMs traditionally account for virtually all of that market: Textron Cessna, Daher, Pilatus, Piper and Quest. Collectively, those OEMs accounted for 254 of the 490 turboprop singles (including aerial application aircraft) produced in 2012 and 299 of the 467 produced last year, according to GAMA. There is even a great deal of concentration within these numbers when you consider Cessna and Pilatus collectively accounted for 169 new turboprop singles in 2012 and 175 last year.

When it comes to twins, Textron's Beechcraft has a virtual monopoly, with the King Air line accounting for 89 of the 94 twin turboprops manufactured in 2012 and 106 of the 115 produced last year. This leaves scant room for new market entrants unless they are either niche players, as in the case of the Viking Air Twin Otter 400 or Quest Kodiak, or they can bring to market such a compelling product at such an attractive price that they manage to capture market share from other OEMs.

Finally, consider that there is still an ample supply of used turboprops and no shortage of cost-effective upgrades to give these aircraft like-new, and in some cases better-than-new, performance. Given these market dynamics, it comes as no surprise that new turboprop market entrants often have tough sledding; making a compelling business case and attracting sufficient capital to execute a new turboprop program can be an extremely difficult proposition. As we see again this year, many such programs are struggling to get airborne and are in search of more runway.

Evektor EV-55 Outback

TWINS

Viking Twin Otter 400S

Beginning this year, Viking is offering a $5.995 million Twin Otter 400S on straight floats with Honeywell VFR avionics, less-powerful PT6A-27 engines (620 shp each) and a 17-place interior. The 400S will have special anti-corrosion features for maritime use such as coatings, drains, seals and platinum-coated CT propeller blades. Amphibious floats are available on the 400 and add $500,000 to the base price. The base $7 million Twin Otter 400 has more powerful 750-shp Pratt & Whitney Canada PT6A-34 engines and Honeywell Primus Apex glass-panel avionics.

Optional upgrades for the 400S: IFR avionics; 19-passenger configuration; and a 15-seat/cargo combi configuration. Amphibious composite floats are planned. Viking said that the 400S is designed for quick turnarounds and can break even with eight passengers under typical conditions.

Evektor EV-55 Outback

Projected EASA certification for the Outback has been delayed again, this time to 2019. But that's assuming new investors come forth. In March the company issued a statement saying the project had been "put on hold" because of "uncertainties with our Malaysian investor."

The first conforming prototype flew in April last year. This $2.1

Viking Twin Otter 400S

Dornier Seastar


CHAD TRAUTVETTER

Nextant G90XT

million light twin from the Czech Republic has been in development for more than a decade and a non-conforming prototype first flew in 2011. The aircraft was originally slated for certification in 2013. However, the order book to date appears slim and the flight-test program appears to be adhering to a leisurely schedule, perhaps a reflection that it is a largely public-sector project. Evektor says it holds orders for two dozen copies of the military/utility/cargo/combi/passenger aircraft, which seats between nine and 14 people.

Underwritten thus far by the Czech ministry of industry and receiving technical assistance from the Czech army, the project had been receiving funding from Malaysian company Aspirasi Pertiwi, which agreed to invest up to $200 million. The aircraft is designed for high-altitude operations at unpaved airstrips. Evektor claims interest from several air forces and is marketing the aircraft to entities currently flying Cessna 402/404 piston twins and Antonov An-2 single-radial biplanes.

The Outback features a quick-change cabin that can be reconfigured in 20 minutes. Power comes from a pair of 536-shp P&WC PT6A-21s. Maximum speed at 10,000 feet is 220 knots and maximum payload is 4,021 pounds. Service ceiling is 29,000 feet. The volume of the combined cargo/passenger area is 447 cu ft and the maximum cargo payload is 3,021 pounds. Evektor claims the Outback can take off from, and land on, a 1,700-foot runway at 6,500 feet msl under standard conditions. Evektor has selected Esterline's CMC SmartDeck integrated digital avionics system as standard equipment.

Dornier Seastar

The Seastar's schedule continues to slip, with deliveries pushed out two more years to 2020. Dornier Seawings, however, did roll out the first new production $7.21 million Seastar amphibian twin in August at Oberpfaffenhofen, Germany.

The new-generation Seastar offers an all-digital cockpit with a Honeywell Primus Epic 2.0 avionics suite featuring four 10-inch LCD displays with advanced vision, communication, navigation, surveillance and air traffic management systems. The aircraft is certified for single-pilot IFR. Other new items: a stern hydro thruster for tighter water maneuvering; corrosion-resistant landing gear with nosewheel steering; a revised 12-passenger cabin layout with air conditioning; and new propellers. First flight is scheduled for the first half of 2019.

The Seastar first flew in 1984 and was initially certified in 1991; however, the effort to put the aircraft into serial production subsequently fell victim to a chronic lack of money. In 2014 Dornier partnered with two state-owned Chinese companies (Wuxi Industrial Development Group and Wuxi Communications Industry Group) to bring the aircraft to market, announcing plans to assemble it in Germany and China. Last year Dornier Seawings China began construction of a purpose-built aircraft assembly plant in Yixing. Early last year Dornier Seawings announced an agreement under which Canada's Diamond Aircraft Industries would build Seastar airframes under contract.

The Seastar is powered by two Pratt & Whitney Canada PT6A-135s mounted push-pull above the wing on the centerline, has a maximum cruise speed of 180 knots, a 900-nm range, a service ceiling of 15,000 feet and a maximum demonstrated sea state of two feet. The Seastar was designed in the 1980s and was FAA certified under Part 23 in the early 1990s at a cost of almost $150 million. A decade ago, the company said it held letters of intent for 25 Seastars.


Mallard

Turbine Mallard C-73T

Type certificate holder Frakes Aviation has formed Mallard Aircraft in Cleburne, Texas, with the goal of building new-production aircraft with new Pratt & Whitney Canada PT6As and Rockwell Collins avionics. Fred Frakes converted eight piston-powered Grumman Mallards to PT6 power between 1970 and 1984 and later purchased the Mallard's TC.

Mallard plans to offer several interior configurations, among them an executive floorplan with six single seats and a three-place divan, eight single seats in a utility configuration and a 17-seat high-density layout. Predicted numbers for the new Mallard: mtow (land or water) 14,000 pounds, 4,462 pounds of fuel, a useful load of 5,470 pounds, maximum payload of 2,350 pounds, typical cruise speed of 190 knots and a service ceiling of 24,500 feet.

Mahindra Airvan 18

Mahindra Aerospace has delayed plans to begin working on an updated version of the Government Aircraft Factories N24 Nomad twin, rebadged the Airvan 18. A Mahindra executive said the company is focused on bringing the Airvan 10 turboprop single to market. Plans for the Airvan 18 had included a modern glass cockpit and an 18-passenger layout with quick-change options for passenger, cargo and combi ops.

The Airvan 18 was slated to be powered by a pair of upgraded 450-shp Rolls-Royce 250 engines and new propellers that would preserve its STOL capabilities, easily using runways shorter than 2,000 feet. Performance estimates: maximum cruise speed of 173 knots and 1,080 nm range with 2,190 pounds of payload. Maximum useful load was projected at 4,405 pounds, with an mtow of 9,400 pounds.

NAL Saras

Indian Prime Minister Narenda Modi's "Make In India" initiative apparently has breathed new life into the development program of the NAL Saras. After 30 years of development and half a billion dollars, India's National Aerospace Laboratory (NAL) has struggled to develop the Saras twin-turboprop pusher for business aviation. A third prototype was spotted taxiing in 2014. While formal funding for the Saras was cut off in late 2013, NAL managed to keep it alive with "lab" funds after that. However, by last year the program had been disbanded.

But at this year's Aero India show Harsh Vardhan, India's minister for science and technology, announced plans for NAL to devote another $60 million to two prototypes and resume limited flight-testing. Even though that flight-testing had yet to resume, he proclaimed Saras was "at an advanced stage of production." The Saras program has struggled since 2009, when the second prototype crashed. The latest iteration of the aircraft makes wider use of composite components to cut weight, and has uprated engines and more modern avionics. NAL says it corrects myriad design problems with the original prototype.

REMANUFACTURED TWINS

Nextant G90XT

Nextant Aerospace is remanufacturing Beechcraft King Air C90s. The Nextant G90XT received FAA certification in November 2015 but the company is delaying customer deliveries until it receives subsequent FAA approval of the single-level power control unit—now anticipated for this fall. The single-lever Unison power control manages engine power and prop speed and has in-flight torque- and temperature-limit protection, auto-start and trend-monitoring capabilities and full exceedance protection.

Powered by GE H75-100s, the G90XT has Garmin G1000 glass panel avionics, a new digital pressurization system, new air conditioning with twin evaporators that delivers 300 percent more cooling capacity, new seats and new interior. TBO for the H75 will be 4,000 hours, with no requirement for a midlife hot-section inspection.

Several different standard cabin configurations are available, among them

Continues on next page ▶

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Daher TBM 910

special mission/air ambulance, a high-density five-passenger layout and an executive three-seat configuration. The price for converting a customer-supplied aircraft is $1.99 million, or $2.75 million for turnkey delivery of a Nextant-supplied aircraft.

NEW SINGLES

Mahindra Airvan 10

In June the Mahindra/Gipps-Aero Airvan 10 turboprop single received type certification from both the Australian Civil Aviation Safety Authority (CASA) and the FAA. The $1.7 million, 10-seat airplane was developed from the boxy metal piston-powered Airvan 8. This unpressurized turboprop single is powered by a Rolls-Royce 250-B17 turning a Hartzell three-blade propeller. It features a 50-inch-wide sliding aft cargo door. It has a full-fuel payload of 1,400 pounds (useful load 2,250 pounds, standard fuel capacity 153 U.S. gallons), a maximum range of 550 nm with IFR reserves and a cruise speed of 145 ktas. Maximum climb rate is 1,000 fpm and the service ceiling is 20,000 feet. The takeoff roll is 1,100 feet (1,600 feet over a 50-foot obstacle), giving this aircraft true STOL capability.

The flat floor of the Airvan 10 main cabin can be configured for diverse missions, from patrol/reconnaissance/surveillance, medevac and skydiving to freight and commuter operations. The cabin measures 50 inches wide, 45 inches tall and 16 feet one inch long and can be configured for nine passengers in the cabin (plus one more in the copilot position) or a commuter configuration with an additional 32 cu ft of cargo space in the rear cabin. An optional cargo pod (600 pounds capacity) can also be attached to the aircraft, and fittings for amphibious floats are another likely option.

Arvind Mehra, executive director and CEO of Mahindra Aerospace, said the Airvan 10 would allow the company to expand existing markets and provide a "much needed boost to regional low-cost connectivity to areas where avgas is a constraint." Customer deliveries are expected to begin next year. GippsAero CEO Keith Douglas said the company is focusing on developing customer- and region-specific enhancements to the aircraft.

Daher TBM 910

Daher unveiled the $3.919 million TBM 910 in April. The new model incorporates the next-generation Garmin G1000NXi integrated flight deck, as well as cabin interior and safety enhancements. According to Daher, the TBM 910 has the same range, performance and technical features as its predecessor, the TBM 900.

The G1000NXi flight deck, a step up from the G1000 on the TBM 900, has faster processors that accelerate system boot-up and software loading, while also enabling the system to manage more data and maps, including visual approach procedures and overlays on the HSI. Another feature is improved cockpit connectivity, allowing wireless transfer of aviation databases from the Garmin Pilot app on a mobile device to the G1000NXi. Meanwhile, an enriched "feel" with the flight deck's new keyboard joystick gives more accurate panning and fluid navigation on the multifunction display pages, according to Daher.

The TBM 910's new cabin features updated seat styling and fittings that are identical to those on the $4.195 million TBM 930.

Cessna Denali

Textron Aviation officially named this new single-engine turboprop in July last year. The Denali is slated to fly next year and the company is accepting letters of intent for the $4.8 million, single-pilot-capable, six-to-nine passenger aircraft. Textron Aviation reported over the summer that the company had begun constructing major subassemblies for the aircraft and that most of the production engineering drawings had been completed.

The Denali will have a range of 1,600 nm, a maximum cruise speed of 285 knots and a full-fuel payload of 1,100 pounds. The aircraft offers a flat-floor cabin; a 51-inch by 53-inch rear cargo door; a digital pressurization system that maintains a 6,130-foot cabin to 31,000 feet; and an optional externally serviceable belted lavatory with pocket door enclosure in the aft of the cabin. The cabin has large windows, LED lighting, a refreshment cabinet and a baggage compartment accessible in flight. The cabin is designed to be easily and quickly converted between passenger and cargo configurations.

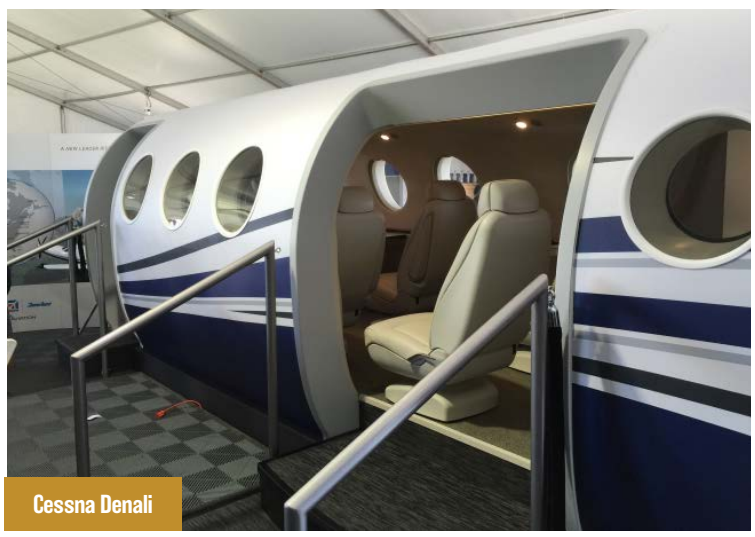
The aircraft will be powered by a new GE Aviation Fadec-equipped 1,240-shp engine with single-lever power and propeller control. GE announced development of the engine late last year. The engine incorporates the modular architecture of the T700/CT7 turboshaft for better performance and lower operating costs and features an all-titanium, 3D aero compressor design for lightweight and efficient power generation, cooled turbine blades enabling higher thrust and fuel efficiency, and integrated electronic propulsion control to enable single-lever power control. GE will flight-test the new engine next year. It will have an initial TBO of 4,000 hours.

The engine will be mated to a new McCauley (a Textron property) 105-inch diameter, five-blade, constant-speed propeller, which is full feathering with reversible pitch and ice protection. Brad Mottier, vice president and general manager BGA at GE Aviation, said the new engine is on schedule for first test run by year-end.

"All of the initial design work is complete. The detailed parts have been released. And the ATP team has printed all the additive parts. We've taken 855 individual parts and through an additive design and manufacturing process we have reduced that number to 12, and those parts are complete. We also started writing the first engine assembly and disassembly procedures," he said. The ATP software and fuel controls have been tested on a GE H80 at the company's facility in Prague.

The Denali's cockpit will be equipped with the Garmin G3000 touchscreen avionics suite and will have high-resolution displays and split-screen capability. The G3000 flight deck will come with weather radar, advanced terrain awareness warning system (Taws) and automatic dependent surveillance-broadcast (ADS-B) capabilities.

The Denali will be offered with a five-year limited warranty covering airframe, engine and avionics and will qualify for enrollment in Textron Aviation's ProAdvantage programs.



Cessna Denali

Epic E1000

Epic E1000

Anticipated FAA certification of the $2.95 million Epic E1000 turboprop single has slipped again, this time to next year's first quarter. The E1000 has carbon-fiber construction, three-screen Garmin G1000 avionics and a Pratt & Whitney Canada PT6A-67A (derated to 1,200 shp from 1,825 shp thermodynamic) mated to a Hartzell four-blade propeller. Fuel capacity is 288 gallons. Time to climb to FL340 is 15 minutes and the maximum rate is 4,000 fpm. The cabin seats six and measures 15 feet long, 4.6 feet wide and 4.9 feet high. Mtow is 7,500 pounds. Takeoff distance is 1,600 feet; landing distance is 1,840 feet over a 50-foot obstacle.

The E1000 differs from Epic's LT kit aircraft in that it has an emergency exit, different pressurization, air conditioning and lighting systems and several different switches, and a few structural changes. It will also have a service ceiling of 34,000 feet, 6,000 feet higher than the LT's. The E1000 is expected to have a full-fuel payload of 1,100 pounds, a range of at least 1,600 nm and cruise at better than 300 knots on 40 gph. Epic holds orders for 60 aircraft and plans an initial production run of one aircraft per month following certification next year, gradually ramping up to one aircraft per week.

Diamond DA50-JP7

Conceived as the diesel-powered, seven-seat SuperStar in 2006, this updated version first flew in January 2015 with a 465-shp Motor Sich AI450S dual-Fadec turboprop made in Ukraine. Diamond

Continues on page 54 ▶

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claims that the AI450S burns 20 percent less fuel than comparable engines and is fuel-efficient even at medium altitudes.

Diamond plans to develop two variants of the aircraft: the Tundra, with oversized tires and STOL capabilities that will enable it to use unpaved runways as short as 650 feet; and another version for private owners and for use as a trainer that would feature conventional landing gear and cruise at up to 230 knots. The DA50-JP7 is designed to fly in harsh environments such as Africa and Russia, and its engine can endure an outside air temperature range of -50 degrees C to 50 degrees C, according to Diamond.

The aircraft will be produced at Diamond's Wiener Neustadt factory in Austria. Diamond collaborated with Ukraine's Ivchenko Progress on the aircraft design and will use the resources of Diamond's Austro Engine subsidiary in the certification program. Certification of the $1.1 million DA50-JP7 is slated for next year.

Diamond DA50

One Aviation Kestrel K-350

Work on One Aviation's Kestrel K-350 turboprop single has been suspended as the company has shifted resources to the Eclipse 700 very light twin jet. However, One continues to take the K-350 mockup to trade shows. Through last year, the company had selected major suppliers for the K-350, among them Garmin for the G3000 touchscreen avionics system and Honeywell for the TPE331-14GR engine, flat-rated to 1,000 shp and providing a 5,000-hour TBO.

The aircraft has a four- to five-seat executive interior with high-gloss wood veneers, fine leathers, a wide aisle and oversize oval cabin windows. Kestrel is developing nine interior options, with passenger seating for five to nine people. The others will accommodate missions as diverse as medevac, cargo and a high-density configuration for eight passengers. The cockpit features sidestick controls; a low, contoured instrument panel with large flat-panel displays; and a wraparound windshield allowing views of both wingtips.

One Aviaton Kestrel K-350

One Aviation has not released a price for the Kestrel but it is expected to be in the neighborhood of $3 million. Preliminary specifications: maximum cruise speed at least 320 ktas; 1,300-nm range (pilot, five passengers, maximum cruise speed at 31,000 feet and NBAA IFR reserves with 100-nm alternate); 1,200 pounds of payload with full fuel (319 U.S. gallons/2,137 pounds usable); and 8,500 pounds mtow.

Caiga AG300 (formerly Primus 150)

This new $1.5 million, five-seat, all-composite aircraft is loosely based on the Epic Escape and remains in flight-test, according to China Aviation Industry General Aircraft (Caiga), and now appears to be falling significantly behind the original development schedule. Caiga claims the AG300 will have a maximum cruise speed of 352 knots (identical to the Escape), a range of 1,410 nm and a ceiling of 28,000 feet. Power comes from an 850-shp GE H85.

Privateer Industries Privateer

Construction has resumed after being halted in July 2015 and relocated to Titusville, Fla. The prototype for this futuristic-looking, single-engine, carbon-fiber amphibian is entering final assembly and could fly later this year. Last November the assembly team received a custom MT propeller from Germany.

This past June, the company began to address structural changes to the aircraft, landing gear modifications, and establishing weight and balance criteria. The company also hired a test pilot.

Power for the seven-seat aircraft comes from a 714-shp Walter 601 spinning a ducted pusher propeller. Predicted performance numbers: 215-knot cruise speed, service ceiling of 25,000 feet, range of 1,000 nm fully loaded, water takeoff run of 1,300 feet over a 50-foot obstacle and useful load of 2,000 pounds. Plans call for the airplane to be marketed first as a kit and then as a certified aircraft. Starting price is in the $1.5 million range. Privateer claims to have received interest from prospective customers in Canada, Brazil, Great Britain, France, Indonesia, China, Chile and the Dominican Republic. ❑

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Privateer Industries

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UPGRADES/MODIFICATIONS

TWINS

Textron Aviation/Beechcraft King Airs

Blackhawk Modifications is offering the XP67A engine upgrade for the King Air 350. Certification flight-testing was completed at 15,000 pounds maximum takeoff weight. Blackhawk CEO Jim Allmon said the upgrade makes the XP67A-equipped turboprop "the fastest King Air on the planet." Blackhawk said that at FL280, ISA +20 degree C day, max cruise, 13,000 pounds, the XP67A upgrade delivers 332 ktas compared with 292 ktas for a stock King Air 350. Under the same conditions, the XP67A climbs from sea level to FL350 in 18 minutes, versus 45 minutes for the stock King Air 350.

The XP67A engine upgrade installs two factory-new Pratt & Whitney Canada (P&WC) PT6A-67As and new five-blade composite MT propellers and spinners. Training, support and a five-year or 2,500-hour new-engine warranty are provided by P&WC.

The company is also equipping a King Air 350ER with the XP67A engine upgrade and expects certification this year at 16,500 pounds mtow. The final phase of the project will be to equip and certify a King Air 300 with the XP67A engine upgrade starting early next year.


Textron King Air 350i

In July, **Raisbeck Engineering**, in collaboration with Hartzell, announced that it is offering a new carbon-fiber, five-blade swept propeller for the King Air 350. STC approval is expected shortly, and the price is expected to be $140,000 per aircraft. The 105-inch diameter prop features a six-year, 4,000-hour TBO and a three-year, 3,000-hour warranty. The propeller is expected to improve overall aircraft performance by between 5 and 7 percent and is designed to maximize thrust and boost cruise speed, improve single-engine climb and generate less blade tip noise. The Raisbeck propellers are available with the Blackhawk XP67A engine upgrade.

Innovative Solutions & Support (IS&S) and Blackhawk have announced an agreement for Blackhawk to distribute and install IS&S's NextGen flight deck and integrated turboprop autothrottle for King Air 200s and 350s. The two models account for 3,000 airplanes, according to IS&S, and another 2,000 C90 through E90 and F90 models are upgradeable as well. The King Air NextGen flight deck will be similar to IS&S's STC'd Pilatus PC-12 avionics upgrade *(see below)*, which installs new PFDs and MFD, dual SBAS GPS receivers and IS&S's integrated flight management system with LPV approach capability.

In the twin-PT6 King Air application, the autothrottle will provide engine-out thrust control, which in case of engine failure automatically sets the remaining engine to the correct power level if airspeed approaches minimum controllable airspeed. The IS&S PT6 autothrottle is able to control an engine fully with a hydromechanical fuel control, and it protects against over-torquing during takeoff or over-temping in climb or at high altitudes.

CenTex Aerospace has received FAA approval for a 14,000-pound mtow for Beechcraft King Air 200s, A200s and B200s with high flotation landing gear. The Halo 275 conversion yields a 1,500-pound mtow increase, a 1,000-pound gain in maximum landing weight and, for model year 1993 and later, a 500-pound rise in the zero fuel weight. As a result of its certification in the Part 23 commuter category, the Halo 275 conversion adds five safety systems: an engine fire extinguisher, elevator trim warning, overspeed warning, emergency cabin lighting and an ice mode for the stall warning system.


Pilatus PC-12

The new systems raise the empty weight by 80 pounds. Overall, the net payload increase can equate to eight 170-pound passengers with 60 pounds left over for baggage or another 1,420 pounds of cargo or fuel. According to CenTex, a fully fueled King Air 200 with the Halo 275 conversion can fly 1,900 nm (zero wind, 45-minute reserve) while carrying a pilot and nine passengers. To fly that far, a standard King Air 200 would have to leave behind eight of the nine passengers.

DHC-6 Twin Otters

Manufacturer **Ikhana Aircraft Services** has received U.S. FAA parts manufacturer approval (PMA) for the "Re-Life" DHC-6 fuselage. The PMA approval for the remanufacturing process followed U.S. supplemental type certification that was granted in 2011. The process involves replacing all fatigue-critical structural components with new components, resulting in new certified life limits of 66,000 hours or 132,000 flight cycles. The PMA enables Ikhana to supply the fuselages with an FAA Form 8130 for component manufacture. With the fuselage, "all of the Twin Otter life-limited structural components are now eligible for Re-Life re-manufacture, providing regulatory approved 'new' components," Ikhana said, noting that it also offers the process for Twin Otter wing boxes, flight controls and nacelles.

SINGLES

Pilatus PC-12 NG and PC-12

Advent Aircraft Systems received STC approval for anti-skid brakes for the Pilatus PC-12 in April. The STC applies to all PC-12s equipped with a Waas-capable GPS, such as those with Honeywell Apex avionics or Garmin or IS&S Waas GPS receivers. The Advent eABS weighs 27 pounds installed, comes with all required installation hardware and requires no changes to the existing PC-12 brake system. List price for the PC-12 eABS is $50,604, not including installation at an Advent-authorized dealer.

The eABS reduces pressure on the braking system to provide the anti-skid modulation that prevents flat-spotting or blown tires. After landing, the eABS allows the pilot to "confidently apply" the brakes immediately after touchdown or in other situations where hard braking is needed, such as a rejected takeoff. Essentially eABS acts as an alternative to reverse thrust, reducing prop erosion and the risk of FOD ingestion. During the ground test and FAA flight-testing, the eABS allowed pilots to bring PC-12s to a halt on wet and dry pavement in light wind with average ground rolls of 710 feet on approaches flown at normal VREF speeds throughout the aircraft's weight envelope.

Earlier this year, **Innovative Solutions & Support** (IS&S) received FAA STC approval for a Pilatus PC-12 retrofit avionics suite with two eight- by 10-inch LCD primary flight displays and a 13-by 10-inch LCD multifunction display. The IS&S NextGen Flight Deck for the PC-12 has dual SBAS GPS receivers that enable LPV approach capability using IS&S's integrated flight management system (IFMS). "The result is an integrated avionics suite providing unrivaled situational awareness, safety enhancements and operational performance," according to IS&S. Other standard features: IS&S's integrated standby unit; synthetic vision and enhanced vision; ADS-B OUT AND IN; and electronic checklists. The upgraded flight deck can display airport diagrams, runway depictions, approach charts, airspace, high and low airways, navaids and intersections. Satellite weather and iPad control are optional.

IS&S has also received STC approval for a non-Fadec turboprop autothrottle

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DHC-6 Twin Otter

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for the Pilatus PC-12 equipped with the IS&S NextGen flight deck. According to the systems integrator, the retrofit allows pilots to automatically control power settings of the PT6 to prevent overtorque and over-temperature while providing speed-envelope protection. The autothrottle computes and controls the appropriate power levels and features an automatic takeoff and go-around (TOGA) mode that will bring the engine to max power in a few seconds. Other modes allow the pilot to select the desired torque or airspeed, and if those manual settings approach limits in either parameter, the system will respond with a built-in throttle-shaker.

Cessna Caravan

The Garmin G1000NXi flight deck is now standard on new-production Cessna Grand Caravan EXs and Caravans. **Textron Aviation** has already received FAA and EASA certification for the upgraded avionics on the turboprop singles, allowing deliveries to begin in the U.S. and Europe. The G1000NXi updates the display of flight information, with faster processing times, improved graphics rendering and enhanced readability with LED backlighting. Other improvements: map overlay on the HSI; more capable FMS; standard ADS-B OUT and optional ADS-B IN; VFR and IFR charts displayed on the moving map; and animated Sirius XM weather depiction. SurfaceWatch, which provides enhanced runway situational awareness, is an option.

Cessna Grand Caravan EX

In July, **Blackhawk Modifications**, in partnership with **Metal Innovations**, launched a program to revitalize aging Cessna Caravans. The Caravan Reset Program will address issues for Caravans with 20,000 hours total time and at 5,000-hour intervals thereafter. It is coupled with a Blackhawk engine upgrade. "This program will allow Caravan operators to reset their aircraft to like-new standards for a fraction of the cost of a new airplane. Typical maintenance schedules for the Caravan are frequent and costly. Cessna maintenance inspection requirements significantly increase at 20,000 hours of total time, then again every 5,000 thereafter. These intensive inspections take hundreds of man hours to complete and can cost an operator hundreds of thousands of dollars in maintenance and lost revenue from aircraft downtime," Blackhawk asserted.

The Reset program comes with a pending FAA-approved Metal Innovations Cessna 208 Special Inspection Document (SID) Reset STC along with the new 867-shp Blackhawk XP140 engine, the same PT6A-140 engine installed on the production Caravan EX. The engine upgrade delivers 28 percent more horsepower for takeoff, climb and cruise, while retaining the existing cowling, engine mount and exhaust system. The upgrade installs a 325-amp starter generator that lowers start temperatures by 100 degrees F, a new Hartzell 106-inch propeller and Hawkeye DigiLog engine gauges. ❑

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AVIATION PRODUCTS

Brazilian providers rebrand as Icon

by Richard Pedicini

São Paulo-based Icon Air, a relatively new services provider, took advantage of LABACE to introduce attendees to its product, and Icon's general superintendent, Décio Galvão, discussed the company's history—and its future—with **AIN**.

"We plan to strengthen charter, expand fractional and continue with hangarage to serve operators," he said. "We are able to help our customers buy, sell and trade aircraft; we can make it happen for them."

Although the company is new in its current iteration, it emerged from familiar brands in the region. Last year charter firm CBAir agreed to purchase Global Aviation, another long-time charter firm. The company also acquired Reale Air Taxi, Passaro Azul charter and SSR, a services company.

The operational merger began with the back office. All had separate ANAC registrations and licenses, separate sets of approved maintenance manuals and all the other paperwork. The plan is to merge all of this to "at most two companies." The company is consolidating the fleets under the name Icon Air, and it launched the brand in May.

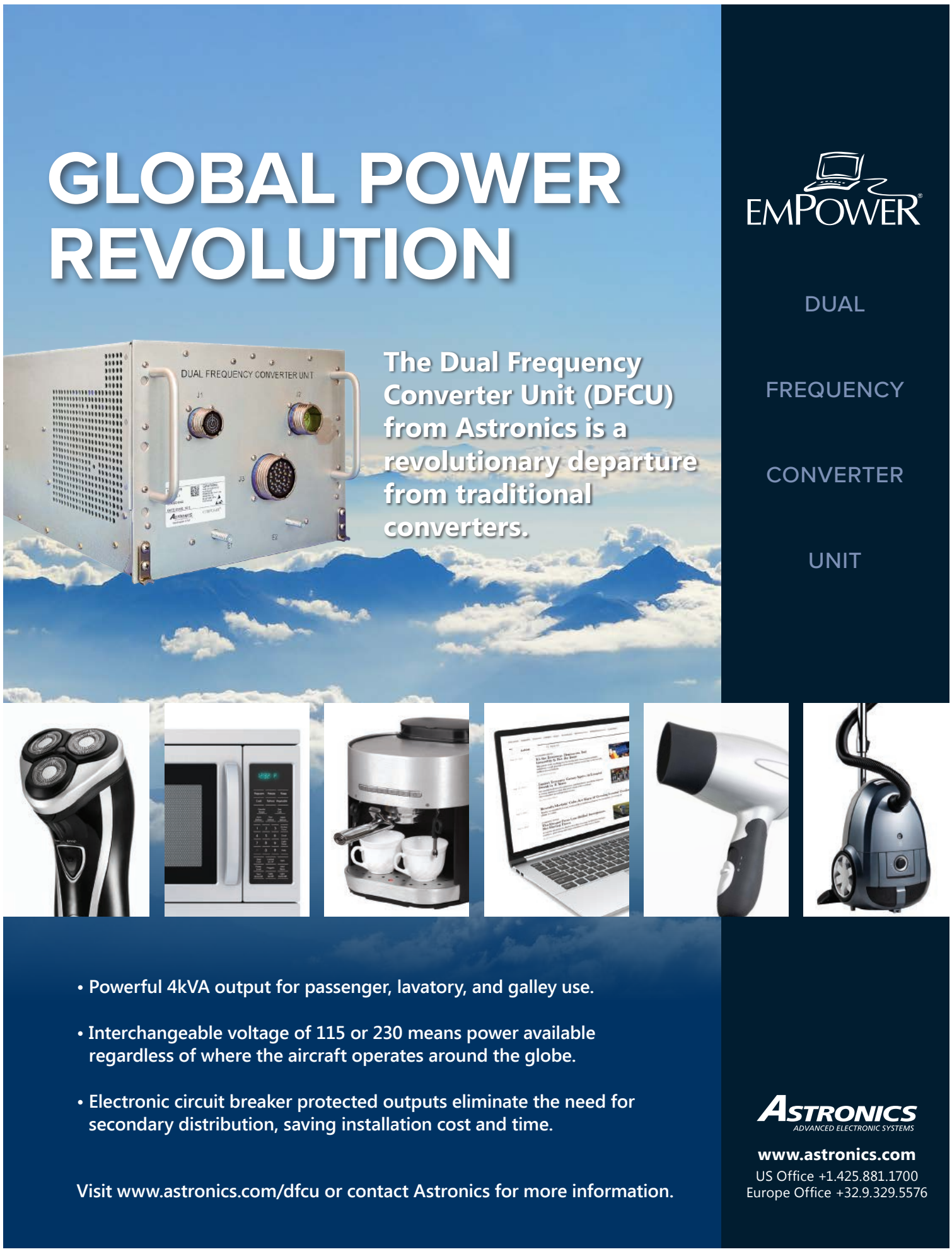
Charter Matches Mission

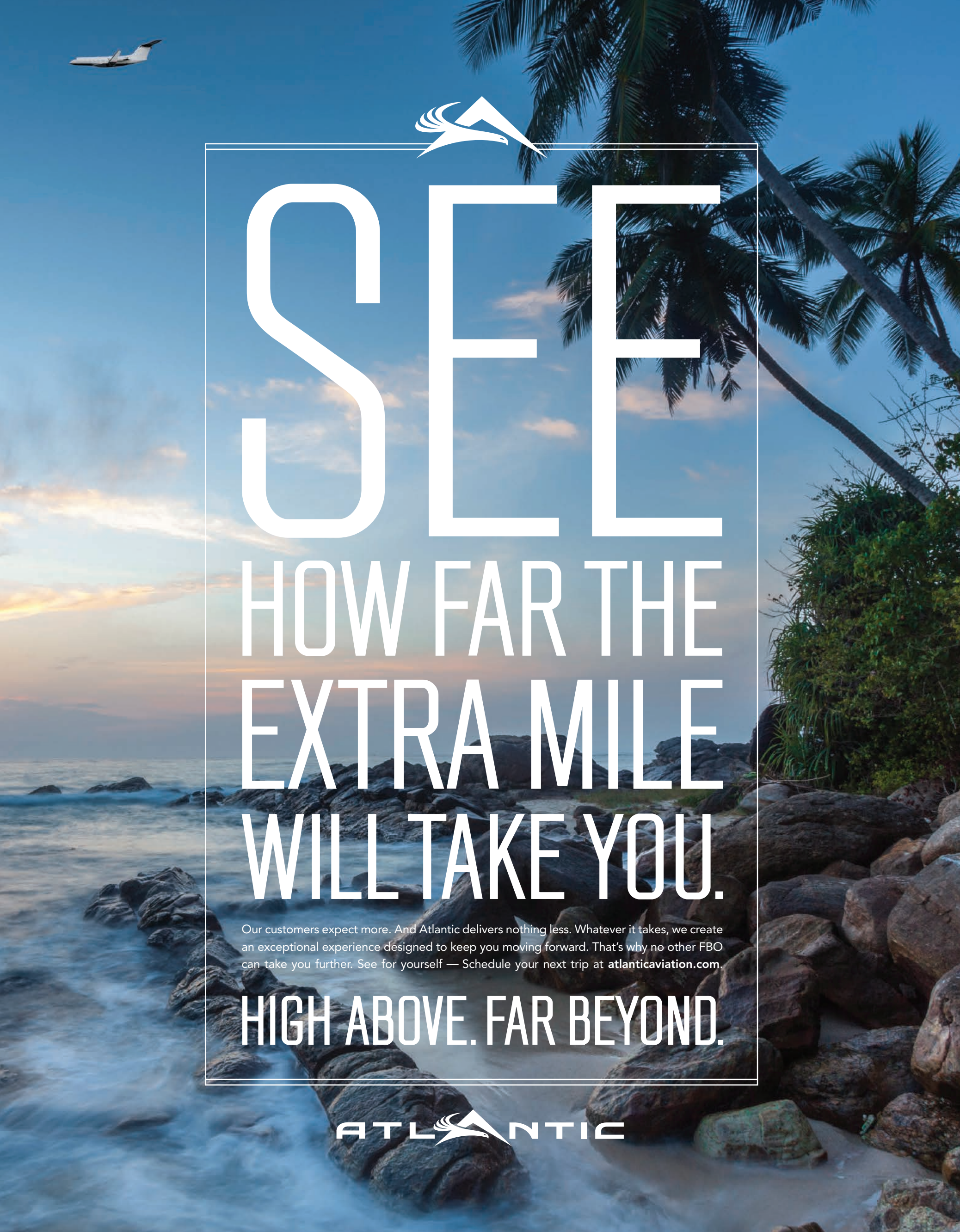
Icon Air fields the largest charter firm in Brazil, Galvão said, adding that charter is "an important part of our business today." Icon's fleet comprises turboprops, light jets, long-range jets and turbine helicopters. The fleet incorporates varying interior configurations, allowing the company to match the aircraft to the customer's mission, he said.

"CBAir made a point of buying diverse equipment," Galvão said, but "medium to long term, Icon will be diminishing the variety," while maintaining varied capabilities. Even with varied equipment, Icon Air achieves economies of scale, on the price of fuel and insurance, simulator training and maintenance.

In the fractional ownership market, Icon Air has several advantages, he said. Fractional share owners have access to the entire Icon fleet, paying a differential for aircraft larger than the one in which they hold a share. The fractional program is "more selective" because the company sells fewer quotas per aircraft. Icon Air is also marketing a jet card, where upfront payment entitles the client to special rates. There is still no specific regulation for fractional ownership in Brazil, although a new regulation—RBAC Part K—is expected to be issued by year-end. "Part K will bring light to a market that is already large. Legally, it will remove obstacles," Galvão said. "Operationally it will raise the bar, imposing requirements closer to those for air taxis. We may launch something under Part K, but we already meet the more rigid air taxi rules."

Hangarage accounts for Icon Air's second-largest revenue source. It has 11 hangars: four at Congonhas, two at Campo de Marte, one of which is just for helicopters; two in Sorocaba; two at Rio's downtown Santos Dumont; and one in Brasilia. Icon Air will finish revitalizing the hangars over the next six to 12 months. ❑

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Grand Caravan EX

Cessna's big utility turboprop single is a capable and all-around solid performer

by Matt Thurber

The Cessna Caravan has been in production since 1984, and earlier this year I had my first opportunity to fly the single-engine utility turboprop from Textron Aviation's private airport—Beech Factory Airport—in Wichita.

My demo pilot was Terry Allenbaugh, the perfect pilot to show me the Caravan's capabilities. During his early flying career, Allenbaugh flew one of the first Caravans, Serial Number 8, for Mission Aviation Fellowship in Ethiopia. Although he has flown all the Citations and King Airs, Allenbaugh returned to flying the Caravan as a sales demonstration pilot two years ago, and he is an enthusiastic proponent of the big single-engine turboprop.

While it's common to be told the Caravan "flies just like a heavy 172," the airplane is not simply a stretched and beefed-up version of any Cessna single. The configuration may be similar—there aren't many options when it comes to designing a tricycle-gear single-engine turboprop for rough-field operations—but the Caravan employs many features found on larger airplanes.

The strut-braced wing has massive flaps that extend to 70 percent of each wing's length. Spoilers mounted inboard of the ailerons improve low-speed handling. Elevator trim tabs have dual actuators. A pressure fuel system is optional and typically installed on float-equipped Caravans. The pressure port is mounted on the cargo pod near the left landing gear leg, and it is far easier to use that for refueling than to try to climb onto the wing to reach the fuel caps.

The EX's 867-shp Pratt & Whitney Canada PT6A-140 has a 65-amp backup alternator for the standard 200-amp starter-generator. A 300-amp starter-generator is optional, as is air-conditioning. This Caravan is equipped with the optional four-blade Hartzell propeller; both the three- and four-blade props are reversible, helping to shorten ground roll by about 10 percent. When the prop is feathered, it nearly doubles the Caravan's glide ratio, to 13:1 from 7:1, according to Allenbaugh.

This Caravan is fitted with optional larger tires with more plies and lower tire pressure for unimproved airfields. The nose gear might look like a typical single-engine Cessna air-oil strut, but the majority of the shock absorbing is handled by the spring steel nose gear, another nod to the airplane's rough-field capabilities.

Caravans are approved for flight into known icing when equipped with the TKS ice-protection system. The TKS tank holds 20 gallons and provides 3.5 hours of normal anti-icing operation or 45 minutes at the high-flow setting. The propeller has its own TKS slinger ring, which helps protect the nose of the airplane. The windshield also is protected with a TKS spray bar. The TKS system is much cleaner looking than the deicer boot system found on earlier Caravans, which had boots mounted on almost every forward-facing surface.

The Grand Caravan EX's 340-cu-ft cabin offers loads of flexibility, with seating configurations available for up to 14 occupants. Search-and-rescue (SAR) and intelligence, surveillance and reconnaissance (ISR) equipment is easily mounted in roll-on, roll-off style on the floor's seat tracks.

SAR operations are enhanced by the Garmin G1000 avionics suite, which offers the option of a full set of customizable search patterns that can be flown by the autopilot. The Garmin displays can also accept video input. Among other avionics options are weather radar and high-frequency radio as well as military radios.

The large cargo door on the aft left fuselage allows loading of up to four standard pallets, and many operators are flying their Caravans with dual passenger-cargo configurations. The optional belly cargo pod is also a popular choice. The aft baggage compartment in the cabin carries 31.5 cu ft and up to 320 pounds, while the cargo pod's maximum cargo weight is 1,090 pounds and has a volume of 111.5 cu ft.

For aerial survey work, the Grand Caravan can be fitted with up to two 22- by 22-inch ports with floor support. The ports are spacious enough for medium-format cameras, although they will accommodate large-format camera systems.

For medical transport, the Grand Caravan can carry up to four gurneys for casualty evacuation or two patients on air-ambulance stretchers offered by a variety of manufacturers.

Other available special-mission configurations allow parachute operations, training and float operations. With Wipline 8750 amphibious floats, the Grand Caravan EX's maximum cruise speed drops to 164 from 185 knots and maximum range to 813 from 912 nm.

Useful load with floats is 3,162 pounds, down 405 pounds from the non-float-equipped Caravan's 3,567 pounds.

"The mission depends on the payload," explained Robert Varriano, technical solutions manager for Textron Aviation. For ISR-type operations, the Grand Caravan can fly at loiter speeds for five to six hours. "It has a great useful load to be able to do that." Medevac flights are typically shorter because the Caravan is not pressurized, so the range capability is more than sufficient.

With a full load of fuel—2,246 pounds—the Grand Caravan can carry a payload of 1,286 pounds. For an ISR or SAR mission, the Caravan can fly as slowly as 90 ktas at 2,000 feet while burning 290 pph. At higher altitudes, fuel consumption drops even lower, and loitering at 14,000 feet, the engine burns 240 pph while propelling the Caravan at 103 ktas. At these fuel consumption levels, loiter times of more than six hours at low altitude and almost eight hours at high altitude are possible, even allowing for a generous reserve.

The Grand Caravan's flexibility shows in how little runway it needs (or water, typically 2,000 feet for a water takeoff). At sea level on a standard day, at the maximum takeoff weight of 8,807 pounds, the turboprop leaves the ground in just 1,355 feet, with 2,095 feet needed to clear a 50-foot obstacle. In more challenging conditions, 6,000 feet and ISA +20 degrees C, the Caravan's ground roll is 2,765 feet and takeoff distance 4,395 feet. Taking off in the same conditions with 500 fewer pounds of payload (8,300 mtow) requires a ground roll of 2,355 feet and takeoff distance of 3,690 feet.

"The great thing about the Caravan," said Varriano, "is that because of its multiple uses, most things are optional so if you're cargo hauling and you don't need to have a lot of equipment on board, you can make it as light as possible so you can maximize your cargo. But at the same time if you need to be in inclement weather or doing things that you need to have some more information, you can load up the airplane with all sorts of equipment."

Climbing Inside

The Caravan's cockpit is comfortably spacious, more like a small business aircraft than a light airplane, and it is both utilitarian and well appointed. Climbing into the left seat is easier using the fold-out ladder at the pilot's door, but you can also clamber in through the cabin after entering via the large cargo door.

An integrated glass cockpit is pretty much a standard requirement these days, and the Caravan has long featured Garmin's G1000 flight deck, now delivered in the NXi version with faster processors and added features such as visual approaches and HSI map overlays. ADS-B OUT is standard, and ADS-B IN optional. VFR and IFR charts can also now be displayed on the moving map. Garmin's SurfaceWatch alerts pilots if they are about to take off or land on the wrong runway or on a taxiway or too short a runway. I especially like the newest feature that comes with NXi, the com frequency decoding, which spells out the facility for the selected com frequency, right below the numbers. (This Caravan wasn't equipped with the G1000 NXi.)

Once I was seated in the left seat, it felt like I had climbed up into a seriously big truck; the Grand Caravan EX is a tall airplane, and at 41 feet 7 inches it is long, too, with the cabin able to accommodate a variety

Continues on next page ▶

The newest versions of the Caravan EX are equipped with the Garmin G1000NXi, offering additional features compared with the G1000 on the airplane flown for this report.

MATT THURBER

Cessna Grand Caravan EX Specifications and Performance

Price (typically completed and equipped)	$2.5 million
Engine	Pratt & Whitney Canada PT6A-140, 867 shp
Avionics	Garmin G1000NXi
Passengers (typical)	1 crew + 9 pax
Maximum range (NBAA IFR, 100-nm alternate)	964 nm
High-speed cruise	185 ktas
Long-range cruise speed	167 ktas
Fuel capacity	2,246 lbs
Max payload w/full fuel	1,286 lbs
Ceiling (certified)	25,000 ft
Max takeoff weight	8,807 lbs
Takeoff distance over 50-ft obstacle (sea level, standard)	2,160 ft
Landing distance over 50-ft obstacle	1,871 ft
Length	41.6 ft
Wingspan	52.1 ft
Height	15.1 ft
Cabin	Volume 340 cu ft
	Width 5.3 ft
	Height 4.5 ft
	Length 16.75 ft
Baggage capacity (internal)	32 cu ft/320 lbs
Baggage capacity (external)	112 cu ft/1,090 lbs
FAA certification (basis, date)	FAR Part 23, 2012
Number built (since 2013)	357 (June 2017)

Grand Caravan EX

▶ *Continued from preceding page*

of interior configurations from utilitarian but comfortable corporate style to high-density commuter seating for the pilot and up to 13 passengers (one of them occupying the right front seat), or variations of seats combined with cargo-hauling capability.

Our load was fairly light, with Allenbaugh, one passenger and me and a bit more than tanks half full of fuel for a takeoff weight about 1,000 pounds less than the 8,807-pound maximum. The PT6 started easily, and I taxied from the Textron Aviation new airplane delivery center to Beech Airport's Runway 19. The Caravan moves solidly on the ground, tracking the centerline with little extra effort, except for the occasional pull of the power lever into beta range to manage taxi speed. In tight spaces, turning in a small radius with nosewheel steering and brakes feels just like it does in a smaller single-engine Cessna. This was helpful during the taxi back on the active runway at Beech Factory, which has no parallel taxiways, and I would also come to appreciate this during one of our upcoming maneuvers.

Density altitude was about 3,000 feet, and the wind was 20 degrees off the runway heading and gusting to 15 knots. I pushed the condition lever to high idle before lining up on Runway 19, then advanced the power to maximum torque, which is handily indicated on the torque gauge's dynamic redline on the G1000 multifunction display engine indicating system. The PT6 and Hartzell four-blade prop sped up quickly and accelerated the Caravan, and I needed just a touch of right rudder to keep the nose on the centerline. At about 70 knots, the nose felt light, and the big turboprop climbed off the runway without any need for a big pull on the yoke.

I turned to the east while climbing at the cruise climb speed of 110 knots and getting a feel for the Caravan's controls. It is a heavy airplane, but by keeping it trimmed I could easily fly with a light touch on the yoke. Like any single-engine Cessna, the Caravan is rock-solid stable, but it is also easy to feel when trim is needed.

After turning south then leveling off at 9,000 feet, I pulled the power back, slowed down and added full flaps for some slow flight. Handling is even better at low speeds, aided by the spoilers and aileron servo tabs that improve lateral control forces.

Slow flight is a comfortable regime for the Caravan, and with takeoff/approach flaps set, it'll fly for hours and hours at medium altitudes sipping fuel while dutifully following the search-and-rescue patterns built into the G1000 avionics. The patterns are easily customizable to adapt to the particular situation, and the GFC 700 autopilot just follows along. A lone pilot could be freed up to look outside using the autopilot tracking the patterns, but more likely multiple observers would be on board. With the Garmin synthetic vision technology switched on, the animated view of the outside world helps keep the pilot aware of the Caravan's situation.

Steep turns these days feel almost like cheating; putting the flight path marker on the primary flight display's horizon line with synthetic vision running makes it almost impossible to mess up. The Caravan tracks true in a 50- to 60-degree bank and enters and exits turns crisply.

Soft-field Patrol

The exercise that showed the Grand Caravan EX's true skills as a rough-country vehicle came next, as we planned a full-stop landing at a grass strip, Sedan City Airport. During the preflight briefing, Allenbaugh had outlined the plan: fly a normal traffic pattern and approach with approach flaps, but without landing. We would allow the main wheels to touch so we could get a feel for the condition of the grass runway, then add takeoff power and return for a full-stop landing.

We entered the traffic pattern from the crosswind leg, then I turned downwind and deployed the flaps as the Caravan slowed.

Except for the PT6's turbine whine and the large airframe, the Caravan feels sprightly in the traffic pattern, maneuvering like a much lighter airplane.

On short final, I allowed the speed to drop to about 80 knots. With just half flaps, the Caravan assumed a nose-high attitude as it crossed the runway threshold, and I goosed the power lever to keep from sticking to the runway as the main wheels rolled in the turf. Allenbaugh agreed that we could feel no bogging down of the wheels as I held them on the runway, and then I added power and climbed back into the air.

After returning around the empty traffic pattern, I set up final approach almost the same, except for adding full flaps and slowing to 78 knots. The Caravan felt solid, responsive and stable as we crossed over the end of the runway. Touching down mainwheels first, I brought the power to idle, allowed the nose to drop then moved the power lever past beta into reverse, and the Caravan quickly came to a stop in what looked like just a few hundred feet.

Before the big Cessna stopped rolling, however, Allenbaugh asked me to advance the power to keep from getting stuck, so I moved the prop out of reverse and added power while stepping on the left rudder then brake to turn tightly around on the narrow runway. The Caravan pirouetted promptly, and it did so once again in the other direction at the runway end.

With flaps back to the takeoff setting, I pushed the power lever forward and held the yoke aft for a soft-field takeoff. The Caravan couldn't wait to get airborne and lifted off the strip in short order.

We climbed to 4,000 feet on the way back to Beech Airport, and then I flew a normal approach and full-flaps landing back on Runway 19.

Overall, the Grand Caravan EX's handling reminded me of flying an old friend, a big brother to the classic Cessna single-engine, strut-braced-wing design, with plenty of performance, massive amounts of passenger and cargo space and handling and performance characteristics that any pilot will appreciate. ❑

The Grand Caravan EX has an external baggage capacity of 1,090 pounds. The cabin has room for nine passengers.

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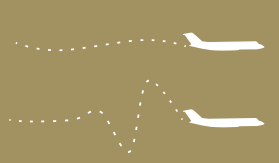
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UTC Collins

▶ *Continued from page 8*

Concern from Boeing, Airbus and others is not surprising. Supply-chain consolidation is seen as part of the ramifications of OEMs seeking higher margins by squeezing costs out of their suppliers, with the UTC-Collins tie-up serving as the largest example.

"We believe at least part of the motivation for [UTC] is the incremental pressure on the supply chain from Boeing, both from a price and economics standpoint," said Canaccord Genuity analyst Ken Herbert. "We expect the supply chain to continue to look to get bigger, both to increase leverage in the marketplace, and also to provide additional opportunities to take out cost and realize synergies."

A UTC-Rockwell Collins combination "would also be more challenging to bully" into cost-reduction agreements, such as those behind Boeing's Partnering For Success, "whereas smaller suppliers are easier to push around," said Vertical Research Partners analyst Robert Stallard. UTC generates half of its $57 billion in annual sales from Pratt & Whitney and UTAS. Collins generates $5.3 billion in annual revenue.

"As we think about 2018, one of the things that we are focused on is structural cost reduction," Hayes told analysts on a late-July earnings call. "It's organization. At the same time, the need to continue to reduce factory footprint remains. We're going to continue to go by the playbook of taking out high-cost locations for low-cost locations where the markets are moving."

While the Collins acquisition will not create a simpler corporate organization, it should bring other benefits. "We believe UTC has sought greater scale in its aerospace business for some time, and Rockwell Collins enjoys leadership positions in avionics, interiors and connectivity," Canaccord's Herbert said.

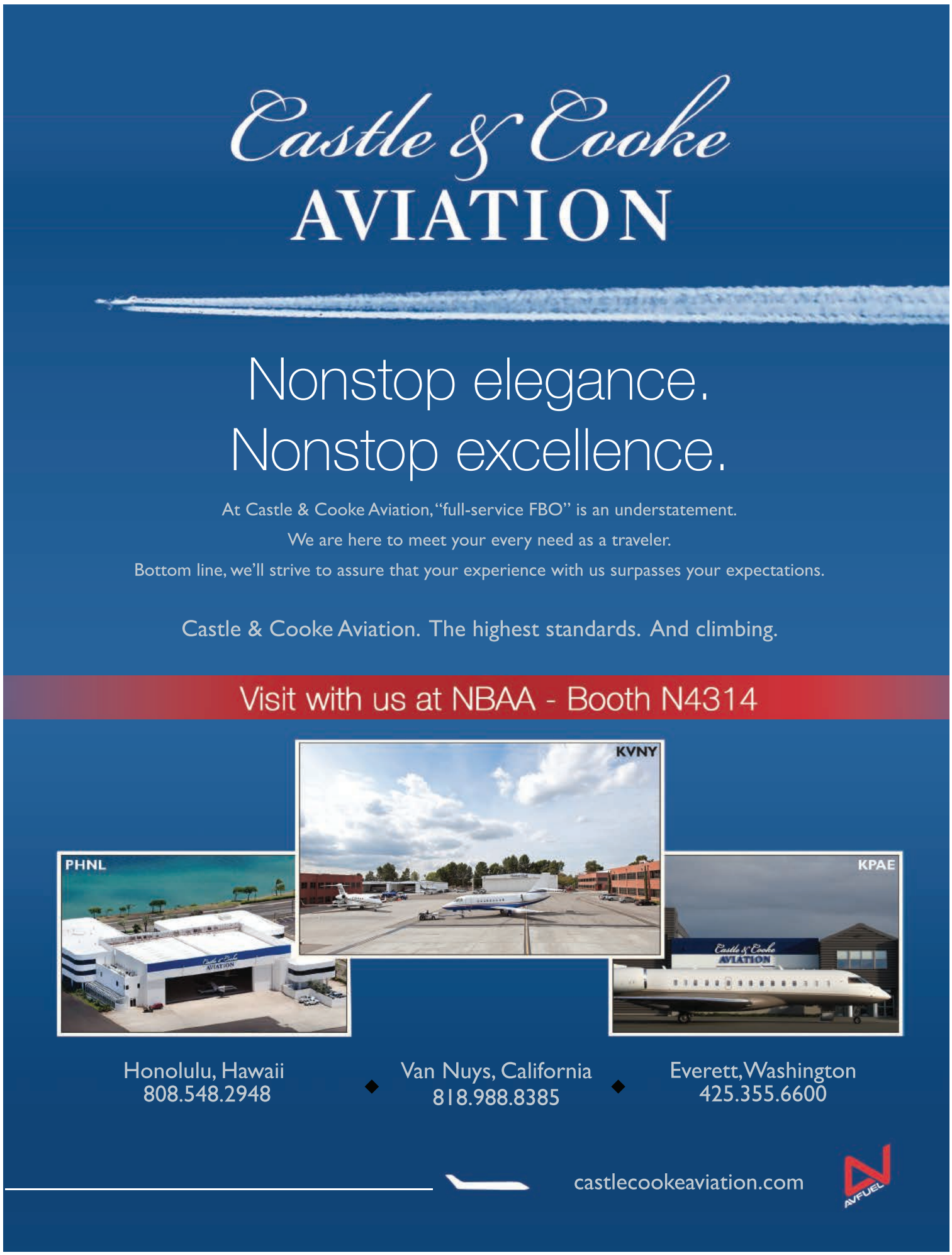
Aftermarket Access

It also gives UTC more size in the all-important aftermarket segment. On July 1 Boeing started operating Boeing Global Services as an integrated business unit. The $14 billion business is targeting rapid growth in the next decade, with Boeing officials tossing around targets of $45 to $50 billion in annual revenue. Much of that growth is expected to come from commercial business—a prospect that has suppliers concerned.

"One of the fundamental strategic issues…is who gets to participate in the aftermarket," Hayes said in July, before the Collins deal was announced. "The model has always been that the [OEMs] take big risks and invest big dollars, along with the first-tier suppliers, to develop all of these innovations. I think we need to have these discussions—as we have started to do with the big OEMs—about partnership risk revenue-sharing arrangements. But clearly, you can't continue with the current business model if the OEMs are going to demand a bigger and a much more significant chunk of the aftermarket."

The UTC-Collins tie-up also raises speculation that the company will spin off its two core competencies: building systems (Otis Elevator and its Climate Controls and Security unit) and aerospace. "We shall see, but the newly named Collins Aerospace Systems potentially paves the way for United Technologies to split into two separate [aerospace and defense] and building systems companies," said Stallard. This would potentially unlock the value in Otis and CCS, with Aerospace Systems able to sustain the risk inherent with Pratt & Whitney."

UTC's Hayes says that although the company's primary focus is closing the deal while executing on current programs, it won't rule anything out." ❑



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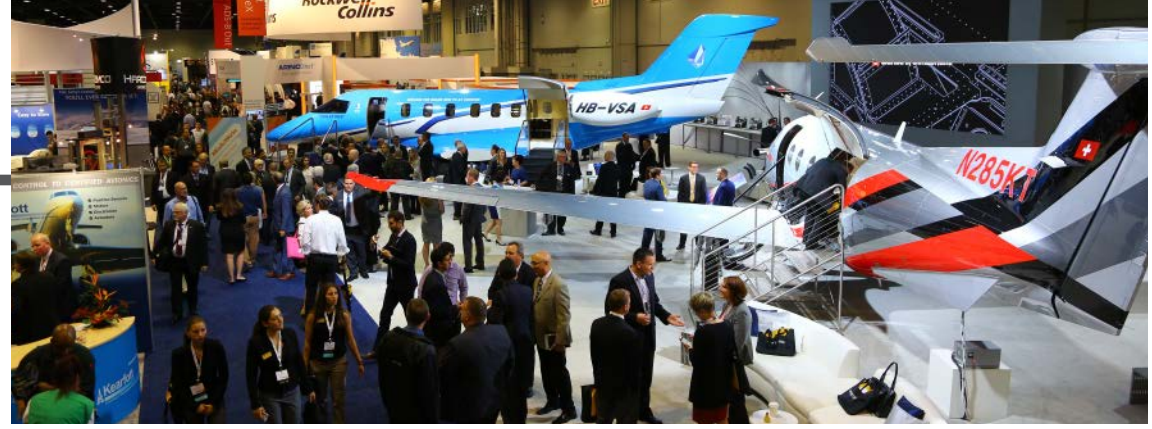
Las Vegas preps for NBAA BACE arrival

by Matt Thurber



DAVID McINTOSH

As is typical when the annual NBAA Business Aviation Convention & Exhibition is scheduled in Las Vegas (October 10-12), record numbers of attendees—at least 27,000—are expected to show up. And they will be offered a cornucopia of business aviation opportunities to sample, from 1,100 exhibitors and a static display inside the Las Vegas Convention Center to the outdoor static display at Henderson Executive Airport, with nearly 100 aircraft expected.

While this show is primarily about business aviation, there is room for the lighter side of general aviation, and a variety of companies are displaying some interesting airplanes. These include Aerometal with a DC-3, APS's S211 jet upset trainer, an American Champion Super Decathlon, Aviat's Husky and Rare Aircraft with a Stinson SR-9F and Waco UPF-7. In addition to corporate turboprops and jets, Textron Aviation has booked a space for its nimble Scorpion military tactical jet.

OEMs typically wait until the last minute to announce their biggest news for the NBAA Convention, but the rumor mill this year isn't exactly full of speculation about new model plans. Some OEMs are going to unveil new interiors for upcoming business jets, and it is possible that certification announcements could be timed for the show, such as for the Pilatus PC-24 and Gulfstream G500, but we will have to wait and see.

Upgrades for the existing fleet will probably garner a lot more attention this year, with airborne connectivity the predominant subject, although ADS-B OUT and FANS will also be strong areas of focus. For ADS-B OUT, deadlines are rapidly approaching. Approximately 40,000 aircraft in the U.S. have compliant systems installed thus far, with 100,000 still to be upgraded by the Dec. 31, 2019 deadline in the U.S. and June 7, 2020 deadline in Europe.

The NBAA show also offers plenty of safety, operational and maintenance seminars. Before the show opens, NBAA is holding its annual Single Pilot Safety Standdown (October 9), and on the final day the National Safety Forum (October 12). Both events are free. The standdown "will focus on building a safety culture in a small or single-pilot organization," according to NBAA, "while the third annual NBAA National Safety Forum begins with keynote addresses from FAA and NTSB representatives, and also will concentrate on three of the 2017 NBAA Top Safety Focus Areas: fitness for duty, airport and ground handling safety and loss of control inflight."

On the evening of October 11, the annual fundraising event to benefit the Corporate Angel Network (CAN) transitions to a new format. For this year's event, the Fund an Angel Cocktail Reception at the Wynn Las Vegas (formerly the NBAA/CAN Soiree) will feature live and silent auctions. Funds from the event will help CAN continue its work to arrange flights for cancer patients to and from treatment.

The Opening General Session on the first day of the show (October 10) will feature FAA Administrator Michael Huerta, Apollo 13 Captain Jim Lovell, Senator Jerry Moran (R-Kansas), NTSB chairman Robert Sumwalt and Rep. Dina Titus (D-Nev.).

Two keynote speakers will share the podium during the second Opening General Session on the morning of October 11, astronauts Mark and Scott Kelly.

On the final day of the NBAA Convention (October 12), students, faculty and chaperones are invited for the free Careers in Business Aviation Day.

NBAA is welcoming a number of new exhibitors this year, among them XTI Aircraft, which is designing a radical vertical takeoff and landing and fast horizontal flying personal and executive aircraft, the Tri-Fan 600. Other new exhibitors: Scott International Procedures, which offers training and information for business aircraft operators flying outside the U.S.; and Hangar Tonight, designed to facilitate last-minute overnight storage via an iOS app, for short-term accommodations. ❑

MEBAA event

▶ *Continued from page 48*

Tangier Ibn Battuta and Fez-Saiss. Global connections by departure through the end of July saw Africa as the most popular destination, with 55 percent, Europe with 40 percent and the rest of the world with 5 percent.

The fleet in Morocco grew at an average annual rate of 2 to 3 percent over the last five years, but this will fall to 1 or 2 percent through 2021. "Recent fleet growth slowed as predicted because of political instability and migration of aircraft from the region. The fleet was nearly static in 2015," said Raghed Talih, director, Middle East and Turkey, commercial aviation, Honeywell.

The major preference in the market is for large-cabin, long-range jets, accounting for around 80 percent of units and 95 percent of value, he said. There is virtually no interest in small-cabin aircraft, the survey showed.

Middle East and African bizav operators are expected to contribute 3 or 4 percent of global demand over the period 2016-21. "Purchase expectations rose five percentage points globally to 21 percent in 2015," he said, meaning 21 percent of companies expect to make aircraft purchases over the next five years.

Show organizer Dubai's F&E said the bizav fleet size in the region has doubled over the past 10 years. "Africa is forecast to receive aircraft deliveries worth $7 billion over the next ten years with 80 percent of these predicted to be in the light or medium categories," according to the Bombardier Business Aircraft Market Forecast 2016-2025. The same report predicts compound annual fleet growth of 3.2 percent.

More Operators Wanted

Air Ocean Maroc was the sole bizjet operator in Morocco in attendance at the Marrakech show. The company offers private flights on charter for up to eight passengers, as well as medevac to Africa and Europe. It operates three aircraft: a Citation VI, King Air 200 and a Cessna 404 Titan.

"The business plan is to run a total of four jets in the next five years [three Citation 650s and a Falcon 50]," Mohammed El Masaoudi, CEO of Air Ocean Maroc, told **AIN** at the show.

Anecdotal evidence points to the fact that there are no more than 10 private jets operating in Morocco, and one source said the number could be as small as five or six. "We are expecting more AOC applications will be presented to the Directorate General of Civil Aviation," Alnaqbi told **AIN**. "Having more local players will expand the charter business. It needs more investment to encourage more AOC holders to come here. This will help private aviation grow. Having more AOC operators is very important. There are a good number of AOC holders but most of the owners here fly their airplanes for private use," Jetex's Mardini told the conference.

Alnaqbi said Moroccan officials he met at the show would "seek the opinion of MEBAA for any new business aviation venture in Morocco. In Morocco, when it comes to relations with the civil aviation authority, there is an element of complexity. Our close relationship with the civil aviation authorities will override this, close that gap," said Alnaqbi.

"Remember Saudi Arabia. Earlier, there was no relationship in Saudi Arabia between the General Authority for Civil Aviation [GACA] and the operators. Now the relationship is extremely good. Everybody is happy with GACA's attitude. The UAE was the same. MEBAA is committed to changing the relationship between the operators with the authorities in each country in the region individually."

The next MEBAA Show Morocco will take place at Marrakech Menara Airport on Sept. 17-18, 2019. ❑

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IAN WHELAN

The open secret of non-compliance

by Pete Combs

George Braly will be the first to tell you: he's lucky to be alive.

Braly runs Tornado Alley, an aircraft retrofit company based in Ada, Okla. Tornado Alley develops, tests, markets and installs aircraft modifications. It was aboard one of his modified aircraft, while conducting a test flight, that Braly almost lost his life because of a kinked oxygen line.

"On the test flight, I needed to get above 18,000 feet," Braly told **AIN**'s *The Human Factor: Tales from the Flight Deck.* "I was headed out on a round-robin flight plan over western Oklahoma that would take me to between 24,000 and 25,000 feet." Braly is no novice when it comes to flying small airplanes into the flight levels. Between 1968 and 1981 he logged 4,500 hours at high altitudes aboard a turbocharged, unpressurized Cessna twin.

But none of that experience prepared him for the moment when, alone in the Cirrus SR22, he lost consciousness. In adjusting his seat, Braly had apparently rolled over his oxygen line, stopping the flow of O_2 to his mask. As he drifted off into unconsciousness, the aircraft continued on autopilot to fly along its programmed course.

Twenty minutes later, Braly said he vaguely heard the voice that had been calling him for 15 minutes. That voice, he said with certainty, saved his life. "The next thing I remember, a very nice lady was calling my aircraft number in an urgent and anxious voice," he recalled. "I heard that while I was still not fully conscious, but it roused me." Braly was able to descend below 10,000 feet, recover from his brush with hypoxia and eventually land the airplane. The controller had been anxious, persistent, even aggressive, Braly remembered, and he has no doubt she saved his life.

Others have not been so lucky.

- On April 5, 2012, a Cessna T182 headed from Laughlin/Bullhead International Airport, Ariz., to Santa Monica Municipal Airport, Calif., crashed near the California town of Ludlow. According to the NTSB, air traffic controllers queried the pilot after noticing he was in an unannounced descent. He responded, but it was so garbled they could not understand him. The 182 crashed, killing the pilot. The NTSB attributed the crash to in-flight loss of control as a result of the pilot's impairment by hypoxia.
- On Dec. 4, 2008, a newly painted Beechcraft King Air C90 departing Hondo, Texas, was cleared to 17,000 feet seven minutes after takeoff. The King Air began to stray from its course, prompting ATC to query the pilot several times. Despite that, the pilot was cleared to FL240. Passing through 18,000 feet, the pilot finally acknowledged the course correction. It was his last transmission. Thirty minutes into the flight, the aircraft descended to FL210, then descended rapidly until it crashed near the Texas town of Rocksprings. The NTSB found that the 67-year-old pilot had failed to configure the King Air's pressurization controls, "resulting in his impairment and subsequent incapacitation by hypoxia." The pilot, who was alone in the aircraft, died.
- After two Learjets crashed—one on Oct. 1, 1981, and the other on May 6, 1982—the NTSB asked the FAA to establish for use at pilot schools a minimum training curriculum that would cover "special considerations involved in a pilot's initial transition into general aviation jet airplanes, including the aerodynamic, meteorological and physiological aspects of high-performance, high-altitude flight."

The NASA Aviation Safety Reporting System (ASRS) contains 1,195 reports submitted between January 1988 and May 2005, outlining incidents in which cabin pressure was a factor. In many cases, pilots did not use supplemental oxygen while troubleshooting cabin-pressure problems. In one case, according to an NTSB letter dated Dec. 20, 2000, several crewmembers aboard a Boeing 727 lost consciousness. The cabin's altitude warning sounded as designed. The crew simply failed to put their masks on as they tried to troubleshoot the cabin-pressure problem.

In that letter, the NTSB concluded that "existing guidance and information on time of useful consciousness (TUC) is inconsistent and misleading because it does not accurately reflect the TUC for pilots trying to perform complex tasks in an emergency environment. It fails to convey to flight crews the urgency of donning oxygen masks immediately after a loss of pressurization at relatively high altitudes.

"Therefore, the Safety Board believes that the FAA should revise existing guidance and information about high-altitude operations to accurately reflect the TUC and rate of performance degradation following decompression and to highlight the effect of hypoxia on an individual's ability to perform complex tasks in a changing environment; and incorporate this revised information into both the required general emergency training conducted under Parts 121 and 135 and training and flight manuals provided to all pilots operating pressurized aircraft."


George Braly safely landed the airplane he was test flying when he suffered hypoxia as the result of a kink in his oxygen line.

A Study in Non-Compliance

Fast forward 15 years.

When business aviator Chris Shaver embarked on a master's degree in safety from Embry-Riddle Aeronautical University, he decided to question his fellow pilots about a poorly kept aviation secret.

"I started to think about things that were affecting aviation safety that really weren't on the forefront," he said. "Maybe they were known, but not a lot of people were talking about them. And this supplemental oxygen regulation and compliance came up pretty quickly."

Shaver was talking about the trend among his colleagues on the flight decks of business aircraft in the U.S. who en masse disregard FAR 91.211 *(see sidebar on facing page)*. As part of his thesis, Shaver surveyed 500 business aviators and found "the large majority of pilots—87 percent—choose not to comply with the 91.211 rule that requires them to wear an oxygen mask above 41,000 feet."


Part 91 pilots are required to wear oxygen masks above 41,000 feet, but many admit to not doing so.

"It has been a source of frustration for me, this one particular regulation, because there's so much resistance about following it," said Rick Miller, chief pilot for a corporate flight department. "It's not just rogue pilots out there disobeying the regs," he added. "These are highly respected professionals who don't generally have problems following the rules. We're talking about chief pilots, demo pilots and test pilots."

Why do so many pilots refuse to abide by rules requiring the use of supplemental oxygen? Miller did some investigating of his own and came to the conclusion that a big part of the problem is the masks themselves.

"I had to sit down for my own sanity and figure out why this is happening," he said. "I wrote it all down and came to this conclusion: either consciously or by gut feeling, pilots are mitigating eight other hazards encountered as they complied with 91.211. *(See sidebar on facing page.)* They're just uncomfortable," Miller said. "The mask fits very tightly. When you get on those ultra-long-range flights of, say 12 to 14 hours, we augment the flight crew with additional personnel. Each pilot is wearing the mask for three to four hours. So that means it's basically squeezing your head for three or four hours at a time. And then there's the health risk," said Miller, citing the difficulty of cleaning masks properly. He pointed to the exceptionally onerous task of cleaning behind the mask's microphone. "We do carry alcohol wipes to sanitize the mask between uses. But you're really at the mercy of how the previous person has cleaned the mask. We do tend to pass colds back and

forth between us when we use the mask," he added.

Other pilots point out the masks are built to be used in emergencies. "They're just not made for everyday use," Shaver said. The wear and tear means there is a greater probability that masks might fail, he added. "Sometimes, masks that are required to be in a quick-use position to meet the FAA's five-second rule are instead simply set aside. Donning masks in such cases often takes longer than five seconds."

Non-Compliance Contagion

Shaver and Miller believe the wide disregard for 91.211 has the potential to become a slippery slope. Both think that by selectively complying with the rules, some pilots might become insensitive to ignoring other rules. The NBAA Safety Committee estimates procedural noncompliance is a factor in up to 40 percent of aviation accidents worldwide that were reviewed by human-factors experts.

The International Civil Aviation Organization (ICAO) requires the use of supplemental oxygen but its rules are slightly but significantly different from those set forth by the FAA. Annex 6 of the ICAO Standards and Recommended Practices (SARPS) sets supplemental O_2 requirements according to the pressure *inside the aircraft* rather than outside, as is the case with FAA requirements.

Miller sees that approach as a possible solution to non-compliance among U.S. flight crews. "We don't want to get rid of the entire rule [that requires supplemental O_2 use above FL410]," he said. What we want to do is harmonize with the ICAO Annex 6 rule." To that end, both Miller and Shaver are part of NBAA's High Altitude Supplemental Oxygen Working Group (HASO), an arm of the association's Safety Committee. In collaboration with GAMA, major manufacturers and the American Medical Advisory Service, the working group started out by surveying business aviation flight crewmembers.

The design of oxygen masks makes them uncomfortable for use over several hours, as the rules require.

The HASO Working Group found that most pilots (88 percent) regard wearing an O_2 mask for extended periods as adding to pilot fatigue. Most (70 percent) also believe that mask use is behind physiological problems they have experienced, with most citing bronchial irritation as the main symptom. The vast majority (92 percent) of pilots surveyed by the working group worry about becoming sick as a result of wearing an unclean mask. Almost 90 percent of those asked believe oxygen masks interfere with crew resource management (CRM).

To support the idea of changing FAR 91.211, Miller and the working group say the aircraft they fly are demonstrably reliable—that the chances against in-flight depressurization are a billion to one. "When you do a risk analysis, cabin depressurization is considered a catastrophic event. But the chance of it happening is extremely remote. It falls under the category of 'acceptable risk,'" he said.

The suggested solution from HASO, then, is to bring 91.211 into harmonization with ICAO Annex 6. "On the whole, it's tougher than 91.211. But the use of supplemental oxygen is based on cabin pressure," he said.

If the FAA will not change 91.211 to reflect the ICAO standard, Miller suggests exempting operators flying aircraft manufactured in compliance with FAR Part 25.841, which states, in part: "If certification for operation above 25,000 feet is requested, the airplane must be designed so that occupants will not be exposed to cabin pressure altitudes in excess of 15,000 feet after any probable failure condition in the pressurization system. The airplane must be designed so that occupants will not be exposed to a cabin pressure altitude that exceeds the following after decompression from any failure condition not shown to be extremely improbable: 25,000 feet for more than 2 minutes; or 40,000 feet for any duration. Fuselage structure, engine and system failures are to be considered in evaluating the cabin decompression."

NBAA's HASO Working Group is in discussions with the FAA about changing 91.211, Miller said. In the process, he sees a further opening for frank talks about other issues. "What this has done is open the door to addressing other shortcomings with regulations," he said.

In spite of the NTSB's Dec. 20, 2000 letter to the FAA recommending additional flight crew training on the effects of hypoxia, there is no such mandatory training today, Miller said. Instead, the onus remains on pilots to seek out the training they deem sufficient, he said. Training on oxygen equipment is "the minimal amount possible. We have an opportunity to improve not only the requirements for training outlined in the regulations, but also training on the equipment required to operate at those altitudes," he concluded.

In addition, Miller said his group is working with manufacturers to improve mask designs. Should the mask fail, there are other changes the working group would like to see, such as redundant oxygen systems and automatic descent capabilities. ❑

Most Frequent Pilot Complaints About FAR 91.211

- Difficulty talking with masks on: the masks muffle speech, making crew communications almost impossible.
- Difficulty with radio transmissions: pilots have trouble clearly communicating with ATC.
- Interference with vision: masks interfere with eyeglasses, especially bifocals or progressive lenses.
- Fatigue: the masks are great for emergency descent, but not for long-term, routine use.
- Depletion of the aircraft's O_2 supply: routine use of supplemental oxygen depletes the aircraft's supply much faster than when masks are not in use—at a rate of approximately two liters per second.
- Bronchial irritation: aviation oxygen is not humidified. Breathing in dry O_2 irritates the bronchial tube.
- Illness caused by sharing masks: while many flight crews carry alcohol wipes, there is no way to clean emergency oxygen masks completely.
- Increased maintenance: the wear and tear on masks forces operators to repair or replace components more often.

—Rick Miller, NBAA High Altitude Supplemental Oxygen Working Group

What does FAR 91.211 say?

Sec. 91.211 Supplemental oxygen.

(a) ***General.*** No person may operate a civil aircraft of U.S. registry—

(1) At cabin pressure altitudes above 12,500 feet (msl) up to and including 14,000 feet (msl) unless the required minimum flight crew is provided with and uses supplemental oxygen for that part of the flight at those altitudes that is of more than 30 minutes duration;

(2) At cabin pressure altitudes above 14,000 feet (msl) unless the required minimum flight crew is provided with and uses supplemental oxygen during the entire flight time at those altitudes; and

(3) At cabin pressure altitudes above 15,000 feet (msl) unless each occupant of the aircraft is provided with supplemental oxygen.

(b) ***Pressurized cabin aircraft***

(1) No person may operate a civil aircraft of U.S. registry with a pressurized cabin

(i) at flight altitudes above Flight Level 250 unless at least a 10-minute supply of supplemental oxygen, in addition to any oxygen required to satisfy paragraph (a) of this section, is available for each occupant of the aircraft for use in the event that a descent is necessitated by loss of cabin pressurization; and

(ii) At flight altitudes above Flight Level 350 unless one pilot at the controls of the airplane is wearing and using an oxygen mask that is secured and sealed and that either supplies oxygen at all times or automatically supplies oxygen whenever the cabin pressure altitude of the airplane exceeds 14,000 feet (msl), except that the one pilot need not wear and use an oxygen mask while at or below Flight Level 410 if there are two pilots at the controls and each pilot has a quick-donning type of oxygen mask that can be placed on the face with one hand from the ready position within 5 seconds, supplying oxygen and properly secured and sealed.

(2) Notwithstanding paragraph (b)(1)(ii) of this section, if for any reason at any time it is necessary for one pilot to leave the controls of the aircraft when operating at flight altitudes above Flight Level 350, the remaining pilot at the controls shall put on and use an oxygen mask until the other pilot has returned to that crewmember's station.

What does ICAO Annex 6 say?

All Aircraft

An operator shall ensure that passengers are made familiar with the location and use of: ... d) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed...

Non-pressurized Aircraft

An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa (*see Note 1*) in personnel compartments shall be equipped with oxygen storage and dispensing apparatus.

A flight to be operated at flight altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa shall not be commenced unless sufficient stored breathing oxygen is carried to supply: a) all crewmembers and 10 percent of the passengers for any period in excess of 30 minutes that the pressure in compartments occupied by them will be between 700 hPa and 620 hPa; and b) the crew and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa.

Pressurized Aircraft

An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa, cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa... shall be provided with automatically deployable oxygen equipment. The total number of oxygen-dispensing units shall exceed the number of passenger and cabin crew seats by at least 10 percent.

All flight crewmembers of pressurized aeroplanes operating above an altitude where the atmospheric pressure is less than 376 hPa shall have available at the flight duty station a quick-donning type of oxygen mask which will readily supply oxygen upon demand.

Note 1: *hPa approximate altitude equivalents: 700 hPa = 10,000 feet, 620 hPa = 13,000 feet, 376 hPa= 25,000 feet*

Note 2: *National or regional authorities use the ICAO guidance as the basis for their regulations. However, these regulations may be more or less restrictive than the SARPS. Consult the appropriate documentation provided by the aircraft state of registry for specific criteria.*

Tanzanian charter operators look ahead to market growth

by Peter Shaw-Smith

The charter industry in Tanzania is growing, and Dar es Salaam-based Tanzanian Air Services, known as Tanzanair, leads the field for corporate and private VIP charter in Tanzania, as the oldest player to launch private air services in the United Republic of Tanzania.

Founded in 1969, Tanzanair operates from its own purpose-built passenger terminal between Terminals I and 2 at Julius Nyerere International Airport in Dar es Salaam. It offers charter flights with Caravans and King Airs.

"Business is mainly corporate or VIP charter and high-end tourism. A major part, however, is contract work and support to oil-and-gas [operators] when active and of course mining," managing director John Samaras told **AIN**.

"We operate in our own facility and also have our approved AMO that caters to all general aviation aircraft and the Bombardier Dash 8-300. We maintain 30 third-party aircraft operated by the government and charter and scheduled operators."

The Tanzanair fleet consists of the Cessna 208 Caravan, capable of carrying 13 passengers, the Reims Cessna 406 (10), King Air 200 (seven) and King Air 350i (eight). Samaras did not specify the total number of aircraft in the fleet. Tanzanair claims to be equipped to cater to "medical evacuations, scenic and aerial surveys, air safaris and cargo flights."

"Aviation has grown tremendously in Tanzania, and there are a lot of new Caravans for charter and scheduled work into areas where larger aircraft cannot land. The last year has been challenging for business for various reasons, but we hope the conditions will improve in the next six months," he said.

Tanzanair will fly to any location in Tanzania and neighboring countries, offering charter services for passenger, VIP, cargo and contractual flights to fixed destinations, as well as to game parks and hunting lodges. It flies on charter to 70 airports and airstrips within Tanzania, and to neighboring countries and farther afield if need be, especially given the capabilities of the King Air 350i, purchased new in 2014.

It also has a maintenance facility where it works on its own fleet as well as that of other operators. The technicians receive regular training to ensure that aircraft are maintained to manufacturers' standards.

"Challenges faced by operators are lack of night facilities at most of the airports, together with perhaps only six airports where jet-A is available," said Samaras. Scheduled player Precision Air complains that it can fly only between the hours of 6 a.m. and 6 p.m. and flag carrier Air Tanzania faces the same limitation.

"Additionally, [when] flying outside Tanzania, getting overflight permits can also prove to be challenging, especially for charter operators. Lack of properly qualified locally available pilots and engineers is a big challenge and it is getting worse. The ones available are aging and one can replace them only with expatriate expertise, which adds to the already bulging costs."

Coastal Air has emerged as the biggest competitor to Tanzanair, and its "flying safari network" can access the remotest parts of the country, where road access is nonexistent, from a base in Dar es Salaam. It flies scheduled and VIP charter to 100 airstrips in East Africa, taking in the Serengeti, southern parks Ruaha and Selous, island destinations Pemba and Zanzibar, as well as Kenya and Rwanda. It claims to have 30 aircraft, including the Cessna 206, Caravan and Pilatus PC-12.

Newer market entrant Auric Air is a third player in VIP charter in Tanzania. It is based in Mwanza, which has become a business hub because of its status as a gold-mining base and proximity to capital cities Kigali, Rwanda; Kampala, Uganda; and Nairobi, Kenya. The company, established in 2001, has 13 Caravans.

Zantas Air provides private and shared charter out of Arusha Airport, where it operates an FBO. It offers scheduled flights from Arusha to destinations in western Tanzania such as Kigoma on Lake Tanganyika.

Tanzania's economy has struggled in the wake of the global financial crisis, and business is tough in today's environment. "Expansion plans are there but have been delayed by the economic slowdown. We have retired older aircraft and plan to replace them with new. Aircraft being looked at are another King Air 350i and an additional Caravan EX," Samaras concluded. ❑

Tanzanair's fleet consists of Caravan 208s, King Air 200s and King Air 350is. In addition to maintaining its own fleet, it services the aircraft of other operators.

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Hurricane IRMA

Continued from page 1

and with communications limited to satellite phones, days after the storm Signature had yet to account for all of the location's employees. Yet, according to company president and COO Maria Sastre, the GAT remains largely intact and suffered mainly water damage. Signature had undertaken cleanup as it worked to stabilize the infrastructure there. Signature is also a commercial servicer at the airport and it was working with the airport authority to see if it could service both airliners and GA aircraft from the GA side of the airport.

St. Thomas was also hard hit, with severe damage to infrastructure. In the aftermath of the Category 5 hurricane, the FAA airlifted a mobile ATC tower to the island's Cyril E. King International Airport to substitute for the heavily damaged permanent tower, which had controllers managing relief and rescue flights from a tent on the airfield for several days. The tower was operational less than four hours after it arrived on an Air Force C-17.

Nearby sister U.S. Virgin Island St. Croix avoided Irma's knockout punch. Bohlke International Airways (which itself was destroyed by Hurricane Hugo in 1989), the lone FBO at Henry E. Rohlsen Airport (STX), immediately became a hub of rescue and relief activity. The FBO supported a flurry of operations from the U.S. Air Force, U.S. Navy, Air National Guard, FEMA, Red Cross, Salvation Army and several medevac services such as AeroMD. Country singer Kenny Chesney and entrepreneur and former New York City Mayor Michael Bloomberg also sent their private jets to STX filled with relief supplies. Chesney also chartered a helicopter to run mercy missions to his beloved St. John.

Landfall in the U.S.

As the storm approached Florida, most FBO operators urged tenants to relocate their aircraft. According to statistics from aviation data provider FlightAware, in the week leading up to Irma's landfall on the mainland U.S. there were nearly 6,000 business jet departures from the state. That exodus meant a frantic operations pace at the departure airports, which saw not only tenant aircraft departures but also steady streams of charter aircraft summoned to extricate passengers.

Those FBOs were in some cases understaffed as workers were released to safeguard their homes and families. Fuel providers were largely able to meet the demand right up to the storm, according to many FBOs. At Naples Municipal Airport, September is typically the slowest month of the year, with fuel sales at the airport-owned FBO averaging 9,000 gallons a day. "The day before closing the airport, we sold 40,000 gallons with area residents evacuating," said airport manager Christopher Rozansky. "It was reminiscent of a typical day during the busier winter months, except we had far less staff and fuel to deal with the demand."

It was a similar story at most airports across the state. "You would have thought we became the business aviation evacuation center, because for Wednesday, Thursday and Friday [before the storm's landfall] the number of aircraft that we handled made the Super Bowl look like a picnic," noted Don Campion, president of Fort Lauderdale Executive Airport-based Banyan Air Service. He described his facility's lobby as filled with hundreds of people awaiting the arrival of charter aircraft from all over the country.

At the other end, airports such as New Jersey's Teterboro saw an influx of arrivals. On the Wednesday before Irma's landfall, 80 aircraft arrived at the Atlantic Aviation facility from Florida alone, according to Barbara Briccola, the company's regional sales manager for the Northeast.

As the storm approached, the Florida Keys were heavily hit, and Signature evacuated staff from its FBO at Key West International Airport for the duration of the storm. The area reported widespread devastation, and while the FBO's terminal survived in good shape, the hangar suffered damage. Within a week of Irma's passing, the location was operating on generator power, under limited hours because of a curfew, with the fuel supply prioritized for relief and rescue operations. Sastre noted the company established a supplemental operation at Miami Executive Airport to process Key West's transactions, allowing the limited staff there to concentrate on the operation's activities.

More than a week later, the Signature location at Palm Beach County Glades Airport near Pahokee remained closed because of power problems. Tampa International Airport and the Signature facility there were back online by the Tuesday after the storm. The FBO had been buffeted by strong wind and heavy rain, shredding fabric doors on hangars, allowing water within, and blowing away the airside arrivals canopy.

Of the 34 Signature facilities in the path of the storm, most were up and running within days—and in some cases hours—after Irma passed. Sastre credits the company's veteran staff for the quick response. "We have experienced leadership in our organization, many of whom have weathered tough storms," she told **AIN**. "This was of a different magnitude. We have never experienced the scale of what we experienced, with Irma, across as many bases. Obviously this was record setting in the FBO industry."

Westward Turn

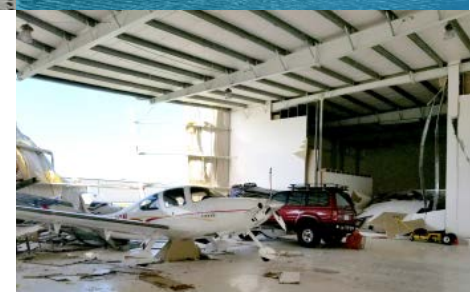
Indeed. The storm, at one point the size of France, virtually blanketed the entire state and most forecasters did not anticipate its last-minute deviation to Florida's Gulf side.

"We had been planning for it for a week, and watching it closely out in the Caribbean," noted Kurt Schmidt, Atlantic Aviation's vice president of southeast regional operations. "The one thing that did surprise us as it approached the Florida peninsula, it began to shift to the west. We were concerned about that because it put almost the entire state on the more powerful side of the storm."

That deviation spurred some changes in the finely tuned plans the service providers made. "Early on in the storm, when we believed Fort Lauderdale would be the first one affected, and heavily, we did not even put a skeleton crew there because we did not want to put any of our staff in harm's way," said Warren Kroppel, COO of Sheltair, which has 11 locations in the state and handled 2,500 hurricane-related operations in the hours before and after the hurricane. "As the storm shifted west, we were able to get some skeleton staff in there and open up as soon as the airport itself opened."

For Banyan, that deviation was heavensent. The sprawling facility, which has 1 million sq ft of hangar space, suffered little damage. According to Campion, every aircraft that could fly did so, yet some of his hangars were packed with small aircraft, such as those from local flight schools, which could not find enough pilots to ferry them to safer areas. All those aircraft survived unscathed in hangars that had their doors pinned shut with half-inch steel rods, and the FBO did not even lose power during the storm.

On the other side of the state, at Southwest Florida International Airport in Fort Myers, Vincent Wolanin, chairman and CEO of PrivateSky Aviation, the lone FBO there, rode out the storm along with staffers and their families, and even cars, in the facility's Stage 5 concrete and steel rebar structure, which is rated to withstand wind of 180 mph. "We were baking apple pies in the kitchen, had ice cream for the families and staff, and had movies streaming for the children, and games and all that stuff," Wolanin explained to **AIN**, adding that the situation wasn't quite as carefree as he described. "Don't get me wrong, when you get a hurricane like this, it sounds like a locomotive coming through the place."



At Naples Municipal Airport nearly every hangar sustained some damage. At least six hangars are either substantially damaged or destroyed. The structures shown belong to Naples Jet Center, which reported that the water receded the day after these photos were taken.

While many aircraft owners chose to evacuate their aircraft from the state, 16 tenant airplanes, among them a G550 and GIV, were safely sheltered in place, Wolanin reported. Power remained on at the facility until many hours after Irma passed overhead, when it was shut off, possibly for repairs to the local power grid. Immediately, the FBO's massive generator fired up and kept the location fully powered until main electricity was restored on Tuesday, when the facility handled 150 inbound flights as anxious homeowners returned to assess the damage. On Thursday, the location hosted Air Force One and its attendant C-17 transports, as the President briefly toured the area.

The city of Naples was the epicenter where Irma came ashore as a Category 3 hurricane. At Naples Municipal Airport, gusts of up to 142 mph were clocked, according to Rozansky, causing millions of dollars in damage to the site. The airport suffered flooding and the roof of the fire station was peeled off. The two FBOs—privately owned Naples Jet Center and the Naples Airport Authority's own facility—suffered damage. At least six hangars were seriously damaged or completely destroyed. According to airport director of operations Ryan Frost, who spent the night of the storm holed up in the second floor of the airport's FBO; he could feel the concrete building, rated to 140 mph, shake at the height of Irma's fury. The glass sliding doors in the lobby popped open, and a tree crashed on the generator, at the time the only source of power to the building.

At the Naples Jet Center across the field, cloth doors failed on empty hangars four and five, according to owner Matthew Hagans, allowing the wind to blow out one of the side walls. Despite insurance he is expecting a big bill for the repairs. "The way insurance works on these things, you have a 5-percent deductible on a named storm," he explained to **AIN**. "It's a $4 million hangar, so I've got a $200,000 deductible." Still, he considers himself lucky when weighing the possibilities. "I can fix all this stuff," he said.

Continues on page 76

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SEQM	Ecuacentair	Quito, Ecuador
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TIST	St. Thomas Jet Center	St. Thomas, USVI
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Hurricane IRMA

▶ Continued from page 74

"The biggest thing for me is none of my employees was hurt." He added that several aircraft, which were in deep maintenance at the facility at the time of the storm and unable to fly out, were safe in undamaged hangars, but at press time with limited generator power and no fresh water, Hagans was uncertain when he would be able to resume operations. Reports from Florida Power and Light said repairs could take two weeks.

At many locations, clean-up and return to operational status was also affected by the absence of staff. While some evacuated the state, others were home dealing with their own safety and that of their families. In areas, flooding prevented staffers from swiftly travelling to the FBOs, while other cities imposed curfews immediately after the storm. "We all have damage and issues at home to deal with—the logistics of helping family members return and even a couple who are still waiting to hear from a loved one," stated Rozansky, "but we are fortunate to have such a group of dedicated professionals working for the Naples Airport Authority."

Ocala was one of several airports to host relief operations.

The lack of running water posed one specific problem for the airport. Per Natca rules, a working restroom is required for air traffic controllers to occupy the facility, and the portable facilities ordered by the airport ahead of the storm never arrived. In desperation, the airport workers located a Port-o-let that had been blown into the woods from a construction site on the field. The airport fire department hosed it down and refilled it with the proper liquid, allowing the controllers to return to the lightly damaged tower. The airport resumed PPR operations without fuel service at the end of the week, and began more normal activities the following Monday, more than a week after Irma hit.

Fortunately, the storm quickly lost steam after landfall, and while cities to the north of the state such as St. Augustine and Jacksonville saw widespread flooding, their airports were relatively unharmed. FBOs as far away as Savannah were affected by the rain, but by Wednesday following the hurricane, most of the major airports had returned to full or limited operations; the ones hit hardest were being used to support relief and rescue operations.

Bizav Mobilizes

Almost immediately after the storm passed, members of the business aviation industry swung into relief mode. David Zara, one of the founders of San Juan-based charter and scheduled service provider Tradewind Aviation and the current operator of Teterboro Airport-based Part 135 management company One Air, immediately began to collect supplies when it became clear that the monster storm would cripple Caribbean islands. He first persuaded a friend to loan him a Falcon 2000 and crew for a relief flight

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Fuel app aims to reduce trip costs

by Curt Epstein

There are already several fuel-planning software packages on the market, and now another company is looking to toss its hat into the ring. AMS Fuel Solutions has been working for the past several years on FuelApp1, which the Dallas-based company claims is "the world's first real-time fuel savings software that quickly calculates the lowest trip costs and lowest carbon emissions for trip routes." The process takes "less than 15 seconds," the company said.

According to company founder and managing director Anthony Struzik, the software "uses real-time data and fuel optimization logic to determine the lowest trip cost and fastest route for multi-stop trips." He added, "our embedded tankering feature works in the background by analyzing each trip leg and determines when opportunities are available, then displays the trip leg, the suggested fuel upload, fuel price and overall savings."

Struzik explained that the system, intended for both Part 91 and Part 135 operators, collects the fuel prices from oil companies and fuel distributors every week and uses an algorithm to determine upload amounts to avoid ramp fees and achieve price breaks.

Users of the system—accessible through the Web, smartphones and tablets—enter their specific aircraft data (the program will otherwise use default data for the type), and then for each trip, enter the stops and populate the trip parameters, such as starting fuel amount, payload, cruising speed, flight level, minimum before stopping, taxiing time, desired fuel reserve and limits for flight path deviation.

Simple System

"In today's marketplace, you want to keep it simple, especially for pilots on the go, because they can use this anywhere," Struzik noted, adding that the system will then locate the best fuel prices. The best price, he emphasized, is not necessarily the cheapest. "If you have to go off the great circle map by say a variance of five degrees or maybe ten degrees to get cheaper fuel, it's not going to be cost-effective."

The program, which has overrides to prevent users from entering incorrect information such as airspeeds and altitudes outside the aircraft's performance envelope, or fuel amounts that it is incapable of holding, analyzes current weather along the flight path, and will then offer two routes: fastest and most economical.

It will give the expected fuel price at what it believes is the optimal FBO along each leg and the flight time to reach it. The system easily accommodates changes in itinerary.

It will also display the time difference, cost savings and extra mileage between the two routes, fuel burn, suggested tankering amounts for each leg of the trip and CO_2 emissions for offset calculations. "You're optimizing your fuel burn," said Struzik. "You're saving fossil fuels and you're cutting your carbon emissions."

A soon-to-be-completed improvement would allow Part 135 operators to enter their fixed costs, enabling further price analysis for each trip. Struzik reports the system is getting " 90 percent accuracy." He is searching for a partner who can take on the licensing and marketing of the software, freeing him to continue to refine and enhance it. ❑

Harvey lingered over Texas for days, dropping between 20 and 50 inches of rain in places.

Hurricane HARVEY

▶ *Continued from page 1*

Iannarelli said, "We made it a cohesive effort for relief, having never faced something this large before. Pooled resources helped maintain safety and security throughout the Harvey efforts."

Patient Airlift Services and Sky Hope Network joined forces and resources in response to Hurricane Harvey and the subsequent Houston flooding, said Eissler. Their efforts were designed to bridge the "gap between aid from the Red Cross and FEMA…to deliver essentials to smaller agencies and charitable institutions," said Iannarelli. She estimated 500 volunteers participated in Harvey operations.

NBAA's Hero database, which is continuously updated, came into play quickly. At one point, 60 business aircraft and 50 bizav professionals were available through Hero for Harvey efforts, according to a joint statement.

Relief Efforts

Beyond immediate relief coordinating pilots, airplanes and humanitarian goods, Aerobridge provided educational relief. It targeted the Port Arthur area, flying in supplies to restore classes in school as soon as possible. Aerobridge was established in the wake of Hurricane Katrina and provided assistance after Hurricane Sandy.

Fifty aircraft participated in Operation Air Drop, an effort organized on Facebook by John Clay Wolfe, of iHeart Media Radio. Pilots brought donations to Galaxy's Conroe FBO for collection and organization, then flew those relief supplies to "Beaumont, Corpus Christi, Port Aransas, Rockport and other communities more accessible by airplane than by truck," according to an Air Drop

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Hurricane IRMA

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into San Juan just days after the storm. He contacted his former Tradewind colleagues, who agreed to ferry the supplies on their PC-12s. He then contacted another friend, Dassault Falcon CEO John Rosanvallon, who agreed to lend him a Falcon 900 and crew used by the company's rapid response parts delivery service. Zara believes he delivered 50,000 pounds of supplies: chainsaws, generators, tarps, gloves and workboots.

In lightly affected San Juan, local individuals and charities purchased additional supplies that were delivered to the Tradewind hangar at Luis Muñoz Marin International Airport, and loaded onto the turboprop singles. Tradewind president Eric Zipkin believes that with the two aircraft his company flew 75 segments in the week after the storm, carrying supplies to islands and returning with evacuees. As things began to settle, the company resumed scheduled service and began to carry in recovery workers such as engineers and insurance adjustors, as well as family members looking to aid loved ones. Zipkin expected the arrival of Hurricane Maria, which had Puerto Rico squarely in its sights, would force him this time to evacuate the airplanes from the island. During Irma the company's airplanes rode out the storm in their San Juan hangar.

From across the Atlantic, Airbus dispatched an A350 XWB test aircraft carrying 84 medical personnel and loaded with 30 tons of supplies such as water purifiers, solar lamps, beds, mosquito netting and generators supplied by the Airbus Foundation and the French Red Cross to Guadeloupe, for distribution to affected islands such as St. Martin and St. Barthélemy.

Back in the U.S., aviation-based disaster support organization Aerobridge began an airlift of needed supplies into the Florida Keys, Jacksonville and Fort Myers. The privately donated goods are being stored in warehouses near Ocala International Airport and loaded on aircraft there. Aerobridge is staging the relief flights, using a fleet of volunteered aircraft including a Cessna CJ3 and a PC-12, out of Lakeland Linder Regional Airport. The use of private aircraft allowed the organization to deliver the supplies swiftly by avoiding the region's highly congested roads and highways. ❑

Universal Handles Massive Storm

Hurricane Harvey dumped four feet of rain on the Texas Gulf Coast in late August and left hundreds of thousands homeless, but Houston-based Universal Weather and Aviation didn't miss a beat, servicing its usual volume of 100 flights per day worldwide during the storm.

The trip support, flight planning and handling company implemented a business continuity plan to ensure that customers experienced uninterrupted service. The plan was drafted after 110-mph Hurricane Ike slammed into Galveston and then denuded downtown Houston of much of its glass in 2008, leaving $29 billion in destruction in its wake.

Universal's staff of 30 meteorologists closely followed the storm and the company began putting plans in place 10 days before Harvey made landfall in Texas. Universal's lead meteorologist, Jason Plowman, also happens to be the company's business continuity manager. Pete Lewis, senior vice president of global operations, said those plans staged employees closer to Universal's main office in local hotels, preparing for continuity of operations and temporarily releasing employees ahead of the storm to prepare their homes.

While Universal sent most of its 700 employees home before the storm, a dedicated crew equivalent to a typical night shift—50 to 60 people—remained in the third-floor operations center in a six-story building, near NASA's Johnson Space Center, to handle client needs.

Universal was also able to keep off-site staff engaged with remote log-in capabilities functional during the Hurricane to support people in the building. The company was back to full-strength staffing within days after the storm, he said.

Lewis said putting a business continuity plan together can be a "pain," testing it once or twice a year with a tabletop exercise can be a grind and spending resources on it may seem inefficient, but in the long run it's invaluable.

Part of Universal's plan is the remote-site capability in Austin and Dallas should the need arise to evacuate Houston altogether. "We test that once a year before hurricane season, turning on the computers, answering the phones and working some trips from there to make sure it actually works," he said.

Ten percent of Universal's employees lost homes and/or vehicles in the storm, Lewis said, adding that the company, employees and clients have all stepped up to help. Through the beginning of September, employees had raised $115,000 to assist coworkers. Universal has matched that figure. *—M.H.*

West Houston Airport quickly returned to normal operations and welcomed 30 humanitarian flights.

Airports, GA Step Up

West Houston Airport was dry after the passage of Harvey, but it did not remain that way, as the Corps of Engineers had to release water from two nearby reservoirs, causing water to rise on the property. As a result, the terminal had eight inches of water. Some hangars took on water, but no aircraft were damaged. "Business was off for about a week, but we were back to normal after minimal cleanup," said Woody Lesikar, owner-operator of the airport.

Thirty flights brought in humanitarian aid on board everything from a B-25 flown by Beth Jenkins from Georgetown, Texas, to a Cessna TTx that carried nonperishable goods. To support relief efforts, the airport picked up the fuel tab for smaller airplanes; operators of corporate aircraft did not accept financial help from the airport.

Shelly deZevallos, West Houston vice president, said, "This would not have happened without Robin Eissler of Sky Hope Network and Steven Langley and Brian Kelly of Operation Air Drop. They organized the food, supplies, water, aircraft and pilots to get to Houston."

Aircraft owners and pilots rise to the occasion when there is a need, said Lesikar. *—N.K.*

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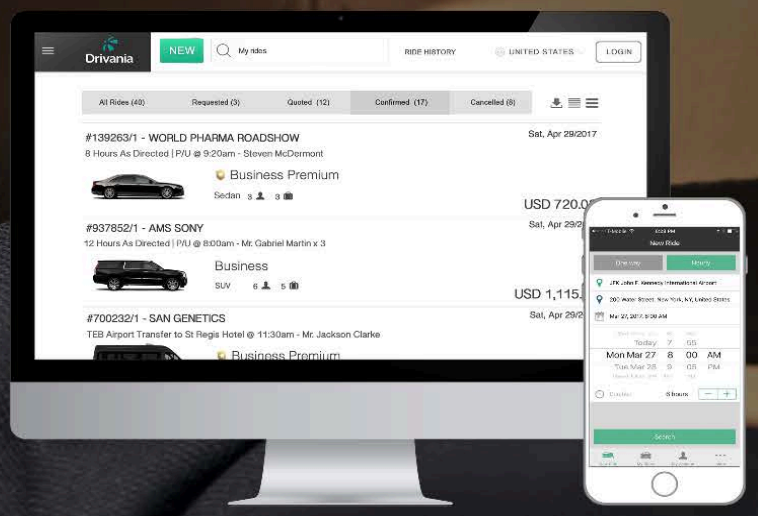

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FAA decisions

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advocacy group, Flyers Rights Education Fund, petitioned the FAA for rulemaking governing size limitations for aircraft seats to ensure, among other things, that passengers can safely and quickly evacuate in an emergency.

The group argued that as seats have gotten smaller and closer together, and passengers heavier, there could be an impact on emergency evacuations.

In its petition, Flyers Rights provided evidence that airline seat and spacing dimensions have steadily decreased over the last several decades. The petition noted that economy-class "seat pitch"—the distance between a point on one seat and the same point on the seat directly in front of it—has decreased from an average of 35 inches to 31 inches, and in some airplanes has fallen as low as 28 inches. Evidence in the petition further indicated that average seat width has narrowed from 18.5 inches in the early 2000s to 17 inches in the early to mid-2010s.

The petition also noted that, since the 1960s, the average American flier has grown steadily larger in both height and girth. The FAA denied the petition without citing any studies and without challenging the group's assertions.

Flyers Rights petitioned the Court of Appeals for a review of the FAA's decision. The Court was unimpressed with the FAA's arguments. "The Administration denied the petition, asserting that seat spacing did not affect the safety or speed of passenger evacuations. To support that conclusion, the Administration pointed to (at best) off-point studies and undisclosed tests using unknown parameters. That type of vaporous record will not do; the Administrative Procedure Act requires reasoned decisionmaking grounded in actual evidence." Concluding that the FAA's record was "vaporous" and not based on "reasoned decision making grounded in actual evidence" is pretty harsh language to use against an agency that is supposed to be safety and data-driven.

Short on Evidence

Although the Court stated that its review of the FAA's decision is limited by law, it nonetheless agreed with Flyers Rights "that the Administration failed to provide a plausible evidentiary basis for concluding that decreased seat sizes combined with increased passenger sizes have no effect on emergency egress." In the course of its decision, the Court used the following language: "The Administration argues that the omission of information about seat dimensions from the tests means that seat dimensions are categorically unimportant to emergency egress. That makes no sense."

The Court continued: "The Administration's rationale also blinks reality. As a matter of basic physics, at some point seat and passenger dimensions would become so squeezed as to impede the ability of passengers to extricate themselves from their seats and get over to an aisle. The question is not whether seat dimensions matter, but when." The Court ultimately did not order the FAA to enact specific rules but sent the matter back to the agency to properly consider the petition and if it rejects it, to do so on the basis of proper evidence.

So what does this highly critical language from a reviewing court say about the FAA and its decision-making? Is this another example of FAA arrogance at work? Incompetence? Or something else? Whatever it is, I hope the FAA takes a long hard look at these decisions and makes some much needed course corrections.

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

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Four-Legged Friends Moved by Wings of Rescue

In the weeks after Hurricane Harvey, Wings of Rescue, a FEMA first responder for pet rescues, transported hundreds of pets out of the Houston area to safety. Damian Cross, Wings of Rescue CFO/COO, chief pilot and director of operations, told **AIN**, "It's hard to put a number on the total pets we have moved, but I feel it would be 15 times more than we normally carry in the same time frame." As of September 7 the organization had flown 20 flights, each approximately 1,300 miles, he said.

He had to fly certified animal crates to Tulsa (Okla.) International Airport in a Pilatus typically flown for regular pet transfers throughout the U.S. During the Tulsa transfer, 200 temporarily staged pets were loaded into chartered Metroliners and Brasilias. A Wings of Rescue Facebook post said 140 cats and dogs were airlifted to Chicago on board a Berry Aviation Brasilia. Every animal placed goes to a no-kill shelter.

"Air traffic controllers were a huge help on a flight from Houston Executive to Seattle Boeing Field in the Pilatus. When they learned it was an animal rescue flight, I was given direct routing. That let me make the seven-and-a-half-hour trip without refueling," he said. —*N.K.*

Hurricane HARVEY

▶ *Continued from page 76*

statement. Galaxy, airport staff, Montgomery County and the Salvation Army supported the mission, which handled two truckloads of donations, it said.

Texas operations concluded on September 9, with goods flown from Killeen to West Houston and Hardin County Airports. Within a few weeks of creation, Air Drop had 200 pilots who made 400 flights carrying 250,000 pounds of goods, Air Drop said.

Dassault Falcon Jet's Falcon 900C customer-response aircraft was pressed into action for a couple of days to support Harvey relief, said a company spokesman. "We flew from Teterboro to Farmingdale, N.Y., to pick up meals-ready-to-eat and medical supplies for delivery to Orange, Texas," he said. "Next day we flew within Texas delivering [material] where it was needed."

Local Business Returns to Normal

FlightSafety International Houston closed on August 27 because of street flooding (there was no flooding in the building). Nearby training centers in Austin; San Antonio; and Lafayette, La., were unaffected. The Houston Hobby facility reopened on August 30 with limited operations and was in full swing on September 5. "We ensured the safety of all crewmembers in for training at their hotels," said an FSI spokesman. "Training schedules that slipped for the closure are getting caught up."

A small number of employee homes were affected but no one was injured, the FSI spokesman said. Fellow workers have donated goods as needed, and "we will help with whatever they need. It is obviously devastating, but our employees have gotten through it just fine."

Twenty to 25 aircraft at Aransas County Airport were lost when Harvey came ashore, airport manager Mike Geer told

Continues on next page ▶

Hurricane HARVEY

▶ Continued from preceding page

AIN. The airfield serves Rockport, Texas, which took the brunt of the landfall. Most were single-engine aircraft with a couple of twins in the count, he said. "We are trying to dismantle flattened hangars and get to the airplanes, but resources are limited because heavy equipment is working in crucial priority areas. It might take 30 more days to get the aircraft out and as many as two years for the airport to recover fully," Geer said.

At least five aircraft were seriously damaged or destroyed at McCampbell-Porter Airport in Aransas Pass, next to Rockport. "We did not flood, but wind caused considerable damage," said Paul Lehnert, airport manager. "An older structure of T-hangars was opened up by strong wind, and one aircraft was flipped onto another." What he called "project aircraft" occupied many of the stalls. "An older Apache was ripped from a tiedown and carried about a hundred yards to be wrapped around a pole."

Harvey did not seriously damage FAA buildings and equipment. "Major facilities in that region are on comparatively higher ground, so we didn't suffer serious damage, other than a few roof leaks," said a spokesman for FAA Mid-States. "Some ground equipment, such as ILS systems, was flooded and will require repairs. We are working with the various airports to assess that damage." Power restoration was a typical repair.

FAA employees remained on duty to provide assistance during relief efforts, he said. "In some cases, controllers spent several days at their facilities because flood waters prevented them from leaving. They alternated taking rest periods until relief personnel could make it in."

Even when airports were closed to airline traffic, "they remained open to Coast Guard and other aircraft that were flying official missions. Our controllers made sure those operations were able to take place safely," the spokesman said.

Avfuel reported that Astin Aviation at Easterwood Airport in College Station, Texas, was active during Harvey search-and-recovery efforts. The FBO was a staging location for military helicopters, fast-boat rescue, FEMA, commercial air ambulances and C-130 supply aircraft. Operations ran around the clock, with line staff and customer representatives working 12-hour shifts for 48 hours straight, according to Avfuel.

Houston Airports

The City of Houston Airport System established "emergency mode" operations "to ensure safety and security of passengers and employees" and maintain infrastructure, according to a summary prepared by the city. An airports emergency operation center opened; all flights were cancelled and roadways were closed by high water from more than 40 inches of rain in some areas.

Neighborhoods around Hobby Airport received some of the highest rainfall totals. Passengers and anyone working at the airport were stranded when airline operations ceased and water rose, the city said. Cots, food and water were in high demand, but Sarah Freddie, Hobby administration manager, pulled everything together, notably the airport's food vendor, for emergency assistance, a city statement said. Rescue and relief flight operations continued during the closure.

George Bush Intercontinental Airport "essentially became a civil-military operations center for the U.S. Air Force, Air National Guard, U.S. Coast Guard, Homeland Security and FEMA," said the city. "Medical supplies were routed through the field, with aircraft refueled and crews resting. Several injured people were flown to relief hospitals in bordering states," it added.

When military operations started at Ellington Field, they continued with no interruptions, according to Arturo Machuca, general manager. Airport runways, taxiways and roadways were cleared to ensure movement of all aircraft, refueling trucks and the like, he said. The entire 12,000-troop Texas National Guard was activated, and a portion of them conducted search-and-rescue missions from Ellington, the city reported. The Coast Guard's typical six operations a day mushroomed to 40 a day during the busiest days. Evacuees were taken to the George R. Brown Convention Center. ❑

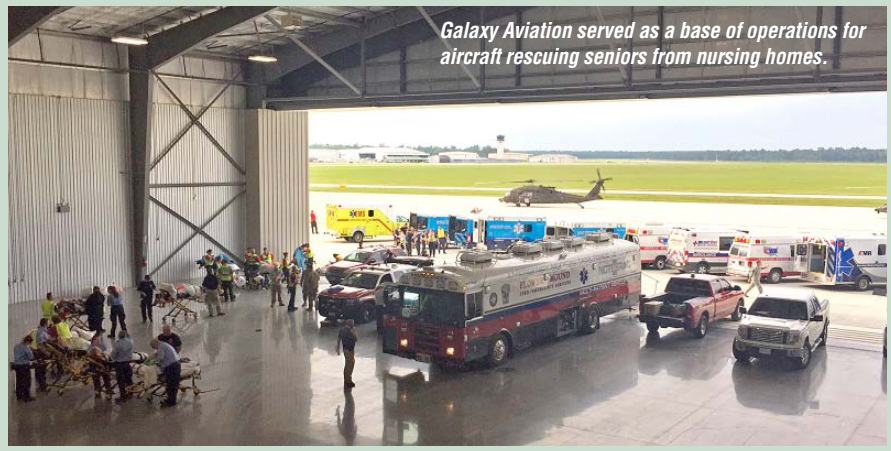
Million Air Focuses on Relief Efforts

In the wake of Hurricane Harvey Million Air Houston was "right there with first responders," CEO Roger Woolsey told **AIN**. "The airport was closed for four days and nights, but we were open with seven or eight rescue helicopters on the ground at any given time. Flight and rescue crews were battling a life-threatening enemy: time. Teams from New York, Georgia, Florida, all over, could use our ramp for a quicker turnaround than returning to their main base." Local pilots familiar with the area could fly at night; visiting crews were [day] VFR only. Missions were shifting all the time to find areas where rain was not falling.

Million Air was pumping fuel and providing food and showers. Rescue swimmers would hose off on the ramp in all their gear, go inside for a hot shower, review a flight plan while eating, and take off again. Laundry facilities were in use practically nonstop washing towels and more.

The company is working with its employees to deal with the effects of the hurricane. "Of the 150 people in our Houston office, 14 were affected by Harvey," Woolsey told **AIN**. "Of those, 10 had light damage with less than a foot of water, four had real damage of more than two feet of water." —*N.K.*

Flight and rescue crews operated from Million Air's Houston facility in the wake of Hurricane Harvey.



Galaxy Aviation served as a base of operations for aircraft rescuing seniors from nursing homes.

Galaxy Supports Rescues, Military and Media

Galaxy Aviation supported Hurricane Harvey rescue missions from its new facility at Montgomery County Airport in Conroe, Texas. Numerous UH-60 Black Hawks and CH-47 Chinooks rescued 200 residents and patients from six North Houston senior-care facilities.

Galaxy was a participant in Operation Air Drop, an effort that grew out of social media, to gather donations and deliver nonperishable goods via airplane throughout Texas.

Usually PHI keeps one or two helicopters at Galaxy's Montgomery County FBO for air-ambulance work. After the storm, four helicopters were "picking up supplies and personnel from North Houston and transporting them to South Houston," said a Galaxy/Wing Aviation spokesman.

Supplies were flown in on Phillips 66's Embraer Legacy 600, then transferred to its Sikorsky S-92 for deliveries in South Texas, he said.

In addition, CNN, Fox, CBS and *The New York Times* used the airport and Galaxy for live reports and aerial observations of flooding.

Wing manages 25 aircraft in Texas and the majority were grounded at its Houston Hobby headquarters because of runway flooding. Aircraft were undamaged and no high water got to the ramp, hangar or building, the spokesman said. Operations resumed on August 31. —*N.K.*

Atlantic Aviation Locations Provide South Texas Harvey Support

Atlantic Aviation facilities in the Houston area suffered no major structural damage; airports might have been closed, but the FBOs remained open for rescue operations, Al Archuleta, Atlantic regional manager, told **AIN**.

Houston Intercontinental Airport was closed from August 27 through August 30, during which time Atlantic fueled 115 rescue helicopters. Two U.S. Marine Corps helicopters were housed at Atlantic for President Trump's visit on September 2, according to Archuleta.

"When tragedy struck Texas, Atlantic stepped up and made sure the rescue flights got in the air to take care of people in desperate need," he said. Among them, the Corpus Christi location was operating on emergency power as soon as rescue flights started; Hobby FBO staffers were cleaning the facility and preparing the fuel farm before the airport reopened, he said.

The Atlantic location at Kelly Field in San Antonio supported Customs and Border Protection evacuation efforts for six days with 30 H-60s, four P-3s, three UH-1s and two AStars, Archuleta said. Over the course of two days, 680 people were rescued.

Atlantic's Hobby operations closed August 27 and reopened the morning of August 29. Some offices suffered water damage. While the Hobby location did not support any rescue missions, the FBO did support humanitarian relief, and the Austin FBO refueled rescue helicopters and military aircraft. —*N.K.*

Harvey: anatomy of rescue ops

by Mark Huber

Within hours after Hurricane Harvey came ashore near Rockport, Texas on Friday, August 25, the phone rang at CHI Aviation in Howell, Mich. Air Methods, the nation's largest air ambulance provider, wanted to enlist one of CHI's Sikorsky S-61Ns to move personnel, patients and medical supplies between Houston-area hospitals being deluged with up to 50 inches of rain.

"Once we got the call to go down there it was all hands on deck in the hangar to get the aircraft configured and loaded with spare parts and tools," said Stu Edwards, CHI project manager. A support truck and trailer, driven by a company mechanic, began the trek to Texas. Another mechanic and the flight crew finished configuring the aircraft with sound-dampening blankets and 19 folding Martin-Baker passenger seats. The trio, led by PIC Mike Jones, launched at 6 a.m. Monday, August 28, for the 7.9-hour, two-stop flight to the staging base in New Braunfels, Texas. Edwards deployed separately from his home in Oklahoma.

Harvey triggered the largest coordinated national rotorcraft rescue response since Hurricane Katrina struck New Orleans in 2005. That storm killed at least 1,245 and inflicted damages of $108 billion. While Harvey's final toll remains unknown, estimates in mid-September spoke of 70 U.S. deaths and a reconstruction bill that could approach $200 billion. Shortly after Harvey made landfall in the U.S., federal, state and local agencies, National Guard and active military units from across the country began sending helicopters and personnel into the impact zone rescuing stranded civilians, delivering vital supplies and personnel and providing crucial air medical support. The tally included 37 U.S. Coast Guard helicopters, Sikorsky MH-60s and Airbus MH-65Ds, from units scattered from San Diego to Cape Cod, performing mostly hoist rescues and evacuations as the flood waters quickly rose to roof lines.

National Guard units from across the country contributed 69 helicopters at the mission's peak: 35 Sikorsky UH-60s and two HH-60s, 18 Boeing CH-47 tandem-rotor Chinook heavy-lifters and 14 Airbus Lakota UH-72s. Active military units under the direction of Northcom contributed another 73 helicopters—mainly UH-60s but also specialized machines such as giant three-engine Navy MH-53Es that can carry up to 55 passengers. U.S. Customs and Border Protection contributed a dozen helicopters as well, some from its Air and Marine Operations unit. The rapid response of these units saved thousands of lives. The Coast Guard alone was credited with 10,000 saves in Harvey's aftermath, many of them from helicopters.

"The training and equipment that the National Guard receives for our federal mission to fight the nation's wars also make it possible to be very good, especially as we rapidly respond to states' needs domestically. Especially as you look at this in terms of rotary-wing rescue and ground rescue," said U.S. National Guard commander Maj. Gen. James C. Witham.

The Defense Department established incident support bases at Fort Hood (Killeen), Joint Base San Antonio and Naval Air Station Joint Reserve Base Fort Worth to support the effort. The Defense Logistics Agency provided 645,000 gallons of fuel. Some 6,300 active-duty military and 19,000 Guardsmen from 40 states were deployed to the impact area. The effort also drew foreign military support: 34 members of the Republic of Singapore Air Force flew sling loads of food and water from one of their CH-47s in coordination with the Texas National Guard. Singapore's Air Force trains for large-scale emergency responses at the Grand Prairie Army Aviation Support Facility in Dallas.

Military helicopter SAR crews were guided in their responses by Air National Guard imagery analysts from the 101st Intelligence Squadron in Cape Cod, Mass., who were fed satellite and reconnaissance aircraft images. High overhead, an Air Force E-3 Sentry from Tinker AFB in Oklahoma flew 16-hour sorties, acting as an airborne communications link and a real-time data coordination hub linking military air operations, the Houston Air Route Traffic Control Center and 80 SAR helicopters in theater. The E-3 tracked hospital status, helicopter

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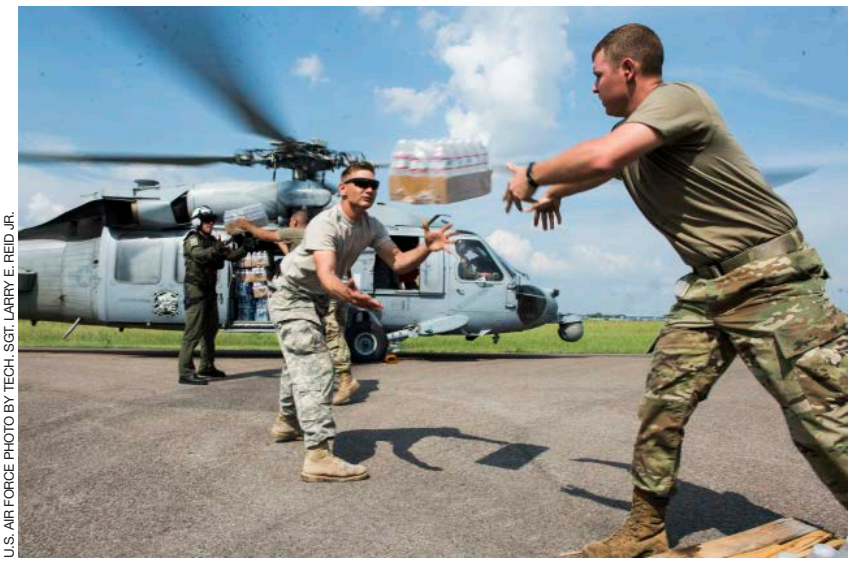
ALEXANDER ZAMORA

A CBP air and marine operations Black Hawk aircrew works to bring a surviving family into the aircraft after being hoisted to safety.



U.S. AIR FORCE PHOTO BY TECH. SGT. LARRY E. REID JR.

U.S. servicemen load water onto a U.S. Navy MH-60S Sea Hawk in Beaumont, Texas, on September 3.

NEWS UPDATE

Bell 407 Gets a Boost

Bell Helicopter has delivered the first of one hundred 407GXP singles on order from Shaanxi Helicopter (SHC), a subsidiary of Shaanxi Energy Group. The OEM announced the delivery in August at China's Xi'an Air Show. Bell and Shaanxi had finalized the order in June. The deal has a list price value of $300 million and finalizes a framework agreement the company entered with SHC last year.

Separately, Bell signed a deal for the sale of eight 407GXP singles to Caverton Helicopters, a subsidiary of Caverton Offshore Support Group. The group operates in the marine and aviation logistics sectors for the oil-and-gas industry in Nigeria. Delivery of the aircraft is scheduled to begin later this year. Launched in 2015, the 407GXP offers 50 pounds more payload than the original, a new Rolls-Royce 250 engine with improved fuel efficiency and hot-and-high performance, new avionics features such as hover performance calculator, and a transmission TBO extension of 500 hours. Some 1,400 Bell 407s are in service worldwide. During the first half of this year, Bell delivered fifteen 407GXPs, according to GAMA data.

CHC Leases Super-Medium Models

CHC Helicopter has moved into the super-medium segment in a deal with Gecas's Milestone Aviation Group to lease three new Leonardo AW189s and two Airbus Helicopters H175s. The aircraft will be used to support CHC energy sector customers in the North Sea and Australia. CHC said it will use the helicopters for missions that had previously been performed by heavy aircraft or to serve platforms that are not designed to support heavies.

MD's Billion-dollar Baby

MD Helicopters (MDHI) has been awarded a five-year $1.385 billion contract to provide up to 150 armed MD 530F Cayuse Warriors to the Afghan Air Force. The foreign military sale was contracted through the U.S. Army Contracting Command at Redstone Arsenal in Alabama. The contract covers program management, delivery support, pilot training and maintenance. In the first phase, 30 MD 530Fs valued at $176.6 million will be delivered by September 2019. These aircraft will be configured with MDHI's newly certified Block 1 glass cockpit featuring the Howell Instruments engine instrumentation system, Garmin GDU 620 electronic flight instruments, Garmin GTN 650H communication/navigation/global positioning system and Northern Airborne Technology's cabin audio system.

Bell V-280 Readies To Fly

Bell Helicopter has completed final assembly of the V-280 Valor next-generation tiltrotor prototype and is preparing for ground runs leading to first flight this fall. The V-280 is competing to win the U.S. military's Future Vertical Lift Program to replace the Army's Sikorsky UH-60 Black Hawks and the Bell UH-1s operated by the Marines. With the potential for significant foreign military sales as well, the program could account for as many as 4,000 aircraft worth $100 billion by 2030. The aircraft differs from the Bell/Boeing V-22 tiltrotor in that on the V-22, the engines, gearboxes and prop-rotors all rotate as thrust direction is changed; on the V-280 only the gearboxes and prop-rotors rotate. The V-280 will also have 50 percent more flapping capability in the rotor system than the V-22 has, giving it greater agility in all axes. *—Mark Huber*

Airbus hands over the 400th Lakota twin

by Mark Huber

The U.S. Army is using the Airbus Helicopters Lakota to train crews for the Chinook, Apache and Black Hawk.

Airbus Helicopters delivered the 400th UH-72 Lakota twin to the U.S. Army in late August at its assembly plant in Columbus, Miss., and fielded at Fort Rucker, Ala. The aircraft is the 160th Lakota fielded at the Army's primary rotary wing training facility. Today, half of all new U.S. Army aviators train on the UH-72 Lakota. Airbus will deliver nine more UH-72s to the Army this year.

"The stand up of the [training] fleet at Fort Rucker since 2014 has exceeded our expectations," said Scott Tumpak, senior director of the Lakota program at Airbus Helicopters. "We're already seeing the benefits to the Army of transitioning to a go-to-war aircraft that is twin engine and has a glass cockpit compared to the single-engine analog, legacy trainer. Students come out of the initial training more advanced in their transition to the Army's go-to-war aircraft" such as the UH-60 Black Hawk, Apache and Chinook, Tumpak said.

Airbus signed a new five-year support contract with the Army last December, renewable annually for five years, to support the UH-72 fleet that Tumpak said should deliver new efficiencies. "It takes advantage of the fact that the Lakota is based on a commercial, FAA-certified aircraft [the EC135] where there are strong opportunities for the Army to gain cost benefits compared to their other aircraft which are military certified [mil cert]. The contract is also designed to provide maximum support for the Fort Rucker training fleet," he said. The contract is mainly parts support provided at the flight hour rate with some additional activities such as material purchases, pilot and maintenance training, and engineering services. Airbus has trained 1,000 active Army and National Guard pilots at its facility in Grand Prairie, Texas. Tumpak said Airbus primarily supports the contract through a large parts warehouse adjacent to DFW Airport that facilitates rapid national distribution not only to Fort Rucker but to the remainder of the UH-72 fleet, which is widely distributed among National Guard sites. Airbus also provides the Army with a local parts stock at Fort Rucker.

Airbus's current Army contract expires in February next year after an aggregate of 412 delivered aircraft. There is funding in the FY 2016-17 federal budget for another 44 aircraft.

"Throughout the course of the program [since 2006] there have been a lot of modifications to the aircraft," Tumpak noted. "Some of that has been compliance with FAA standards, some of that is additional mission-identified equipment. That has been a significant part of the program. The best example is the SFS [Security Forces Squadron] configuration operated by the Guard that introduces a significant reconnaissance and surveillance capability with a [Wescam] MX15 [multi-spectral imaging system] with an operator station in the rear cabin that has been used for homeland security and drug interdiction missions on the southern [U.S.] border."

Airbus provides much of this modification work at the Columbus plant, which performs Lakota final assembly, flight line prep, paint, warehouse, administrative offices, flight operations and flight-test engineering. The Army also uses third-party providers. ❑

USHST DEVELOPS NEW SAFETY ENHANCEMENTS

The U.S. Helicopter Safety Team (USHST) has finished analyzing the root causes of fatal accidents and has developed 22 measurable safety enhancements. They are grouped into four categories: IMC and visibility; loss of control; safety management; and competency.

Within the topic of IMC and visibility, the USHST will be working to implement safety enhancements within four industry sectors: personal/private, air ambulance, commercial and aerial application. The enhancements include the detection and management of risk changes, threat and error management training, enhanced helicopter vision systems and recognition of and recovery from spatial disorientation.

With regard to detecting and managing risk level changes, the USHST will develop and promote recommended practices for pilots and nonflying crewmembers to detect elevated risk levels during the course of a flight, effectively communicate that risk level to each other and make a decision about the appropriate mitigation. As to threat and error management training, the USHST has committed to developing best practices for, and promoting the teaching of, threat and error management as part of initial and recurrent pilot training.

The USHST will research, develop and promote the use of enhanced helicopter vision systems (EHVS) such as night-vision goggles, enhanced vision systems and combined vision systems to assist in recognizing and preventing unplanned flight into degraded visibility and to improve safety during planned night flights. Training will be developed for recognizing spatial disorientation and recovering to controlled flight by using all available on-aircraft resources and automation, such as broader use of the autopilot.

The USHST said it will be announcing more safety enhancements soon. The organization remains focused on reducing fatal civil helicopter accidents, targeting a reduction to 0.61 fatal accidents per 100,000 flight hours by 2019 and a rate of 0.69 per 100,000 flight hours this year. —*M.H.*

280FX suffered rotor spindle crack

The fatal crash of a 1985 Enstrom 280FX in Erie, Colo., during an instructional flight on Jan. 26, 2015, was the result of "an in-flight failure of the helicopter's number-two main rotor spindle caused by undetected fatigue cracking, which resulted in an in-flight break up (of the main rotor system)," according to the NTSB.

Contributing to the failure were "nonconforming thread root radius of the spindle and the manufacturer's failure to include a bending moment within the spindle threads when performing the fatigue analysis during initial design of the spindle."

The fatal crash of an Enstrom 280FX prompted an emergency AD requiring inspections of all rotor blade spindles with more than 1,500 hours time in service.

Witnesses to the accident reported that the main rotor blades separated from the helicopter before impact. Both occupants were killed. The NTSB found that "the helicopter was on approach to land when one of the three main rotor blades (number-two blade) separated from the main rotor head. The main transmission and the main rotor head (with number-one and number-three blades still attached) then separated from the helicopter, and the helicopter descended to ground impact."

The accident triggered an emergency Airworthiness Directive in February 2015 mandating magnetic particle inspections of piston-model Enstrom main rotor blade spindles with more than 5,000 hours time in service (TIS) or unknown times in service. The AD also applied to a limited number of spindles installed on Enstrom 480 turbine singles.

That emergency AD was modified in May 2015 to require inspections for all spindles with 1,500 hours TIS after results from the previous emergency AD found that 20 percent of the spindles inspected had evidence of cracks, including those with less than 5,000 hours TIS.

Before the accident, the spindle was not a life-limited part and recurrent inspections were not specified for the spindle threads, making fatigue fracture detection unlikely, noted the NTSB.

Earlier this year, Enstrom noted that the spindle failure on the accident helicopter was the "first report of a failure of a main rotor spindle in Enstrom's history of more than 50 years and, conservatively estimated, three million flight hours."

The company "found no evidence to support a design flaw or material defect that would result in the 280FX accident" and pointed out that the full maintenance history of the accident aircraft is unknown. Specifically, Enstrom noted aircraft sale offer documents that contained spindle serial numbers that do not appear in the aircraft's records.

The NTSB's metallurgical analysis revealed that the fractured spindle on the accident helicopter had "signatures consistent with a fatigue crack initiating from multiple origins that propagated across 92 percent of the cross-section; the remaining 8 percent of the fracture surface exhibited signatures consistent with overload.

The high percentage of stable fatigue fracture growth compared with overload suggested that low-loading propagated the crack. Further, corrosion was visible on the fracture surface in the fatigue initiation area, which indicated that the crack had been present and growing for some time."

The NTSB also noted, "The root radii of the thread on all three spindles did not meet the thread form specified on the manufacturer's drawing. —*M.H.*

With recent Starspeed acquisition, Luxaviation doubles its fleet size

by Chris Kjelgaard

Luxaviation Helicopters acquired UK-based charter helicopter operator Starspeed last month in what Luxaviation Helicopters CEO Charlotte Pedersen describes as an ideal growth move.

Starspeed's fleet of 19 managed helicopters, which it operates under its own AOC, plus four more not on its AOC but available to Starspeed for corporate and VIP charter work, doubles Luxaviation Helicopters' roster of managed rotorcraft. Luxaviation Helicopters manages and operates 19 helicopters for private owners, and most of them are available to it for charter flying. Starspeed will remain separately managed, staffed and branded under its new owner, but together the two companies represent "the world's largest VIP helicopter operator," according to Pedersen.

Starspeed brings Luxaviation Helicopters other attributes that will help both entities expand business as part of parent Luxaviation Group, according to Pedersen. One is Starspeed's helicopter pilot-training business, which she said complements Luxaviation Group's fixed-wing business aircraft management and training activities. (Luxaviation Group, which manages 262 aircraft and operates 25 FBOs and 15 maintenance facilities, counts itself as the world's second-largest operator of business aircraft.) Starspeed's training activities will allow Luxaviation Group to offer private customers who own both fixed-wing and rotary-wing aircraft high-quality pilot training for both, she said.

Additionally, the fact that Starspeed and Luxaviation Helicopters operate worldwide might win them future VIP business from the group's fixed-wing customers, said Pedersen: "There is a clear connection between large business jets and large helicopters. [VIPs] want to go fast and conveniently."

Another attribute is that Starspeed, which owns two helicopter simulators, not only offers training for operating to ships and offshore oil platforms but also is the only private helicopter operator specifically approved by EASA to fly charters to ships. This could entice business from companies that manage superyachts for private customers, Pedersen thinks.

Starspeed also adds to Luxaviation Helicopters' growing charter presence in large helicopters, as a 19-seat Sikorsky S-92 is available to it. Luxaviation Helicopters itself has Leonardo AW139s, AW119s, an A109 and a Bell 430 available for charters, while both companies offer EC155s. Regarding helicopter size, "This brings us more in the region I'm targeting," said Pedersen. ❑

With the acquisition of UK-based Starspeed, Luxaviation will have 40 helicopters under management and eight available for charter.

MORE MEDICARE REIMBURSEMENT MIGHT NOT SOLVE AIR AMBULANCE WOES

A group of industry stakeholders interviewed for a new study released by the Government Accountability Office (GAO) cast doubt on the ability of increased Medicare reimbursements to solve the ills of the U.S. air ambulance industry. The industry has long called for higher Medicare reimbursements to mitigate "balanced billing" and other practices seen driving the high costs of air medical transports, whose average median costs climbed to $30,000 from $15,000 between 2010 and 2014, according to the GAO.

The average Medicare reimbursement was just $6,502 in 2014, which the industry has long claimed is substantially below actual costs. The nation's largest air ambulance provider, Air Methods, raised its average price per transport to $49,800 in 2016 from $13,000 in 2007—an increase of 283 percent. By last year, the nation's three largest independent air ambulance providers all had average transport costs in excess of $40,000 and the GAO noted that, collectively, they were rapidly increasing market share. The agency noted, "The three large independent providers reported operating 692 air ambulance helicopters in 2015 and 763 in 2016—an increase from 66 to 73 percent of all helicopters in the industry."

However, raising the Medicare reimbursement rate might actually exacerbate the industry's overcapacity/underutilization/high-cost problem. The GAO reported, "Some of these stakeholders noted that increasing Medicare rates could encourage further growth in the industry, which could reduce the average number of transports per helicopter, putting pressure on providers to raise prices charged—thereby exacerbating the problem. Further, industry growth may be an indication that Medicare rates are not too low. We have previously reported that when rates are set too low, access to appropriate care for patients covered by Medicare may be adversely affected. However, the growth in the number of air ambulance helicopters indicates that providers are still deciding to provide service under existing Medicare rates."

The number of Medicare patients as a percentage of overall patient transports is climbing, the number of air medical helicopters went up by more than 10 percent, from 900 to 1,020, between 2010 and 2014, but the number of transports per 1,000 Medicare patients was flat and down slightly among the privately insured. Industry stakeholders attributed this to two trends, the GAO said. "Representatives from three providers stated that there is an issue with overcapacity or oversaturation in the industry and that the helicopters being added to the industry are in areas with existing coverage and not serving additional demand, thereby reducing the average number of transports per helicopter rather than improving access to patients previously not covered by the service. On the other hand, representatives from four other providers told us that the decline in transports per helicopter is attributable to helicopters increasingly being located in rural areas where there is greater need, but less population density, leading to fewer transports per helicopter." —*M.H.*

Harvey rescue ops

▶ Continued from page 83

and landing zone availability and survivor coordinates—information that enabled flight crews to prioritize their missions.

Military helicopters quickly moved in the storm's aftermath to perform exigent rescues and later went on to fly more mundane but still vital missions, such as air-dropping hay bales to stranded livestock from the back of Ohio National Guard CH-47s near Beaumont, Texas.

Civil Operator Efforts

Civil helicopters, mostly medevac at first, also moved in. On August 24, Air Methods activated its emergency response plan in anticipation of Harvey's impact. It deployed 40 flight nurses, paramedics, pilots and mechanics to Grand Prairie, Texas, along with several helicopters. It was ready to move in when the weather began to break on August 28, transporting ICU and NICU patients out of hospitals that had lost power and/or sewage service.

"One hospital had no water for days," said Joe Rios, a flight nurse from Chatham, Ill. "We were able to assist, evacuating some of the critical patients who were on ventilators and medication drips. They needed care similar to what they received in the ICU. We were able to provide that and get them up to the Fort Worth-Dallas area," he said. The company also enlisted 10 pilots and two Airbus AStars and one EC130 from its Sundance Helicopters airtour division in Las Vegas, basing those aircraft in New Braunfels, Texas. Air Methods deployed 200 personnel and 20 aircraft adjacent to Houston in support of Harvey relief efforts.

OEM Response

OEMs also stepped up in Harvey's aftermath. Bell Helicopter, based in Fort Worth, Texas, sent two 429 light twins and a 412 medium twin to assist in the recovery efforts, and in the days immediately after the storm, Bell and sister Textron companies raised $120,000 for Harvey relief. The helicopters delivered critical food, water and supplies. The 412 flew six sorties for a total of 11.4 hours delivering 7,300 pounds, while the 429s flew seven sorties for a total of 11.7 hours delivering 6,000 pounds.

"Our pilots were able to get to those who couldn't be reached by vehicles or boats and were in desperate need of relief," said Todd Bufkin of the Bell Helicopter Training Academy. Bufkin also noted, "Our employees are doing a great deal in Fort Worth, Amarillo and Lafayette to donate supplies and give to the Red Cross and we will continue to stand ready to support the Houston community."

The airspace in and around Houston in the days after Harvey proved to be a challenging environment, according to CHI pilot Mike Jones. "The flying conditions when we first got down there were pretty miserable. Low patchy ceilings and visibility and raining like crazy the first day. But then it cleared." However, some initial confusion about airspace management and the overall congestion still meant that heads were on a swivel in the cockpit. "You had to have both heads out the window," said CHI's Edwards.

Getting a squawk code to enter the temporary flight restriction (TFR) area proved problematic at first. "Initially it [the TFR] was just a circle around Sugar Land but then overnight it expanded to cover the entire Houston double Class B airspace. And once you got in there it was packed full of helicopters," said Jones. "Houston ATC had their hands full and did one heck of a job. But at one point for five or ten minutes the guy working my frequency came back and said they could no longer do separation. I don't think I've ever seen that situation before. He said, 'We're just going to track you and you guys need to have your eyeballs outside.' It got so busy on the radio. We're trying to do CRM in the cockpit and the radios are constantly going. You're trying to get a word in edgewise and it's almost impossible. The radios were really jammed up."

Other than the military traffic, most of the helicopters flying within the TFR were small medevac helicopters. CHI's S-61 is equipped with TCAS, but that did little to tamp down the stress level.

CHI's initial missions were critical inter-hospital transfers. Because of the helicopter's size, up to three or four patients, their nurses and all the attendant gear could be handled on one hop. The patients "were in pretty rough shape," said Edwards. Because of its size (rotor diameter 62 feet) the S-61N can't use most hospital helipads, so parking lots adjacent to the hospitals had to be cleared and ambulances summoned in some cases to finish the last few hundreds of feet of the patient transfer.

While in Houston, CHI's S-61 flew an average of five hours per day. Both Jones and Edwards point to a flight where they lifted in 14 relief doctors, nurses and technicians from Conroe, Texas, to a hospital in Lake City where the staff had been working and living for six straight days in Harvey's wake. "There was a party going on when they showed up. They were extremely happy to see those people," said Jones.

Meanwhile, back at CHI's home office, the phone was ringing off the hook with requests from storm-ravaged oil companies, refineries and utilities for supplemental civil lift. So when Air Methods released the S-61 from duty on September 1, CHI had another gig lined up for it and its crew: supporting the area's largest utility, Entergy, and redeploying to the submerged and blacked-out area to the east near Beaumont, Texas. The mission called for basing from Southland Airport in Sulphur, La., and flying into and around Beaumont, hubbing off of Jack Brooks Airport there. Jones remembers his arrival into Jack Brooks. "It was a complete zoo when we got there. ATC was just as chaotic. You were still talking to Houston Approach, and they had their hands full. Then they would hand you over to Beaumont Tower and it was just as congested there, sometimes launching ten aircraft at a time. The whole [main] ramp was full of mostly small EMS helicopters." Jones said that the military had taken over the north side of the field, running in everything from Black Hawks to Chinooks to Super Stallions.

One of the first orders of business at Beaumont was to fly the Entergy CEO and a load of dignitaries on an aerial damage assessment flight, but after that the missions became more mundane; hauling transformer components in open wooden crates and ferrying Entergy technicians to needed locations in the area. The parts crates loaded easily through the S-61's large cargo door. In many ways, helicopter support was even more critical in Beaumont than it had been in Houston because of severe flooding. "Their roads were completely cut off," said Jones. CHI's mission for Entergy ended on September 7. Jones and his crew flew back to Howell the next day.

Edwards said it was an experience he won't soon forget. "I was just glad CHI was there. The number of people volunteering, including at the FBOs, was amazing. It was just overwhelming to see how much damage was done."

On September 10, Hurricane Irma hit Florida and marched northward toward nearby states. Air Methods had already deployed its emergency response plan for the region and CHI had another S-61 ready to go, positioned in South Carolina. ❑

U.S. ARMY NATIONAL GUARD PHOTO BY SGT. 1ST CLASS MALCOLM MCCLENDON

A Texas Army National Guard LUH-72 Lakota with the 36th Combat Aviation Brigade flies over flooded communities looking for survivors north of Beaumont, Texas, on August 31.

U.S. COAST GUARD PHOTO BY PETTY OFFICER 3RD CLASS CORINNE ZILNICKI/RELEASED

Right, Coast Guard Petty Officer 3rd Class Evan Gallant, a rescue swimmer from Air Station Miami, carries a boy away from an MH-60 Jayhawk helicopter in Beaumont, Texas.

Air Methods pre-positioned several helicopters, including these Bell 407s, at the Grand Prairie, Texas (KGPM) airport to quickly respond to Harvey.

A CHI Aviation Sikorsky S-61N loads patients for inter-hospital transfer in Houston after Harvey.

Airbus tests laminar flow on A340

by Caroline Bruneau

A research program involving Airbus and its partners could help airlines reduce fuel consumption by as much as 5 percent.

In a hangar in Tarbes, France, resides the project called Blade, which stands for Breakthrough Laminar Aircraft Demonstrator in Europe and is intended to "demonstrate the laminarity [laminar flow] for commercial aircraft," explained Axel Flaig, senior vice president of Airbus Research and Technology.

Airbus and partners in the Blade initiative are using the A340 prototype to test two wing designs that have the potential to yield significant fuel savings for airlines.

Airbus has transformed the A340 prototype (MSN 001) by adding a new outer wing section with 20 degrees less leading-edge sweep than the inner section. A bullet-shaped pod is mounted at the tip of the wings.

A true laminar-flow wing applies the principle of aerodynamic organized flow and reduces friction and drag. The principle has been known for decades but could not be applied effectively on commercial aircraft for technical reasons, Flaig explained, although it is hoped that the modified A340 will demonstrate the feasibility of this technology. The potential drag reduction could reach 8 percent on short-range aircraft when compared to a standard turbulent (non-laminar-flow) wing, but this would occur at an optimum speed of Mach 0.75, a little less than the current typical cruise speed of Mach 0.78.

Two Concepts, Two Wings

On this A340 there are two different outer wing sections, so the partners can test two manufacturing concepts. The left wing was manufactured by Saab in Sweden and Aernnova Aerospace in Romania. This section is made of a single panel that accounts for more than half of the wing span to improve laminar flow. The right wing section is made of different panels, and the joint in the leading edge has been carefully assembled and polished to improve the laminar effect. This wing's leading edge was provided by GKN in the UK and integrated by Aernnova. The right wing section, which Airbus aerodynamics specialist Laurent Mallard describes as "more perfect," is less expensive to manufacture than the left one. By testing both wings in the same flight conditions, the research team will be able to determine how much each is able to benefit from the laminar-flow effect. If the difference between the two is small, the right wing concept will be more cost effective to manufacture, the engineers explained.

The A340 has been equipped to capture a massive amount of data during a planned 150-hour flight-test campaign. A couple of thousand parameters will be measured and analyzed, said Philippe Seve, flight-test engineer. Cameras have been installed in the vertical stabilizer and in the wingtip pods. There are 34 cameras in all, three of which have infrared sensors to measure the deformation of the sun's reflection on the wings, which are covered in a striped pattern. To allow the wing to reflect the sun, they have been painted gray. "If they were white, it would have made thermal visualization impossible, so we decided on gray," explained Daniel Kierbel, leader of the Blade project.

Airbus expects to fly the modified airliner by the end of September, flying it from Tarbes to Toulouse, where it will be based during the test campaign. Because of the sun's angle needed for measurement and visualization, there will be no flights during winter. Seve expects flight-testing in normal conditions to be completed between spring and autumn 2019.

The so-called "mosquito flights" are scheduled during spring and early summer of 2019 to test the cumulative impact of insect debris on the wings and how it affects the laminar profile. The test aircraft will mostly fly in circles over Camargue, a marshland area on the French Mediterranean coast formed by the delta of the Rhône river. During this campaign, a Krueger device, a lift-enhancing surface mounted under the leading edge, will be deployed in front of the wing during takeoff and landing to try to repel the insects.

The research team, with members from all over Europe, expects that flight-testing will validate the concept. No timetable has been given yet, but the technology could quickly move into industrial implementation if the Blade experiment delivers the expected results. ❑

MITSUBISHI MRJ RESUMES FLIGHT-TESTING

Flight-testing of the Mitsubishi MRJ resumed last month, following grounding of the four-airplane test fleet on August 21. During a test flight about 90 miles west of Portland, the left Pratt & Whitney PW1200G geared turbofan on MRJ FTA-2 experienced an uncommanded shutdown, and the flight-test crew diverted to Portland International Airport. After an engine swap, the test pilots flew FTA-2 to the flight-test base at Grant County Airport in Moses Lake, Wash.

FTA-4, which had been flying from Phoenix-Mesa Gateway Airport in Mesa, Ariz., resumed flight-testing there on September 6, according to a Mitsubishi spokesman. "We were able to review and inspect the engines on FTA-4 with the Pratt & Whitney team and determine that the aircraft was able to resume flight-tests," he told **AIN**. "We are still in the process of determining the exact cause of the malfunction in the engine on FTA-2." The first three flight-test MRJs received JCAB approval to resume flight testing on September 11 and are now back on active flight status.

The fly-by-wire MRJ was expected to complete flight-testing by the end of 2018, with certification planned in 2019. First delivery to All Nippon Airways is scheduled in 2020. *—M.T.*

MATT THURBER

Mitsubishi MRJ FTA-4 at Phoenix-Mesa Gateway Airport in Arizona, about a week before resuming flight-testing.

NEWS UPDATE

ANA Preps for Tokyo-L.A. Push

Japan's All Nippon Airways confirmed in late August that it will double flight frequency between Tokyo Narita and Los Angeles International airports to 14 a week as part of a wide-ranging adjustment to schedules for the second half of fiscal 2017. Combined with existing flights from Tokyo Haneda, the change means ANA will fly three round trips per day between the Japanese capital and Los Angeles effective October 29.

Several other changes include adjustments to Haneda-Hong Kong, which on the same day will see an increase from nine round trips per week to between 12 and 14. Meanwhile, Narita-Chengdu will drop to four per week from seven.

ANA also plans to adjust equipment type on several international routes, among them Haneda-Kuala Lumpur, Haneda-Vancouver and Haneda-Delhi, all of which will see the addition of Boeing 787-8s on seven-times-weekly services now flown solely with 787-9s. Meanwhile, Narita-Ho Chi Minh City will see 767-300ERs replace some 787-8 service, as will Narita-Beijing.

ExpressJet Pilot Leaders Agree to Novel Pay Scale Credit Deal

The pilots of U.S. regional airline ExpressJet reached a tentative agreement with airline management in late August on a new program that will allow current flight crew and new-hire applicants with similar experience at other carriers to count previous years of service toward their total longevity at ExpressJet and/or Atlantic Southeast Airlines (ASA). The tentative deal would allow pilots to count up to 10 years of previous experience at Federal Aviation Regulation Part 121 carriers for purposes of hourly pay according to the specific equipment and status. That experience would count toward benefits such as the 401(k) retirement match, defined contributions and vacation accrual.

St. George, Utah-based SkyWest, the parent company of Atlantic Southeast, bought ExpressJet Airlines in 2010. ExpressJet and Atlantic Southeast began operating under a single FAA certificate in November 2011 and a month later ASA adopted the ExpressJet name. However, the pilots of the two units continue to bargain as distinct groups.

SkyWest remains in broader negotiations with ALPA over new contracts for ExpressJet's two pilot groups. The pilots of the SkyWest Airlines subsidiary agreed to terms on a new four-year deal that took effect July 1.

Trent XWB-97 Gains EASA Nod

The Rolls-Royce Trent XWB-97 received formal flight certification from the European Aviation Safety Agency in late August, clearing it for entry into service on the first production Airbus A350-1000 later this year.

Designed to power Airbus's biggest A350 XWB variant exclusively, the engine produces 97,000 pounds of thrust, some 13,000 pounds more than the version that has powered the A350-900 since it entered service in 2015. Rolls achieved the higher thrust through a combination of new high-temperature turbine technology, a larger core and advanced fan aerodynamics. The company has sold 1,600 Trent XWBs to 40 customers.

Certification of the XWB-97 comes less than a week after the Trent 1000 Ten, destined to power all variants of the Boeing 787, gained a similar level of EASA certification. *—Gregory Polek*

Avolon picks winner among 737 Max lineup

by Sean Broderick

Avolon expects the Boeing 737 Max 8 to occupy the core of the narrowbody market.

Orders for the Boeing 737 Max 8 and Max 10 will predominate among the company's Max narrowbody series, while the Max 7 fills a niche and the Max 9 finds itself all but squeezed out, a recent analysis from lessor Avolon concludes.

The conclusions fit with macro trends favoring higher-capacity aircraft, signifying that OEMs will fight for future narrowbody orders at the upper end of the respective aircraft series.

"Comparing the mix of the smaller variants of the current 737 NG and A320ceo series fleets with their re-engined successors, it is apparent that demand has shifted; the smaller variants of both series have all but disappeared from the order books," said Avolon, which counted 136 Max jets and 159 neos in its 921-aircraft portfolio as of June 30. "Whilst the 737-700 and A319ceo hold a combined 17 percent of the current fleet, the Max 7 and A319neo account for a mere 1 percent of series orders."

On the high end, the 737 Max 9/10 accounted for 29 percent of the 2,065 aircraft on order at the time Avolon published the report in early August, versus 71 percent for the A321neo. Before the Max 10's launch at the Paris Air Show in June, Boeing's share amounted to only 15 percent.

"The Max 10 will serve as a crucial gap-closer to take market share back from the A321neo and is expected to be a compelling unit-cost aircraft," the report said. The highest-capacity Max will appeal to mainline, low-cost and charter operators, it added. Fifteen 737-800 operators also fly A321s, "a strong indication of the lack of a suitable 737 to grow into, but no shortage of demand," the lessor noted.

While the Max 10 has so far proved a worthy addition to the 737 series, it carries "limitations," notably a maximum-thrust option 7,000 pounds less than that of its competitor, Avolon said. The difference gives the A321neo an edge "in markets where airfield performance and capacity" are important. The difference will help the A321neo outsell the 737-10 by two to one, it projects.

Max 8 Opportunities

The lessor owns the first Max 8 put into revenue service—with Malindo Air in May—and remains bullish on the model. At Paris, it signed an MOU covering a firm order for 75 airplanes and options on another 50, amounting to the lessor's largest single commitment for Boeing aircraft. "The Max 8 represents the largest opportunity for the 737 Max series because of the popularity of the 737-800 and its size positioning at the heart of the market," Avolon said.

Avolon expressed less optimism about the high-density Max 8, which boosts passenger capacity to 200 with the addition of an exit door and a modified cabin layout. Only three carriers have signed for the aircraft, but one—737-800 operator Ryanair—has ordered 110.

Strong demand for both the Max and the neo has generated orders and LOIs for 10,300 airplanes, and Avolon expects continued brisk sales. In the 737's case, 65 percent of 737NG operators haven't committed to any next-generation narrowbodies, among them 15 airlines that fly at least 30 of the narrowbodies. ❑

Chinese airlines need 5,000 pilots per year

by William Dennis

Over the next 20 years, China's airlines will require 5,000 pilots per year to meet the rapid expansion and growth of the local civil aviation industry, and today the carriers are scrambling to hire experienced pilots to address the growing shortage.

According to Liu Shen, a senior official at the Civil Aviation Administration of China (CAAC), the number of pilots required climbs every month, an escalation he attributes to "fleet and network expansion, and retirement of senior pilots who have reached the age of 60." Early last year, a study concluded that over the next five years the carriers would require 2,800 to 3,000 pilots per year, but those numbers turned out to be significantly underestimated. Liu pointed out that the industry should now be looking at what it would require in the long term to plan its manpower requirements.

Priming the Pipeline

The 12 flying schools across China with expanded training facilities are now turning out only 1,500 to 1,650 new pilots a year. Three quarters of Chinese airlines send their cadet pilots to Europe, Australia or the U.S. for training. With China placing a greater emphasis on English, cadets are now required to complete a minimum 100 hours of aviation English in China before they begin their course in a foreign country. The previous requirement was for 80 hours.

China's airlines are facing a significant requirement for pilots and should start making plans now, one CAAC official advises.

As part of the plan to ease the shortage, some carriers have independently turned to Eastern Europe and even Russia to attract new hires. In addition to high salaries, some of the companies have even offered to pay taxes.

"With the expansion of the fleets, the increase in the number of private carriers and market liberalization, this is one way of attracting captains and first officers to fill the vacancies," Liu pointed out.

Twelve years ago it was unthinkable for any Chinese carrier to hire a foreign pilot, and getting government approval was a big hurdle. The airlines received the green light from the government to hire foreign pilots in early 2007. Low-cost carrier Shanghai-based Spring Airlines was the first to tap the foreign market, hiring Koreans.

Now, 10 years later, scores of pilots from South America, the U.S., Korea, South America, Singapore and Australia are heading for China. Of the 1,000-plus foreign pilots (captains and first officers) working in China now, 265 are Koreans.

Among the carriers that currently have foreign pilots are Shenzhen Airlines, Spring Airlines, Okay Airways, Hainan Airlines, Lucky Air, West Air, Tianjin Airlines and Sichuan Airlines. Okay Airways official Chen Du believes that the shortage of pilots will be an issue for many years as airlines expand their fleets, networks and frequencies. Chen said it is getting more difficult to hire pilots with a current type rating as airlines around the world are facing the shortage and have the same requirement.

Despite the acute shortage in China, after much debate the CAAC has decided not to extend the retirement age beyond its current 60, complicating the manpower projection of some airlines.

Japan's Ministry of Transport raised the retirement age to 64 from 62 in 2004 and to 67 in February 2015. Malaysia Airlines Berhad raised it to 60 from 55 in 2006, and the Singapore Airlines retirement age is 62, which can be extended to 64 depending on the health of the pilot and at the discretion of management. Low-cost carrier AirAsia's retirement age is 65.

According to Boeing's 2016-2035 projection, the Asia-Pacific region will lead the worldwide growth in demand with a requirement for 248,000 new pilots, with China needing the most. ❑

Bombardier welcomes UK nod in subsidy dispute with Boeing

by Gregory Polek

Bombardier has welcomed UK Prime Minister Theresa May's intervention in a dispute instigated by Boeing over Canadian government support for the C Series airliner. Speaking last month with reporters at the C Series assembly site in Mirabel, Quebec, Bombardier Commercial Aircraft president Fred Cromer called the complaint an attack on innovation and a threat to jobs at companies everywhere that comprise the new narrowbody's supply chain.

"For me, having that sort of support is important because it speaks to the heart of the issue, which is jobs, innovation and an international supply chain," said Cromer. "It seems kind of interesting to me that the UK is obviously in support of Bombardier and you can argue that the U.S. should be in support of us against Boeing as well because 50 percent of the program in terms of value comes from the U.S. Over the life of the program that's $30 billion of investment in the U.S. and 20,000 jobs."

Bombardier's own Short Brothers subsidiary in Northern Ireland ranks as one of the most important C Series suppliers, providing the main structure of the airplane's composite wings and undertaking final assembly. Of course, May's interest centers on protecting jobs at the Belfast site, where some 1,000 of 4,500 employees work on C Series wing production. Last month the UK prime minister appealed directly to President Trump to ask Boeing to drop its complaint, filed with the U.S. International Trade Commission and U.S. Commerce Department in April. May was scheduled to meet with Canadian Prime Minister Justin Trudeau in Canada on September 18 to discuss the Boeing-Bombardier dispute among other matters.

The U.S. Commerce Department expected to issue a ruling by the end of last month. In the event it rules against Bombardier, the next step in the process would involve a determination on what penalties the U.S. could impose. "We're looking beyond the first step," said Cromer. "The first step is a relatively low bar and a mathematical process that is pursued in that case. We're looking beyond that, where you're actually proving damages and that's really the issue for next year."

Delta Order

The charges stem from the 2016 sale of 75 CS100s to Delta Air Lines. In its complaint, the U.S. company claims Bombardier sold the airplanes for $19.6 million each, or some $13.8 million less than they cost to manufacture.

The contract with Delta includes options for an additional 50 aircraft, and the airline might elect to convert a portion of its commitment to orders for the larger CS300. The Atlanta-based carrier will serve as the U.S. launch airline of the 110-seat CS100 as well as Bombardier's largest C Series customer. Delta expects to start taking deliveries next spring.

Delta's order came six months after the province of Quebec agreed to infuse $1 billion in the financially strapped C Series program, giving it a 49.5-percent stake in a limited partnership with Bombardier. Less than a year later the Canadian federal government agreed to grant Bombardier C$372.5 million in interest-free loans for both the C Series and the Global 7000.

Cromer argued that the dispute centers on a category of airplanes that Boeing does not produce and over campaigns in which the potential buyers did not invite the U.S. company to participate.

"We make a product that competes in a size category where Boeing does not compete," he insisted. "We have airlines—specifically Delta—that have been vocal about the fact that Boeing was not included in their process because they don't have an aircraft in the size category that they're looking for. So if you take a step back and you look at the facts of the case, I think the facts favor our position."

Meanwhile, Cromer would not comment on the existence of any direct talks between Bombardier and Boeing, nor would he talk about suggestions of any "deal" struck between the two companies or the governments involved. "I think we're going to look at what is in the best interest of Bombardier and the C Series program," he said. "I'm not going to speculate on the outcome of a deal. We will be strategic in our thinking and we're going to do what's right for our people here at Bombardier and for aerospace in Canada."

Although Cromer acknowledged he does not welcome the publicity generated by the dispute, he and Bombardier Commercial Aircraft vice president Colin Bole dismissed suggestions that it might have dampened interest in the program. "The interest level in the program continues to grow because the airplane is doing well with our customers in service. This is not the kind of attention that I wanted on this program, but this attention is also coming at a time when customers are starting to talk more and more about this aircraft, the merits of this aircraft in this size category and the benefits it can deliver to the airline community."

"This has had no impact on the discussions I've been having with airlines," added Bole. "Why? Because the airlines do recognize the product as exceptional…and second, to a certain extent this has drawn further publicity to the fact that it is an exceptional product, and Boeing is fighting because it is scared of this product."

Bombardier has announced plans to boost C Series production from seven airplanes in 2016 to between 90 and 120 airplanes by 2020. It expects to ship 30 of the jets this year. ❑

Delta Air Lines plans to start taking delivery of the 75 Bombardier CS100s it ordered next spring.

BOMBARDIER BULLISH ON C SERIES DELIVERY TARGET

Bombardier has taken delivery of the first Pratt & Whitney PW1500G geared turbofans fitted with upgraded combustors for the C Series single-aisle airliner as the Canadian manufacturer prepares to accelerate production during the second half of the year in an attempt to deliver some 30 airplanes. Bombardier has shipped just 11 CS100s and CS300s to Swiss International Airlines and Air Baltic this year; the company adjusted its delivery ambitions slightly downward from an earlier estimate of between 30 and 35 to account for supply chain interruptions, mainly involving engine supplier Pratt & Whitney.

"We've always said that our 2017 [deliveries] would be skewed toward the back end [of the year]," C Series program office director Istifan Ghanem told reporters at a briefing at Bombardier's production facilities in Mirabel, Canada, last month. "So we're meeting that plan…There will be a lot of deliveries at the end of the year, but we're working to plan. Pratt is aligning with that production plan."

Although Bombardier Commercial Aircraft president Fred Cromer did attribute much of the early "lumpiness" in program execution to Pratt & Whitney's difficulties, he noted that Bombardier hasn't gone through a unique experience with the C Series, given the complexity and ambitious nature of the program. "One of the challenges that we as a manufacturer and an assembler face is orchestrating that same ramp-up at all the various suppliers that are part of the program as well, and different suppliers are at different levels of learning, different levels of maturity in supporting us," said Cromer. "But we do see the right amount of resources, the right amount of investment coming through the supply chain at every one of our suppliers, and we're on top of every one of them to make sure that we get to that point of harmonization sooner rather than later."

Notwithstanding Bombardier's early internal production challenges, the 18 C Series jets now in operation in some respects have performed better than advertised, said Ghanem. During his presentation of a technical program update in Mirabel, Ghanem reported that Swiss and Air Baltic have seen their airplanes burn 3 percent less fuel than brochure values promise. Utilization has peaked at 17 flight hours a day, and Swiss flies its airplanes on up to 10 legs a day. Finally, after 20 A checks performed since the first CS100 entered service roughly a year ago, operators have reported "no findings" in terms of maintenance irregularities, said Ghanem.

Together, Swiss and Air Baltic now fly the C Series on 100 routes, among them London City Airport to Zurich by Swiss. Next, Korean Air expects to take the first of 10 CS300s on order "in the coming months" or some time this fall, reported Ghanem. In the process of painting the second Korean Air airplane, Bombardier has gained certification from Korean civil aviation authorities and now participates with the airline in delivery preparations such as pilot training. —*G.P.*

In response to demand in the region, Florida-based SevenJet is extending its service offerings, providing maintenance for Avantis, Citations, Beechjets and King Airs.

STS AVIATION GROUP ADDS NEW DIVISION

Florida-based STS Aviation Group has acquired the assets of MRO provider AeroMod International, including a 114,500-sq-ft hangar at Melbourne International Airport that now houses a new division of the company—STS Mod Center—specializing in avionics and structural modifications.

With the addition of this hangar, STS can "perform a variety of avionics and structural aircraft modification services for airline, leasing companies and OEM customers both at our new Melbourne facility or on site at their location," said company CEO PJ Anson. "We already have certifications in place, and the team is up, running and ready for action."

The location will install in-flight entertainment, satcom Wi-Fi connectivity, ADS-B OUT, in-seat power, cabin retrofits and winglet modifications. It holds Part 145 authorization from the FAA, EASA and Brazil's ANAC as well as AS 9110B and AS 9100 quality system approvals.

ADS-B UPGRADE SALES DOUBLE AT CONSTANT AVIATION

MRO chain Constant Aviation has doubled ADS-B sales since this time last year, it announced in late August. All aircraft operating in most U.S. controlled airspace must be equipped with ADS-B OUT by Dec. 31, 2019.

"Constant Aviation has noticed a definitive uptick in ADS-B upgrade sales from this time last year, and new customers account for 26 percent of that increase," said Constant Aviation director of avionics business and development programs Jerry Sanders. "We have worked to expand our capabilities, having access to STCs for 45 aircraft, and have conveniently expanded our nationwide presence by adding locations in Arizona [Phoenix-Mesa Gateway Airport] and Florida [Orlando Sanford International Airport]."

According to Constant, the ADS-B upgrades were completed in conjunction with maintenance, interior refurbishments and avionics installations. "The deadline for completing the mandate is less than 28 months away," Sanders noted.

SEVENJET EXPANDS CLEARWATER MX FACILITY

SevenJet Private Travel (SJPT) continues to expand its new aircraft maintenance facility in Clearwater, Fla., with the addition of space and capabilities. The company began offering maintenance services earlier this year in Clearwater and has added space that triples the previous square footage. The SJPT facility now has three hangars and 9,425 sq ft of maintenance space.

In addition to getting larger, the facility is expanding its portfolio: services for King Airs were added recently. The facility now provides light aircraft maintenance, inspections and other services on Avantis, Citations and Beechjets, in addition to King Airs.

"There is clearly a demand for aircraft maintenance in the region," said Chuck White, president of SJPT.

YINGLING AVIATION JOINS RAISBECK DEALER NETWORK

Yingling Aviation's facility at Dwight D. Eisenhower National Airport (Kansas) is the newest member of the Raisbeck Engineering dealer network.

Yingling provides MRO services for piston and turboprop aircraft. The company was also Cessna Aircraft's first official dealer.

Under the partnership, Seattle-based Raisbeck's line of modifications for the King Air will add "a feature-rich product line to our growing list of services" for these turboprop twins, said Yingling vice president of aircraft and MRO sales Jerry Pickett.

Yingling Aviation's location at Kansas' Dwight D. Eisenhower National Airport is the newest member of the Raisbeck Engineering dealer network.

BUTLER NATIONAL STCs ADS-B FOR OLDER LEARJETS

Kansas-based aircraft special-mission and avionics modification specialist Butler National has been awarded an FAA STC for ADS-B OUT for TCAS II-equipped Learjet 35s, 35As, 36s and 36As.

The installation, which satisfies the Dec. 31, 2019 equipage mandate in the U.S. and the 2020 European mandate, as well as others in the rest of the world, provides independent ADS-B OUT, using Garmin GTX 3000 transponders, the GDL 88 dual-band UAT/1090 receiver with WAAS GPS sensor and the Flight Stream 210 Bluetooth wireless gateway.

The company also has an ADS-B STC for the Lear 24, 25, 35, 35A, 36 and 36A series without TCAS II installed.

AT UTAH SITE DUNCAN ADDS MOBILE NON-DESTRUCTIVE TESTING

Duncan Aviation has added mobile non-destructive testing (NDT) services at its MRO facility in Provo, Utah, which can now provide NDT analyses using eddy current, fluorescent penetrant, ultrasonic, magnetic particle and optical prism inspections.

"The Duncan Aviation NDT team is able to test nearly every surface of an aircraft and a near-limitless list of materials," said Chad Doehring, the facility's manager of airframe maintenance.

The mobile unit will serve Nevada, Idaho and New Mexico.

JSSI EXTENDS PARTS BUSINESS TO ALL OPERATORS

Jet Support Services' (JSSI) parts business is now available to all business aircraft operators, not just those on JSSI hourly maintenance plans. The company launched JSSI Parts in 2015 and last year began acquiring whole aircraft to provide a source of hard-to-find spares, particularly for older types.

Intended mainly for customers that have their own maintenance facilities and teams, and those having difficulty locating spares for particular types, this open-to-all service draws on the purchasing power of the company to source parts at competitive prices.

The JSSI team has access to both new and reconditioned parts and selects the most cost-effective path, with stringent inspections of reconditioned components. JSSI Parts can source spares for 196 business aircraft types, 119 engine models and 60 types of APU, and quickly dispatch them worldwide.

C&L AVIATION TEAMS WITH CMS SUPPLIER DPI LABS

MRO provider C&L Aviation Group has partnered with DPI Labs to install the latter's cabin management systems. C&L will provide custom integrated upgrades and complete replacements of obsolete CMSs in Gulfstreams, Challengers and Learjets, Hawkers and other types. DPI's CMSs are found on many private and commercial aircraft, among them the two Boeing 747-200s that serve as Air Force One.

The two companies have developed offerings with DPI switches, touchscreens and controllers that are fit and functional replacements for former Pacific Systems, Collins and Baker Electronics components. With them, Bangor, Maine-based C&L can upgrade systems with minimal impact on existing cabin furnishings or veneers.

ILLINOIS MRO RECEIVES CONTRACT FOR BRAZILIAN HELO MAINTENANCE

Aircraft Propeller Service (APS) has received a license award from UTC Aerospace Systems to provide helicopter servo actuator repairs on Airbus helicopters in Brazil. The Illinois-based propeller MRO can provide level III repairs of actuators on the EC130, AS350, AS355, AS550, AS565 and AS365, making it the only company in the country with authorization to do so, according to APS.

"We will be providing our MRO servo actuator capabilities for the Squirrel and Dauphin on behalf of multiple operators, OEMs and FBOs in Brazil, as a result of having been selected as the licensee for the OEM subsidiary UTC Actuation Systems," said APS chief revenue officer Dennis Santare.

RECTRIX IS LATEST DEALER FOR ROCKWELL COLLINS

Rockwell Collins has named the Rectrix MRO at Massachusetts' Westfield-Barnes Regional Airport its newest authorized dealer. The designation expands the Part 145 shop's capabilities to sales, service and installation of Rockwell Collins avionics and cabin electronics.

Rectrix's MRO, which started as Airflyte in 1989, has FAA approval to work on Learjets, Global Expresses and 300- and 600-series Challengers; Gulfstreams; Falcons; and Hawkers, Citations, Beechjets and King Airs. It

Continues on page 92 ▶

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NOV. 29 - DEC. 1

AMAC recently installed the Honeywell Jetwave satcom on an Airbus ACJ330.

▶ *Continued from page 90*

also holds ratings for performing RVSM, FAR 91.411 and FAR 91.413 checks and other avionics-related systems servicing.

JET MS ADDS GLOBAL LINE TO BOMBARDIER MAINTENANCE

Lithuania-headquartered Jet Maintenance Solutions (Jet MS) has received approvals to add Global 5000/6000 maintenance. The EASA Part 145-certified maintenance, repair and overhaul company will provide base and line maintenance and spare parts supply service for the long-range jets.

"With 600 Bombardier Global 5000/6000s in operation worldwide, adding the type was a goal and only a question of time for us," said Jet MS CEO Darius Saluga.

This addition will strengthen the maintenance provider's relationships with existing customers, as well as meet demand for the Bombardier market, Saluga added. The company already provides maintenance for the CRJ100, CRJ200 and CRJ440, and Challenger 604/605 and 850. In addition to these Bombardier models, Jet MS provides maintenance services for the Hawker 700, 750, 800, 800XP, 850XP and 900XP.

AMAC EARNS KA-BAND ANTENNA STC FOR AIRBUS ACJ330

Swiss completions and MRO provider AMAC Aerospace has developed an STC for the Ka-band antenna on the Airbus ACJ330. The Honeywell Jetwave satcom system was installed on the bizliner during a base maintenance check, during which it also received several cabin interior upgrades.

The swifter data speed offered by the Ka-band system offers greater access to Internet television and video streaming across multiple on-board devices, as well as support for uninterrupted email, web browsing, videoconferencing, data file transfers and voice and text capability.

Gunnar Jancke, the company's director of design organization and quality assurance, noted that the STC was developed for multiple versions of the ACJ330 "to meet the increasing demand for high-speed connectivity on large VIP aircraft."

BOMBARDIER EXPANDS APPROVALS FOR BRAZILIAN SERVICE FACILITY

Bombardier Business Aircraft has expanded its authorized service center agreement with Brazil's MAGA Aviation to include the Global Express and Global 5000. Based at São Paulo-area Aeroporte de Amarais Campinas, MAGA has been an authorized service facility for the Canadian airframer since 2013, and has approval from Brazil's civil aviation authority ANAC to provide maintenance for all Learjets and Globals, along with most of the Challenger series.

"MAGA is a dynamic young company that has earned the confidence of Bombardier customers in the region in a relatively short span of time," said Stephane Leroy, the manufacturer's vice president of sales for Latin America. "This partnership will reinforce Bombardier's strong OEM support in the region."

Bombardier lists 685 of its aircraft as based in South America, and 125 of them are in Brazil.

DAVID McINTOSH

Newly authorized Bombardier Global service center MAGA Aviation introduced this mobile jet support vehicle at LABACE. It has a rooftop crane for engine removal, and a raised platform for working on jet tails.

NEW PT6A ENGINE SHOP COMING TO BRAZIL

Later this year Covington Aircraft is set to open an engine maintenance, repair and overhaul (MRO) shop at an off-airport site between Goiânia and Anápolis in Brazil. In addition to servicing engines, the company will stock spares. With the aim of continuing to expand operations after the launch, the center's activities will focus primarily on supporting the large number of Pratt & Whitney Canada PT6As serving the agricultural and corporate sectors in Brazil. Headquartered in Tulsa, Okla., Covington Aircraft was founded in 1972 and has become a specialist in the PT6A. It is an authorized Pratt & Whitney Canada distributor and designated overhaul facility.

At the Goiânia site Covington will offer OEM-accredited services as a satellite of the Oklahoma business. The Goiânia shop will also have mobile repair teams to meet the needs of operators in the field.

FLYING COLOURS NOTCHES FANS, ADS-B COMBO ON CL604

Canadian MRO specialist Flying Colours has delivered the first Canadian-registered aircraft to be equipped with Rockwell Collins Future Air Navigation System (FANS) 1/A avionics, in conjunction with Flying Colours' ADS-B package in a single upgrade. The owner of the Challenger 604 requested the avionics modernization as part of a scheduled 48-month maintenance inspection.

In January, the company received approval from Transport Canada to install ADS-B OUT on Canadian-registered Challenger 604s/605s and 300s, and it has performed the modification on 20 aircraft since then. Its new STC for the FANS-1/A installation complements existing U.S. FAA certification. This latest project was completed in less than two months.

KING AIR 350i GETS ADS-B FROM DUNCAN AVIATION

Duncan Aviation has performed its first ADS-B upgrade on a King Air 350i, using the CMD Flight Solutions approved model list STC, at its satellite avionics shop in Cincinnati, Ohio. After doing some research on the turboprop twin, Bruce Miller, the shop's manager, discovered that the CMD option would meet the specified requirements.

"CMD's ADS-B OUT solutions cover almost every business jet, personal aircraft and regional jet flying today with the Rockwell Collins TDR-94/94D or the Honeywell Primus II radio suite," said CMD vice president of sales and marketing Barbara Mahoney. She added that the company holds approvals from several civil aviation authorities: the EASA, Mexico's DGAC and Brazil's ANAC, in addition to Transport Canada approval on the Learjet 60.

During the process, which took less than two weeks, the team upgraded the Rockwell Collins TDR-94D transponders and installed a single, centralized fail annunciator and a digital discrete adaptor for digital-to-analog output.

DUNCAN PROVO ADDING MAJOR MX, PAINT FACILITIES

Duncan Aviation has broken ground on a new business aircraft maintenance, modifications and paint complex at its Provo, Utah location. To be built on a nearly-45-acre tract at Provo Municipal Airport, the facility will span nearly 275,000 sq ft, including a 222,000-sq-ft maintenance and modifications center and a 53,000-sq-ft paint facility.

The new complex will accommodate some of the largest business aircraft, and includes large hangar spaces, along with backshop and office space. The new paint structure will have the latest downdraft airflow technology, including automatic monitoring and alarms, and will be able to accommodate multiple aircraft at once using a two-zone airflow system. With this design, Duncan Aviation paint teams can perform stripping, sanding, painting and detail work on multiple aircraft simultaneously.

"Operators in the Western U.S. that they would like to see more investment in a Duncan Aviation location closer to their home base," said Duncan president and CEO Aaron Hilkemann. "The Provo area is the perfect complement to our other full-service facilities in Battle Creek, Michigan, and Lincoln, Nebraska. That is why we initially started our Provo facility. The plan has always been to expand that original footprint and build a new facility."

The $70 million project is slated for completion by the end of 2019. ❑

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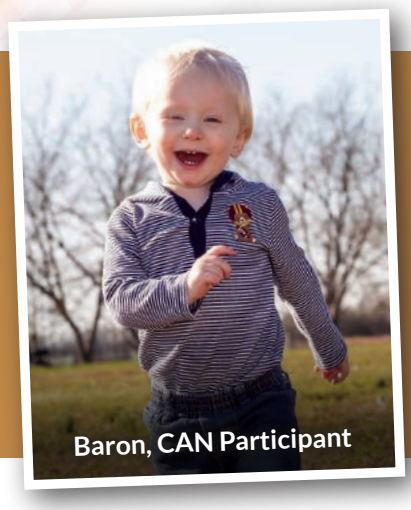

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Orion Jet Center is joining the Atlantic Aviation network, in a deal expected to close later this year.

ATLANTIC AVIATION EXPANDING FLORIDA FOOTPRINT

Atlantic Aviation will boost its FBO network, as well as its footprint in Florida, thanks to an agreement to purchase Orion Jet Center, one of three service providers at Miami Opa-Locka Executive Airport. Pending regulatory approval, the deal is expected to close in the third quarter of this year; terms were not disclosed.

The location offers a 20,000-sq-ft terminal with an aircraft arrivals canopy, passenger lounge, a trio of conference rooms, crew lounge, snooze rooms and showers. It also features 200,000 sq ft of newly built hangar space big enough for a Global Express, along with 36,000 sq ft of office and maintenance space.

Atlantic first moved into the Florida FBO market in 2014 with the acquisition of Galaxy Aviation's five locations in the state. "We are pleased to extend our presence in Florida south to the greater Miami area, and one of the fastest-growing general aviation markets in the U.S.," said company CEO Louis Pepper. "The Orion facilities are first class and the team there has a well deserved reputation for outstanding service, making this operation a great addition to Atlantic Aviation."

GAMA TO BUILD NEW BIZAV TERMINAL AT SHARJAH AIRPORT

Farnborough, UK-based Gama Aviation has signed agreements with Sharjah Airport Authority to build and operate a $30 million, 430,600-sq-ft (40,000-sq-m) private jet terminal as the sole provider of general aviation ground services at Sharjah International Airport in the UAE. Capacity restrictions and congestion at Dubai International and proximity to the financial districts of Dubai have driven more business aviation traffic to Sharjah.

"In the first quarter, our Sharjah International FBO saw 45 percent more aircraft movements than in the same period last year," said Oliver Hewson, Gama Aviation's commercial manager. Once the new facility is ready, within two years, the old one will close. To make room for anticipated growth, the new facilities "will allow us to integrate our FBO handling, parking, hangar and maintenance infrastructure, all in one business aviation center," he added.

Gama Aviation currently manages all aspects of the Sharjah FBO. It has lounge staff, landside handling assistants, airside handling coordinators, porters and customs and immigration officials present 24/7. It is building two hangars, each with capacity for two BBJs or ACJs, to accommodate heavy jets.

VNY HANGAR COMPLEX TO INSTALL SOLAR GRID

Aviation property development and management firm Aeroplex/Aerolease Group has partnered with Los Angeles-based PCS Energy to create the first solar energy project at California's Van Nuys Airport (VNY). The project, consisting of some 4,000 solar panels, will cover 150,000 sq ft on the roofs of the four hangars in the company's Van Nuys East complex.

"We've been working on it for a number of months," said Aeroplex CEO Curt Castagna. "The reflectivity test with the FAA has been approved."

Once on line, the system will generate 2.5 million kilowatts of energy annually, enough to power 200 homes, and reduce carbon-dioxide emissions by four million pounds a year. PCS leased the roof space and will install the panels, as well as retrofit all of the complex's offices, ramp and parking lot light fixtures to LED. The installation, which will not require any structural reinforcement of the hangars, is expected to be generating power by year-end.

Under a separate agreement, PCS will sell 100 percent of the energy to the Los Angeles Department of Water and Power for the next 20 years. VNY was recently designated as the first general aviation airport to hold a Level 2 Airport Carbon Accreditation for its carbon management and reduction, on a path toward carbon neutrality. "There is tremendous potential for airports across the nation to implement sustainable energy projects, and we hope to lead the efforts with this initiative," said Castagna. His company is currently in negotiations for a similar project at Long Beach Airport/Daugherty Field, where it operates a 12-acre facility.

Solar panels will cover the roofs of four hangars at Aeroplex/Aerolease Group's complex at VNY, including this new 50,000-sq-ft hangar (highlighted), and will generate enough energy to power 200 homes a year.

Steel is rising on the new hangar project at Stuart Jet Center at Witham Field in Florida. When completed this fall, the two new 25,000-sq-ft hangars will bring the facility to 320,000 sq ft of aircraft shelter.

FLORIDA FBO BREAKS GROUND ON HANGAR PROJECT

Stuart Jet Center has broken ground on a major development at its 53-acre campus at Witham Field in Stuart, Fla. The multimillion-dollar project consists of a pair of 25,000-sq-ft hangars, capable of sheltering the latest large-cabin business jets, as well as an adjoining 11,000 sq ft of tenant offices and shop space. When completed, it will give the Avfuel-branded location 320,000 sq ft of hangar space.

Company president Dan Capen said, "These new hangars, complete with office space, will give us the space we need to accommodate the growth of Stuart and our customer base, particularly as we head into the winter months," when seasonal traffic picks up. The airport is also adding U.S. Customs service, with a new-build facility expected to open in March next year.

BIZJET TRAFFIC ON UPSWING IN RUSSIA'S ST. PETERSBURG

The Pulkovo-3 FBO in St. Petersburg, Russia, experienced traffic growth last year, despite an overall downward trend of business aircraft flights in the largest cities in the country in recent years. Last year 7,598 business jet flights operated at the St. Petersburg FBO, compared with 7,191 in 2015. According to data from the Russian United Business Aviation Association (RUBAA), released at the Business Aviation Forum 2017 in Moscow last month, the number of business jet flights transiting through FBOs in the seven largest Russian cities slid to 41,415 last year from 50,095 in 2014. The Pulkovo-3 results also were below those of 2014—when the traffic reached an all-time high at 7,888 flights—but the preliminary data available for the first half of this year indicates that this FBO is likely to exceed "the pre-crisis levels."

From January to June this year, the number of flights totaled 3,933 and is likely to exceed 8,000 by year-end, according to RUBAA. The forum provided a platform to announce the planned opening of an FBO at the airport of Simferopol (SIP/UKFF), the largest city in the Crimean peninsula. It will supplement the existing so-called Terminal D, which is a hall serving government officials and at times also available for business travelers. The new FBO is designed along the lines of Vnukovo-3 and Pulkovo-3 and will open in April next year.

OREGON FBO ACQUIRES RIVAL

Leading Edge Aviation, which operates two FBOs in Oregon, has acquired Butler Aircraft Services, its competitor at Roberts Field Airport in Redmond. The purchase of Butler, which has been in business for seven decades, makes Leading Edge the sole provider at the airport, and takes its leasehold to 10 acres from four. Nearly all of the former Butler FBO staff moved to Leading Edge.

Included in the transaction is Butler's 6,000-sq-ft terminal, which Leading Edge will rent to another aviation-related company, consolidating all FBO activities to its location on the north side of the airport. Leading Edge also acquired three hangars totaling 34,000 sq ft, doubling aircraft storage space and allowing it to shelter aircraft up to a 600-series Challenger. It plans to begin construction next year on a new 25,000 sq ft hangar, which will be able to accommodate the biggest business jets.

With the acquisition, the company now operates two fuel farms on the field with its quartet of jet-A tankers and pair of avgas trucks. President and CEO Brad Fraley expects his facility, which handles all of the commercial fueling on the airport, will pump 3.5 million gallons of jet-A this year. Butler parent company Butler Aircraft will continue to provide aviation services to government agencies in support of forest firefighting.

TAOS GETS NEW 8,600-FOOT RUNWAY

Taos Regional Airport (SKX) in New Mexico recently dedicated a new 8,600-foot runway, culminating an effort spanning two decades. FAA Administrator Michael Huerta joined local and state officials in the August 25 dedication of Runway 12/30, which is perpendicular to the original 5,500-foot Runway 4/22.

"An airport is a treasure. It is the lifeblood of a community, an asset that must be nurtured," Huerta said. "The result of our collaborative efforts is a project that will improve both the safety and utility of this important regional transportation link, while respecting the traditional values and unique culture of the Taos Pueblo."

Runway 12/30 will enable pilots to fly into the airport more safely when wind direction can make operations at the airfield challenging. The runway project took measures to protect the land and lifestyle of the Taos Pueblo, the FAA said, with extensive government-to-government consultations with the Taos Pueblo, Town of Pueblo and state and federal agencies. As a result, several mitigation efforts were put in place, among them a passive noise-monitoring system and the raising of the voluntary minimum flight altitude above World Heritage site and adjacent lands to 5,000 feet from 2,000 feet. The project was paid for primarily through $25 million in federal grants.

SECOND INTERNATIONAL AIRPORT PLANNED FOR DELHI

India's domestic traffic growth of 20 percent a year has led the federal government to clear a $3 billion proposal to construct a greenfield airport at Jewar, 72 miles from Delhi International Airport (DIA), the busiest in the country. DIA, which handles 62 million passengers a year, will become saturated once it reaches peak capacity of 109 million.

The new airport will reside in the 16,216-sq-mile (42,000-sq-km) National Capital Region, which takes in Delhi and urban areas of three neighboring states. The cluster counts its population at 47 million. "With so much industrial activity, education institutions and retail activity around it, we expect it to be an aerotropolis [an airport city]," said secretary of civil aviation Rajeev Nayan Choubey. Projections call for India soon to overtake Japan as the world's third largest domestic aviation market after the U.S. and China. However, the International Air Transport Association has expressed concerns that lack of airport infrastructure will curb the potential. ❑

CHARTER NEWS NOTES

> A **G550 is a new addition to the Meridian charter fleet**. Based in Gary, Ind., the 2007 model was refurbished and painted in 2016 and has a 16-passenger interior, free domestic U.S. Gogo Business Aviation connectivity, Airshow 3-D moving map and berthable seats for up to six passengers. It also complies with Fans-1/A.

> The addition of **a Sovereign takes Priester Aviation**'s charter/management fleet to 65 aircraft. The nine-passenger jet, based in Wisconsin, can fly coast to coast nonstop and it is equipped with Gogo's airborne connectivity system.

> **Global Jet has based a new Legacy 450 at Le Bourget** Airport near Paris, and it is available for charters in Europe. The fly-by-wire jet is equipped with Inmarsat SwiftBroadband satcom and can seat up to eight passengers.

> **Silver Air's fleet of managed Citation Xs has grown to five**, and all are available for charter. The Santa Barbara, Calif.-based company's fleet consists of the GIV, GIV-SP, G200, Falcon 2000, Challenger 300, Astra SPX, Learjet 60, Beechjet 400A, Citation X, CJ2 and CJ3 and Phenom 100

> **Castle Air**, which operates Biggin Hill Airport's London Heli Shuttle, **now flies six AW109 Grands** to transport passengers from the airport to the center of the city. The Heli Shuttle service—a six-minute flight—has flown 2,500 helicopter transfers since launching in December 2015.

> Camarillo, Calif.-based **Sun Air Jets has added** an eight-passenger **Citation X** to its charter fleet. Sun Air offers charter, management and maintenance services at Camarillo and Van Nuys airports.

> **Interflight is offering charter fights in a Hawker 800B** that was recently added to its Biggin Hill-based fleet (near London). The eight-passenger Hawker was extensively refurbished before being placed into service.

> Charter/management provider **Liberty Jet has unveiled a website** that helps charter clients build their own itineraries, starting with finding the most suitable airports and the best type of jet for the planned trip. The company's jet research feature also allows users to evaluate jets for sale and compare their performance and operating costs.

> **ExcelAire**'s new 13-passenger **Legacy 600 is one of the first to be fitted with Gogo Business Aviation's Avance L5** airborne connectivity system, which operates on the Gogo Biz 4G air-to-ground network. Avance L5 offers network speeds sufficient for video and audio streaming, on-demand movies, normal smartphone use, real-time data for cockpit apps and in-flight remote diagnostics and support. ❑

FBO PROFILE: Jet Aviation San Juan

CARIBBEAN FACILITY OFFERS EASY ENTRY TO U.S.

Jet Aviation officially added a second Caribbean location and the 10th in the Americas in July when it held the grand opening of the San Juan facility, formerly known as Pazos FBO, at Luis Muñoz Marin International Airport (SJU) in Puerto Rico. The $6 million terminal offers the only U.S. Customs facility integrated within a Caribbean FBO. The facility made its debut in December, but according to Jet Aviation officials the deal to make it part of Jet Aviation's network stretched back before construction of the new two-story glass-sheathed building began.

"We're not here just to put another dot on the map. We're here to develop partnerships with people like [company founder and president of Jet Aviation San Juan] Jose Maldonado. We're here to develop the Puerto Rican economy and drive business aviation traffic, and we're confident we can do that," said David Paddock, senior vice president of regional business operations for the U.S., adding that the in-house U.S. Customs facility, which opened earlier this year, is a big part of the appeal. "That customs facility is already driving a significant amount of traffic through San Juan to other locations internationally."

"A lot of transient traffic from Central and South America comes through here, mainly from Brazil and Argentina," added Maldonado.The facility, one of two service providers at SJU, attracts at least 60 percent of the business aviation traffic at the airport, he said.

Room for Growth

The 12,500-sq-ft terminal offers a spacious atrium passenger lobby, pilots' lounge with recliners, two flight-planning areas, a shower, a glass-enclosed 12-seat A/V-equipped conference room along with a smaller, private 10-seat conference room, a large catering preparation and storage kitchen, and a licensed deli/bar that can serve refreshments and stronger beverages to passengers and off-duty crew. The location always has several rental cars on hand as a result of its relationship with Leaseway but has open-door agreements with all the major rental providers.

Today the facility has 5.5 acres at the airport. It still occupies the original hangar behind the new terminal, and it has another 26,000 sq ft of hangar space leased to permanent tenants. It is refurbishing another 28,800-sq-ft hangar, which can accommodate aircraft up to a Falcon 2000, for tenant and transient use, and it will soon break ground on a $2.3 million, 20,000-sq-ft structure directly across from the terminal, which will be able to shelter anything up to a Boeing 737.

Once that hangar is completed, the original 7,000-sq-ft hangar will be demolished, opening some prime ramp parking space. The company has a 20-year lease on the property and is seeking a 10-year extension to justify the recent capital expediture.

Another area of future expansion is maintenance. According to Maldonado, the location has mechanics on staff who can perform initial troubleshooting and if approved by the operator can make minor repairs on aircraft. He plans eventually to add a full FAA Part 145 repair station.

Currently the World Fuels affiliate and member of the Air Elite Network has a staff of 50, which will expand during the peak winter months. The line service staff undergoes NATA's Safety 1st course along with safety management system training from Aviation Business Strategies Group. World Fuels provides fuel handling and testing training, and the facility has been integrated into Jet Aviation's training program.

The Jet Aviation facility at SJU welcomes visitors with a spacious passenger lobby.

The location serves as the primary fuel dispenser for the World Fuels tank farm at SJU, and in addition to the 2.5 million gallons of fuel it pumps for based and transient general aviation customers, it handles another 12 million gallons a year as the supplier for Federal Express, DHL and several airlines. The FBO has three 10,000-gallon and three 5,000-gallon jet-A tankers, along with two 3,500-gallon and one 2,000-gallon avgas trucks.

Posted hours of operation are 5 a.m. until midnight, seven days a week, with after-hours callout, but Maldonado noted that because of the tempo of operations, and the location's customer-first philosophy, it's rare when there isn't staff at the facility 24 hours a day. "That service and that interaction with the customer has to be the main purpose of the business," he told **AIN**. "We'll bend over backwards to make sure that everything works."

The U.S. Customs facility, which began operations in January, is open from 8 a.m. until midnight, and the FBO has signed an agreement to reimburse the service for any overtime. That cost is factored into the customer's bill. "It's a reasonable rate, and the people who come through and need these services will not have a problem with it," Maldonado said, adding that if customers' documents are in order they can count on a half-hour quick turn. —*C.E.*

PRELIMINARY REPORTS

LANCAIR EVOT WINDSHIELD FAILS AT ALTITUDE

Lancair Evolution, May 15, 2017, Firebaugh, Calif.—A private pilot and his family sustained only minor injuries when their home-built single-engine turboprop Lancair Evolution EVOT was substantially damaged during a forced landing attempt after the windshield failed at altitude. The pilot landed gear-up at Firebaugh Airport (F34), in Firebaugh, Calif., and the airplane slid off the runway and through a fence, crossing a road before coming to rest in a field. The private pilot and one rear-seat passenger did not sustain any injuries. A front-seat passenger and two rear-seat passengers received minor injuries.

The IFR cross-country flight departed Livermore Municipal Airport (KLVK), Livermore, Calif., for Marana Regional Airport (KAVQ), Marana, Ariz. At 25,000 feet msl the windshield "exploded" without warning, according to the pilot. The airplane instantly lost cabin pressure, so he activated the auxiliary oxygen and donned his oxygen mask. During his subsequent steep descent, the pilot found a nearby airport with the requisite landing distance. At 12,000 feet, he leveled off and saw the airport. His headset had departed the airplane after the windshield failure.

The pilot stated that he was unable to locate the airport's windsock during the descent, but chose to land on Runway 12. While on the downwind leg, the pilot deployed one notch of flaps and attempted to maintain 110 knots. After turning final, the pilot deployed the landing gear but the left main landing gear did not show a green indication. The pilot recycled the landing gear, but received the same indication. He then decided to land with the gear retracted. According to his recount the touchdown was smooth and level.

Post-accident examination by an FAA inspector revealed substantial damage to both wings. The wreckage was retained for further examination. Lancair Evolution turboprops are amateur-built, most being constructed at the kit manufacturer's authorized builder assist centers, of which there are seven around the U.S.

R66 HITS HARD ON LANDING, CHOPPING TAILBOOM

Robinson R66, May 20, 2017, Canon City, Colo.—A commercial pilot with four passengers lost control on the approach to landing near Canon City, Colo., resulting in a hard landing on the rear of the skids, and subsequent loss of the tailboom from a main rotor chop. No one was injured, but the helicopter sustained substantial damage. The helicopter was on a Part 91 local air-tour flight in VFR conditions. The flight originated from a private helipad near Canon City.

The pilot reported to the NTSB investigator-in-charge that after completing the local air-tour flight he approached the helipad at between 50 and 60 knots, and then began to arrest the descent. At 200 feet agl, he started a left turn and the helicopter began an uncommanded descent. The pilot applied power to stop the descent, but the helicopter continued sinking for unknown reasons. The pilot then committed to land and leveled the helicopter, realizing he could not get power. During the landing, the back of the landing gear skids struck the ground hard, causing the main rotor blades to contact and subsequently sever the tail boom. The helicopter came to rest upright and the occupants exited.

INDONESIAN KING AIR 350i DEPARTS RUNWAY

Beechcraft King Air 350i, May 31, 2017, Ambon-Pattimura Airport, Indonesia—A King Air 350i registered to Badan Kalibrasi Fasilitas Penerbangan (BKFP), a flight calibration and inspection services company, ran off the runway at Ambon-Pattimura Airport (AMQ) in Ambon, Maluku, Indonesia.

The aircraft came to rest with the right main gear in the grass, off the right side of Runway 4 some 3,000 feet from the threshold, collapsing the nose gear, which resulted in significant damage to both engines and propellers from contact with the ground while under power.

Wind was light and variable with some thunderstorms in the vicinity at the time of the accident; however, marginal VFR conditions prevailed. ❑

FINAL REPORTS

MEXICAN HAWKER 400XP HIT SNOW PLOW

Beechcraft Hawker 400XP, Dec. 23, 2015, Telluride, Colo.—A Hawker 400XP air-taxi charter from Mexico carrying two ATP-rated pilots and five passengers collided with a snow plow while landing at Telluride Regional Airport (KTEX) in Telluride, Colo. No one, including the snowplow operator, was injured, but the airplane was substantially damaged during the accident.

The IFR flight departed Monterrey, Mexico, stopping in El Paso, Texas, en route to Telluride. As the flight neared the destination, the crew was in contact with a Denver controller. The crew also listened to Telluride's automated weather observation station (Awos) broadcast.

At 1:48 p.m., the controller asked the pilots to advise him when they had the weather and Notams for KTEX, adding that another airplane just attempted an approach into KTEX but had to execute a missed approach. The pilot reported that they received the weather information and planned to make the approach. The controller responded by giving the flight a heading, saying this would be for the descent and sequence into the airport. At 1:50 p.m., the airport operator entered a Notam via computer closing the runway (effective 1:50 p.m.) for snow removal, and the airport operator proceeded onto the runway. At 1:58 p.m., the controller cleared the Hawker for the approach to the airport. The pilot then canceled his flight plan at 2:02 p.m.with the airport in sight. The crew did not change radio frequencies to the CTAF for the airport, and never received the Notam. The crew said they did not see the snowplow on the runway until it was too late to avoid a collision.

TBM 700 LOST AFTER VFR APPROACH INTO IMC

Daher TBM 700B, April 26, 2013, Bötersen, Germany—All four souls were lost when a Daher TBM 700B attempting to land in fog at Rotenburg (Wümme) Airfield (EDXQ), near Bötersen, Germany, hit terrain 1.25 nm short of the threshold of Runway 8 and 1,700 feet to the left of the extended runway centerline. The German Federal Bureau of Aircraft Accident Investigation (BFU) attributed the accident to the pilots' decision to continue the flight VFR into IMC conditions, combined with a lack of both vertical and lateral situational awareness.

A witness said that before departure the person in the right seat of the aircraft phoned Rotenburg (Wümme) three times asking about the weather conditions, twice asking a passenger waiting at the airfield about the weather, and once asking the Flugleiter (a person required by German regulation at nontower airports to provide airport information service to pilots). The aircraft then departed Kiel-Holtenau Airport (EDHK) in IMC on an IFR flight plan.

When the aircraft was eight nautical miles north of the destination at about 4,000 feet msl the pilots were told that at the airfield visibility was 1.25 miles and the cloud base was at 500 feet. Minimum landing conditions for EDXQ are visibility of at least five miles above 2,500 feet agl and a minimum cloud clearance of one mile lateral and 1,000 feet vertical. Below 2,500 feet agl visibility shall not be less than one mile.

According to the radar data the pilots continued to 1,400 feet msl. At 9:15 a.m. they executed a left turn to the final approach heading of 090 degrees. A minute later they began final descent. The glideslope was three degrees over a distance of 1.5 nm and until about 800 feet amsl.

Below 800 feet and 2.5 nm short of the runway threshold the aircraft's rate of descent increased, reaching nearly 1,400 fpm at the last radar scan, which was recorded with an altitude of 100 feet msl.

The airplane was consumed in a post-accident fire. According to police data, ground visibility at the accident site at about 9:40 a.m.was between 1,500 and 2,100 feet. The weather conditions were described as misty, temporary drizzle and slight wind.

Investigators determined that the engine was functioning normally when the aircraft hit the ground. The post-crash fire made it difficult to assess the condition of the two Garmin GPS units on board.

Subsequent interviews and research revealed that both pilots had been aware of the marginal weather conditions at EDXQ. The flight plan listed Bremen Airport as an alternate airport, but an alternate was never mentioned in the phone calls with the waiting passengers before the flight.

Investigators found no indication that the crew accessed weather information via the Deutsche Wetterdienst before takeoff, and the Meteorological Briefing Centre did not record an individual weather briefing for this flight. There was no evidence that either of the pilots accessed weather data through any information source at the departure airport.

KING AIR LOW PASS ENDED IN DISASTER

Beechcraft King Air B200, Aug. 5, 2013, Akureyri, Iceland—A pilot's attempt at a fly-by of a racetrack went wrong, killing the captain and the paramedic on board the Beech King Air B200 and seriously injuring the copilot. The Icelandic Transportation Safety Board (ITSB) cited human factors as playing a major role in this accident. Inadequate collaboration and planning of the flyover amongst the flight crew indicated a failure of crew resource management (CRM) that caused the flight crew to be less able to make timely corrections, according to the ITSB.

The medical transport King Air B200 with two flight crewmembers and a paramedic on board was heading back to home base at Akureyri Airport (BIAR), after completing an ambulance flight from Höfn (BIHN) to Reykjavik Airport (BIRK) when the captain requested to overfly the town of Akureyri before landing. As the aircraft approached the racetrack area, it entered a steep left turn and, in line with the racetrack, struck the ground.

During cruise, the flight crew discussed the captain's desire to deviate from the planned route to BIAR to fly over a racetrack area near the airport, where a race was about to start. The captain told the copilot that he planned to visit the racetrack area after landing.

The investigation concluded that the flyby/low pass was poorly planned and outside the scope of company SOPs. The pass was made at such a low altitude and steep bank that a loss of control was inevitable; the aircraft struck the racetrack and both wings separated. The fuselage broke into three main pieces (cockpit, cabin and empennage).

Three videos that captured the aircraft during its last phase of flight were used in the investigation. One of the videos was from a CCTV camera on a building near the accident site, which captured the aircraft before the left turn. The second video, from a personal video camera mounted on a race vehicle, captured the aircraft in the left turn. The third video, from a personal camera mounted on the same race vehicle (facing forward), captured the aircraft during the last phase of the flight and when it hit the ground. Investigators were also provided with a video taken from the racetrack's audience stand.

By calculating the speed from the photogrammetric analysis, investigators determined the aircraft was doing 240 to 260 knots during the turn and close to 275 knots when it hit the ground. At the midpoint of the flight path the bank angle increased to 72.9 degrees from 54.2.

The area of the accident was the hometown of the captain and he had flown over the racetrack before, but from the southwest with no steep turn. He had also deviated from normal procedures before, performing low passes and for flight crew sightseeing on the way back from ambulance flights.

After the accident, the operator started an internal investigation and as a result standardized normal, abnormal and emergency operating procedures. Standardization was emphasized in training, both ground training and simulator. Management clearly communicated that individuality in procedural adherence is not acceptable. Finally, the operator updated its Aerial Work and VFR/IFR Policy. ■

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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Pre-Owned Update

by Sean Broderick

Used-market bright spots still overshadowed by value declines

Anyone seeking signs that the pre-owned business jet market is bouncing back has reason for optimism.

Amstat, which tracks business jets of all sizes and vintages in its 22,000-aircraft dataset, noted that this year's first half closed with many segments "at or close to" their lowest inventory levels as a percentage of the active fleet "in some time." The figure for active business jets, it added, was at its lowest since early 2008.

UBS, crunching JetNet data, reported that among 44 newer models it tracks on the used-jet market, 28 had year-over-year inventory declines in June, while 13 saw increases. Overall inventory was down 5 percent.

Embraer CEO and president Paulo Cesar de Souza e Silva expressed cautious optimism about the used-jet market during a July earnings call. "We have seen some signs of improvement on the used markets," he said. "There is some stability in prices, [and] no further deceleration in general in the value of the aircraft."

Such data snapshots and viewpoints suggest that the long, pronounced used business-jet market slump might be turning around. But a macro view of transaction data from the last decade and a detailed look at specific metrics within that dataset underscore how much momentum the slump has, and suggests that it might not be over.

Data analyzed by AircraftPost shows that while available inventory as a percentage of the fleet declined in this year's first half, it is nowhere near 2008 levels. More troubling is that while inventory levels have generally been climbing year-over-year, the number of aircraft sold as a percentage of the overall fleet has stalled. This is having a predictable effect on values: they continue to fall sharply.

More Models Come on Market

AircraftPost tracks fleet statistics and aircraft transactions within the worldwide business jet fleet's core. Its database contains 11,000 current-generation business jets ranging from the Learjet 70, CJ4 and Phenom 300 up through the Global 6000, Falcon 8X and G650. A look at key metrics back to 2008 shows few bright spots. The percentage of the AircraftPost-tracked fleet available for sale doubled from 2008 to 2016, from 8.7 percent to 17.6 percent. While it dipped a bit in the first eight months of this year, to 14.7 percent, the percentage of the fleet changing hands fell as well. Stalled at 6.2 percent from 2012 to 2016—even as the percentage of the fleet on the market climbed from 14.2 percent in 2012—the sold-inventory percentage dropped to 4.6 percent in the first eight months of this year.

"A higher percentage of the fleet is coming onto the market year over year, yet we're not seeing much movement in the percentage being sold, particularly with in-production models," said Dennis Rousseau, AircraftPost's founder and president.

The percentage of in-production aircraft on the market was 11.3 percent through mid-August, down from 13.2 percent in full-year 2016. But the percentage sold fell too, to 3.7 percent, from 4.3 percent last year.

Sales of out-of-production (OOP) models have fared somewhat better, hovering around 7.5 percent of the OOP fleet for the last four years. But they too slowed in the first part of this year, falling to 5.2 percent.

Rousseau acknowledges that the short-term figures reveal a few bright spots. But the overall picture, he contends, remains mostly cloudy. And that's before examining transaction prices. Among the data AircraftPost gathers where it can are dollar figures that change hands between buyers and sellers. These, Rousseau says, show few signs of sellers clawing back some of the value lost in recent years.

A 2008 Gulfstream G550 can now be had for just under $20 million, based on approximately 25 sold this year. The average price is down 12 percent from last year, when 27 changed hands. Prices have fallen every year since 2011; the average year-over-year decline is 11.5 percent.

The four 2013 G650s sold in the first eight months of this year fetched an average of $49.1 million, down 2 percent from last year's figure. That follows declines of 24 percent and 10 percent in 2016 and 2015, respectively.

Falcon 7Xs built in 2013 are selling in the region of $49.1 million, based on four transactions this year. The 6 percent drop from 2016 prices is hardly alarming, but it follows full-year dips of 25 percent in 2016 and 11 percent in 2015.

"It doesn't matter what aircraft type you look at," Rousseau said. "These trends are consistent across the board."

The big picture: values are still declining at rates that belie hard evidence of a significant recovery. Preliminary 2017 data shows better year-over-year value retention on many models, but the precipitous declines in recent years make it hard to get excited about less-sharp dips this year.

Aircraft depreciate over time, so year-over-year declines in stable markets are expected. Of course, markets are rarely stable, so prices bob up and down. Business jets lost significant value coming out of the 2008-2009 Great Recession—hardly a newsflash. But while markets have bounced back, AircraftPost's data suggests that used business-jet prices have not.

"Where do we go from here?" Rousseau asks. "That's a big question." The destination is uncertain, but the data will mark the way. ■

News Note

Market prices of pre-owned business aircraft will continue to stabilize because of the buying off of oversupply of aircraft, according to Leading Edge president Joe Carfagna Jr. and Guardian Jet co-founder Mike Dwyer. During a presentation at the NBAA Regional Forum at New Jersey's Morristown Municipal Airport last month, Carfagna said that the market will see an uptick in prices "very soon. Currently, we are in a unique place where values are low and used airplanes are starting to dry up. In my opinion, a five- or six-year-old airplane being 50 percent the value of a new one is uncharted territory for this industry. I don't think it will remain that way over the long haul." ❑

Compliance Countdown by Gordon Gilbert

Within 6 Months

NEW

▶ **Oct. 23, 2017**

FAA Aligns North Atlantic Nav Ops with ICAO Specs

Rules covering Part 91 operations of U.S.-registered aircraft over the North Atlantic have been updated to remove obsolete material and align them with ICAO standards covering the North Atlantic (NAT) minimum navigation performance specifications (MNPS). Revisions to Part 91 are required because the ICAO NAT Region is transitioning from the decades-old MNPS navigation specification to a more modern, performance-based navigation (PBN) specification. The revisions go into effect on October 23

▶ **Dec. 7, 2017 and Jan. 30, 2020**

Expansion of Datalink Com 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 were required to be equipped with Fans-1/A controller-pilot datalink communications (CPDLC) and ADS-C. The program expands to these altitudes in the entire ICAO NAT region on December 7 this year, and to all flights in this region above FL290 on Jan. 30, 2020, a month sooner than the previous revised date.

NEW

▶ **Dec. 30, 2017 (estimated)**

Many RCO Radio Frequencies To Be Decommissioned

Beginning late this year (exact date to be announced), the FAA is scheduled to start decommissioning 641 remote communications outlet (RCO) radio frequencies used by Flight Service Stations to communicate with aircraft in flight. The frequencies are associated with dedicated RCOs and 237 outlets co-located with VORs. Frequencies in Alaska and those designated for emergency or military use are not affected by this reduction program. A Mitre study done for the agency concluded that as many as 666 frequencies could be removed and the remaining frequencies would still provide from 93 to 100 percent coverage between 1,000 and 5,000 feet msl. Notams will be issued as each frequency is decommissioned.

▶ **Jan. 1, 2018**

Deadline for European 8.33-kHz Spacing

Starting January 1 next year, aircraft might not be able to operate in any EU member state's 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."

▶ **June 16, 2018 and Jan. 1, 2019**

Upgraded CVRs and Underwater Locators Required

New regulations from the European Aviation Safety Agency (EASA) will require upgraded CVRs and underwater locating devices (ULDs) to be installed. Starting June 16 next year, ULDs must be capable of transmitting for at least 90 days instead of 30 days. By Jan. 1, 2019, airplanes with an mtow of at least 59,500 pounds with more than 19 passenger seats and performing transoceanic flights must be retrofitted with an "additional ULD with very long detection range." Also by Jan. 1, 2019, all CVRs with 30-minute recording duration must be replaced by units that can record for two hours. CVRs recording on magnetic tape must be replaced by solid-state units.

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 on November 8 next year. 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.

▶ **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.

▶ **Jan. 1, 2020**

Taiwan ADS-B OUT Compliance

The Republic of China has pushed the deadline to Jan. 1, 2020 for compliance with ADS-B OUT equipment within the Taiwan FIR above FL290. China was forced to delay compliance because too few aircraft were equipped to render the original ADS-B plan achievable. The new deadline for Taiwan coincides with the Jan. 1, 2020 U.S. mandate for ADS-B OUT compliance.

▶ **Jan. 1, 2020, Jan. 1, 2023 and Jan. 1, 2028**

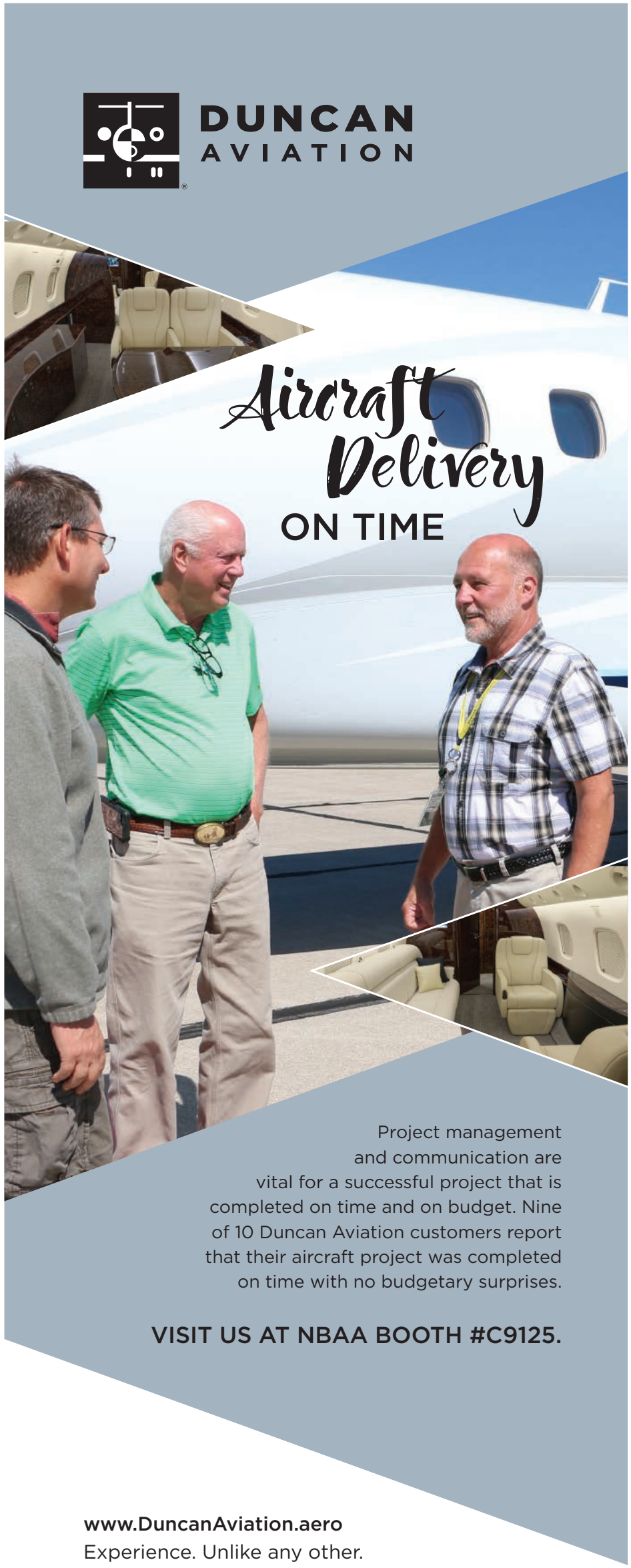
Aircraft CO_2 Emissions Standards Adopted

The first international standards for CO_2 aircraft emissions have been enacted by ICAO and apply initially to large subsonic jets for which the application for a type certificate was submitted on or after Jan. 1, 2020. The standard would apply to new deliveries of current in-production large aircraft starting Jan. 1, 2023. All covered in-production airplanes must meet the standard by Jan. 1, 2028. Jet airplanes with an mtow of less than 12,500 pounds are exempt, as are piston-engine airplanes and turboprops with an mtow of less than 19,000 pounds.

▶ **June 7, 2020**

European ADS-B OUT Mandate

The ADS-B OUT retrofit requirement in Europe takes effect June 7, 2020. This date is about six months later than the U.S. ADS-B OUT mandate. ❑



Fernando de Caralt has taken the helm of *BRS Aerospace* as CEO. Caralt has served with BRS for five years, most recently as senior v-p of engineering, and before that served as president and CEO of Cimsa Ingeniería de Sistemas, director of Ingenia Ingenieria Aeronautica AIE, and director and CEO of TAF Helicopters.

Erickson appointed **Doug Kitani** CEO and director, permanently filling a role that had been held by acting CEO **Andrew Mills**. Mills will remain in an executive capacity for Erickson. Previously Kitani was CEO and director for IAP Worldwide Services and before that had been involved in portfolio strategies and corporate development for DynCorp International and had also held management roles with Honeywell and General Electric.

Metrojet named **Gary Dolski** CEO. Dolski joins the Hong Kong-based operator with 35 years of experience with Bristol Aerospace, Bombardier, MD Helicopters and Jet Aviation.

Mario Lepine was appointed CEO for business aircraft interiors producer *F. List Canada*. Lepine was formerly general manager of F. List's Montreal subsidiary.

Private Sky named **Dave Scully** managing director and accountable manager. Scully, who has two decades of aviation experience, was previously director of operations at Dublin-Weston Executive Airport, founder of AEM and co-founder and president of the Irish Business Aviation Association.

Phil Condit has joined *Icon Aircraft's* board of directors. Condit, a former chairman and CEO of Boeing, has served as an Icon advisor since 2010 and has been an Icon investor since 2011.

Jeffrey Robbins joined *ATI Aviation Services* as chief strategy officer. Robbins has held sales, marketing and management positions at Lockheed, Gulf Aerospace and Professional Aircraft Accessories.

The *Chicago Executive Airport* Board of Directors made some key personnel changes, including the appointment of **Court Harris** as chairman. Harris, who joined the board as a working member in July, spent six years as an active-duty officer with the U.S. Army and logged a tour in Afghanistan as an American liaison to the NATO airport authority at Heart International airport. The board promoted **Scott Campbell** to director of airport operations. A private pilot, Campbell has served at the airport since February 2014. **Jason Griffith** was promoted to director of finance. Griffith has been an accountant for the airport since January 2012.

Quest Aircraft appointed **Jonathan Payne** senior v-p, sales and marketing. Payne joins Quest following a career with American Honda Motors, where he held senior sales and dealer management positions, as well as at Honda Aircraft, where he was head of global dealer sales operations.

Tamarack Aerospace hired **Paul Hathaway** as vice president of marketing. Hathaway previously held marketing roles with Avidyne, WSI and most recently Honeywell Aerospace.

Francis Aviation hired **John Stuart** to serve as vice president. Stuart, a commanding officer in the U.S. Navy Reserve, previously held roles as vice president of operations for Trajen Flight Support, executive v-p of aviation operations at Astin Executive Services and as a senior officer in the Navy.

Curt Castagna of *Aerolease Group* was re-elected to the *National Air Transportation Association* board of directors. Four new members were added to the board: **Randall Berg**, airport director for King County International Airport; **Dennis Fox**, senior v-p flight operations for Executive Jet Management; **Larry Jorash**, senior v-p operations for Signature Flight Support; and **Larry Wade**, president and partner for Golden Isles Aviation.

Meridian appointed **Carlos Rodriguez** general manager of the Hayward operation. Rodriguez, who joined Meridian in 2002 when it was part of the Million Air franchise, most recently had been operations manager of the Hayward location.

David Sylvester has joined *Raisbeck Engineering* as director of sales. Sylvester has 28 years of general aviation experience in maintenance, quality control and sales, recently as a quality assurance inspector and then in maintenance sales for Banyan Air Service.

CAE promoted **Brian Hogg** to center leader at the North East training center in Whippany, N.J. and **Tina Barnes** to regional sales manager for the Central Region. Hogg joined CAE in May 2011 as an instructor on Citation programs and became training manager of the Northeast center in 2013. Barnes has served in a number of sales capacities with CAE since 2001.

FlightSafety International promoted **Mark Gris** to assistant manager of the company's Toronto facility. Gris joined the Toronto center in 2002 as a simulator technician and was later promoted to manager of flight training devices and director of programs for Bombardier aircraft. **Tom Montgomery** was named assistant manager of the company's learning center in Savannah, Georgia. Montgomery joined FlightSafety in 2004 as a GIV instructor and has since held roles as program manager for GIV training, assistant director of programs for emerging aircraft and director of programs for Gulfstream aircraft training.

Flying Colours appointed **Trevor Knox** director of maintenance, based in Peterborough, Ontario. Knox brings 24 years of aviation maintenance to his new role, along with endorsements for Bombardier Challenger and Global types.

Duncan Aviation added **Susie Corn** to the turbine engine service sales team, where she will focus on the South Central region. ❑

Final Flight

Vlado Lenoch, 64, died in the crash of P-51 Mustang *Baby Duck* at Atchison County, Kansas, in July. Also killed was passenger Bethany Root, 34, the manager of Amelia Earhart Airport, where Lenoch had performed the day before. A corporate pilot, Lenoch began flying at age 17. He had accumulated 17,000 hours of flight time, some of them in his own P-51 (subsequently sold) and F4U Corsairs, F6F Hellcats and P-47 Thunderbolts. With degrees from Purdue University and MIT, he was a 747 test pilot for Boeing and was type-rated in the 727. He also flew gliders and competition aerobatics in a Pitts Special he built. Lenoch was a long-time member of the Heritage Flight, Commemorative Air Force and Experimental Aircraft Association, among other groups. ■

Awards & Honors

NBAA has selected MedAire founder **Joan Sullivan Garrett** and former Gulfstream executive **Preston Henne** as this year's recipients of the association's highest honors. Garrett will receive the Meritorious Service to Aviation Award, which recognizes "extraordinary lifelong contributions to aviation." Henne will be honored with the John P. (Jack) Doswell Award, which recognizes "lifelong individual achievement on behalf of and in support of the aims goals and objectives of business aviation."

The awards will be presented during the NBAA Business Aviation Convention and Exhibition, to be held from October 10 to 12 in Las Vegas, Nev.

Garrett founded medical training, equipment provider and logistics specialist MedAire in 1985 and served as CEO until 2006. During that time she had become a renowned advisor and expert on health and safety-related issues. Her testimony before Congress is credited with helping to lead to a regulation requiring U.S. airlines to carry automated external defibrillators and enhanced emergency medical kits.

She is also a 30-plus-year NBAA member. During that time, Garrett served as chair and vice chair of the association's Associate Member Advisory Council and a member of the board of directors.

Henne retired in 2013 as senior v-p of programs, engineering and test at Gulfstream Aerospace, following a 44-year career in the aviation industry. At Gulfstream, he steered product program management, engineering, flight operations and advanced design and technology development. While at Gulfstream, Henne led design, development, test and certification of the Collier Trophy-winning Gulfstream V. His organization also developed the G150, G280, G450, G550 and G650. The G550 and G650 also captured the Collier Trophy, the National Aeronautic Association's honor for the greatest achievement in aeronautics and astronautics in America.

Henne joined Gulfstream in 1994 after serving with McDonnell Douglas for 25 years. There, he steered the aerodynamic design of the wing on the C-17 military airlifter. Later he was chief design engineer for the MD-80 and became vice president and general manager of the MD-90 program. ■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Phil Condit


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Refurbed Learjet 24F helps fulfill child's wish

by Curt Epstein

Learjet 24F owner Jim Hefelfinger (l) with recovering cancer patient and pilot-to-be Manuel Acosta, Northeastern Aviation executive vice president and pilot Anthony Russo, and Acosta's family, in front of Hefelfinger's recently refurbished and hush-kitted 1976 Learjet, before taking them on a Make-A-Wish sightseeing flight around New York City. After the visit to Long Island's Republic Airport, the Dallas residents were flown back to Manhattan on the Hover-Views Airbus Helicopters AS355 TwinStar in the background.

Not every eight-year-old is lucky enough to know what he wants to be when he grows up, and that is especially true for those who have had to deal with a life-threatening illness. That's not the case for Dallas resident Manuel Acosta, who has known for more than half of his short life that he wants to be a pilot, and is fascinated by all things aviation. When he's not flying remote control aircraft, he's flying computer simulator programs. As he recovered from treatment for Hodgkin's Lymphoma earlier this year, his local Make-A-Wish foundation learned that his dream was to visit New York's *Intrepid* Sea-Air-Space Museum, and they contacted the metro-N.Y. chapter of the charity to help make that happen.

Around the same time, Jim Hefelfinger, a New York City real estate developer, was planning to take delivery of his fully refurbished 1976 Learjet 24F and wanted to do something special to celebrate its return to flight. Hefelfinger had purchased the vintage private jet from New York-based charter and management provider Northeastern Aviation.

Company founder, president and former U.S. Air Force pilot Michael Russo had had a long history with the aircraft, having flown it new off the Learjet assembly line, then serving as its owner's pilot for several years. Russo subsequently founded his Republic Airport-based business, and when the owner was forced to sell the aircraft six years later, Russo gathered a group of his friends to buy it as a "short-term" investment.

Aircraft Updates

Nearly 40 years later, the twinjet, while grounded for noise concerns, was still on the company's certificate, bearing the vanity N-number 56MM, for the year Russo married his wife Maureen (the company also still has its very first aircraft, a Piper Navajo, which it has owned for nearly four decades). Refusing to let the aircraft go to the boneyard, Russo began talking it up with his charter client-turned close friend Hefelfinger, who as a private pilot was interested in upgrading to a light jet. In fact, he made and eventually lost a sizable deposit on an Eclipse EA500, when the initial manufacturer of the VLJ went bankrupt.

Eventually he agreed to buy the Learjet, which hadn't flown in nearly a year, and committed to financing a complete renovation. He obtained a ferry permit and flew the aging aircraft first to Butler Avionics in New Century, Kan., where the old cockpit was rewired and enhanced with the addition of dual Garmin GTN 750 GPS/navcom units, Waas/LPV, dual ADS-B IN and OUT, and it was prepared for RVSM. Next, it went to nearby Learjet modification specialist and Butler sister company Avcon, in Newton, Kan., which replaced the landing gear, installed hushkits on the General Electric CJ610s and USB charging ports throughout the cockpit and cabin, and performed structural repairs. Another modification was the replacement of the "potty seat" with a fully functioning toilet that can be blocked off from the rest of the cabin with sound-deadening curtains.

Finally, the twinjet was flown north of the border to New United Goderich in Ontario, for an interior restoration and paint job. According to Hefelfinger, who is currently a copilot on the aircraft, the cost of the seven-month project—including acquisition of the aircraft itself—was "just shy of $1 million, soup to nuts."

"The original price of the Eclipse was right about what I'm in this for," he told **AIN**, "and it's a far more incredibly performing airplane than the old Eclipse was. [It] is a Part 25 airplane, it has only 10,000 hours on it, it's in great shape, so it's going to serve me for as long as I'm going to fly, and beyond."

The aircraft had been back from the shop for less than a week before Acosta and his family arrived at Northeastern's facility at Long Island's Republic Airport, where the Learjet will be based.

"It's better than the day it came out of the factory," said Anthony Russo, executive vice president of family-owned Northeastern, who also served as the project coordinator, and shepherded the vintage 24F through the restoration. "It's amazing, it can still climb, no matter what weight, straight to 45,000 feet and fly 1,100 nautical miles, so we can do New York to Miami no problem, and it's a fun aircraft to fly."

'Wish-making' Flight

It was the younger Russo, at Hefelfinger's behest, who reached out to the local Make-A-Wish chapter and offered the use of the airplane. Just a day later, that office received the wish request from Dallas. "It was an amazing alignment of stars that [Russo] just called out of the blue and volunteered his services," said Tracey Anton, the charity's marketing and communications manager for the Metro N.Y. region. "It was meant to be, and there's a lot of that in wish-making."

Russo and Hefelfinger crewed the flight. Acosta, outfitted in his very own pilot uniform, shared the cabin with his parents and two sisters. Taking off into the clear June sky, the Learjet headed toward New York City, flying over La Guardia Airport and passed over Brooklyn and around the Statue of Liberty. Heading up the Hudson River along Manhattan, at Acosta's request the crew pointed out where Capt. Chesley "Sully" Sullenberger made his water landing now known as the "Miracle on the Hudson." The aircraft then headed out over Long Island Sound for the return to FRG, and once the aircraft came to a stop, an exuberant Acosta bounced down the airstair. "It was awesome," he said, and was every bit as enjoyable as his long-anticipated trip to the *Intrepid* the day before.

But his dream aviation experience didn't end there. After lunch at Northeastern and a walk through the company's cavernous hangars packed with bizjets, the family toured the airport's control tower and rode in one of its fire rescue trucks. Then at the conclusion of the whirlwind visit, Russo arranged for his friend Al Cerullo, owner of Republic-based helicopter operator Hover-Views Unlimited, to shuttle the family back to Manhattan's West 30th Street Heliport aboard an Airbus Helicopters AS355 TwinStar.

But the star of the day was the flight in the light jet, judging by Acosta's repeated trips to the parked aircraft and his reluctance to leave its cockpit, where he clearly felt at home. "We thought it was a great rebirth of the aircraft, and to do something so nice for a needy child made it that much more special," said Anthony Russo, whose company will continue to operate the aircraft as it has since the early 1980s, as well as support Hefelfinger's growth as a jet pilot.

"Obviously the big tradeoff here is that's not a single-pilot airplane, but I don't know that at my proficiency level I'm ready for a single-pilot jet," Hefelfinger explained. "On a transition like this, I can't emphasize enough how important the support and mentoring and tutoring and having this great organization behind it has been."

N56MM will be relisted on Northeastern's AOC, joining its fleet of charter and managed aircraft, ranging from G650s down to a LongRanger.

"I don't expect to make a huge profit off of it, but it will offset some of the cost of ownership by having it on the charter certificate," noted Hefelfinger, who expects to earn his type rating on the aircraft by the end of summer. "It's a great airplane to go to Florida, Boston, Washington, shorter-range trips." In particular, he expects it to be used for summer flights to Nantucket or Martha's Vineyard, a 25-minute trip in the speedy Learjet. ❑

Manuel Acosta is all smiles in the cockpit of a refurbished Learjet 24F. The eight-year-old derived as much enjoyment from his flight between Long Island and Manhattan as he did from his Sea-Air-Space Museum visit during the Make-A-Wish trip.

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DUBAI 2015

OCTOBER

DRONE WORLD EXPO…October 3-4, San Jose Convention Center, San Jose, CA. Info: info@jdevents.com; www.droneworldexpo.com.

AOPA FLY-IN…October 6-7, Groton–New London Airport, Groton, CT. Info: www.aopa.org/community/events/aopa-fly-ins/2017-aopa-fly-ins/.

NBAA IS-BAO FLIGHT OPERATIONS MANUAL WORKSHOP…October 8-9, Las Vegas Convention Center, North Hall, Las Vegas, NV. Info: taustin@nbaa.org; www.nbaa.org/events/pdp/is-bao-flight-operations-manual-workshop/20171008/.

NBAA TAX, REGULATORY & RISK MANAGEMENT CONFERENCE…October 8-9, Las Vegas Convention Center, Las Vegas, NV. Info: sobrien@nbaa.org; www.nbaa.org/events/taxes/2017/.

▲●◆ **NBAA BUSINESS AVIATION CONVENTION & EXHIBITION**…October 10-12, Las Vegas Convention Center, Las Vegas, NV. Info: (202) 783-9000; www.nbaa.org.

GENERAL AVIATION STRUCTURES WORKSHOP…October 16-17, EASA Headquarters, Cologne, Germany. Info: Structures.Workshop@easa.europa.eu; www.easa.europa.eu/newsroom-and-events/events/general-aviation-structures-workshop.

ENGINE LEASING SEMINAR…October 17, Crowne Plaza, Fort Lauderdale, FL. Info: events@everestevents.co.uk; www.everestevents.co.uk/event/engine-leasing-seminar-2016/.

INTERNATIONAL AIR SAFETY SUMMIT…October 23-25, Clayton Hotel, Burlington Road, Dublin, Ireland. Info: events@flightsafety.org; https://flightsafety.org/event/iass2017/.

INTERNATIONAL AVIATION TRADE SHOW AND CONGRESS…Oct. 25-27, JW Marriott Cancun Resort & Spa, Cancun, Mexico. Info: www.expo-ciam.com.

AOPA FLY-IN…October 27-28, Peter O. Knight Airport, Tampa, FL. Info: www.aopa.org/community/events/aopa-fly-ins/2017-aopa-fly-ins.

BOMBARDIER SAFETY STANDDOWN…October 31-November 2, Hyatt Regency Hotel, Wichita, KS. Info: (316) 946-7876; www.safetystanddown.com/.

NOVEMBER

AVIATION FORUM HAMBURG…November 7-8, Hamburg Messe, Hall A3, Hamburg, Germany. Info: +49 (0) 511 473 147 90; www.aviationforumhamburg.com/.

▲●◆ **DUBAI AIRSHOW**…November 12-16, Airport Expo, Dubai, UAE. Info: +97 1 4286 7755; www.dubaiairshow.aero.

NATA ADVANCED LINE SERVICE REGIONAL WORKSHOP…November 14-15, Base Operations at Page Field, Fort Myers, FL. Info: safety1st@nata.aero; http://nata.aero/2017-Advanced-Line-Service-Workshops/ALS-Workshop-Ft-Myers-FL.aspx.

ELECTRIC & HYBRID AEROSPACE TECHNOLOGY SYMPOSIUM…November 16-17, Koelnmesse, Cologne, Germany. Info: andrew.boakes@ukimediaevents.com; www.electricandhybridaerospacetechnology.com/index.php.

US CORPORATE AVIATION SUMMIT…November 17, Cozen O'Connor, Washington, D.C. Info: mail@aeropodium.com, www.aeropodium.com/uscas.html.

AIRCRAFT ECONOMIC LIFE SUMMIT…November 28, Gibson Hotel, Dublin, Ireland. Info: events@everestevents.co.uk; www.everestevents.co.uk/event/aircraft-economic-life-summit-2017/.

AFBAC CONFERENCE AND EXPO…November 29-December 1, ExecuJet South Africa, Johannesburg, South Africa. Info: info@afbaa.org; http://afbaa.org/conference_expo?destination=/events.

DAVID McINTOSH

SINGAPORE 2016

DECEMBER

AIRCRAFT ACQUISITION PLANNING SEMINAR…December 5-6, Scottsdale Plaza Resort, 7200 Scottsdale Rd., Scottsdale, AZ. Info: (800) 832-2025; www.conklindd.com.

EASA 11TH ROTORCRAFT SYMPOSIUM…December 5-6, Cologne Marriott Hotel, Cologne, Germany. Info: rotorcraft@easa.europa.eu; www.easa.europa.eu/newsroom-and-events/events/11th-rotorcraft-symposium.

RUSSIAN BUSINESS AVIATION SUMMIT…December 7, Radisson Blu Hotel, Moscow Sheremetyevo Airport, Moscow, Russia. Info: mail@aeropodium.com; www.aeropodium.com/rba.html.

JANUARY 2018

NBAA REGIONAL FORUM…January 24, Palm Beach International Airport, West Palm Beach, FL. Info: info@nbaa.org; www.nbaa.org/events/forums/2018pbi/.

FEBRUARY 2018

SCHEDULERS & DISPATCHERS CONFERENCE…February 6-9, Long Beach Convention Center, Long Beach, CA. Info: www.nbaa.org/events/sdc/2018/.

▲●◆ **SINGAPORE AIRSHOW**…February 6-11, Changi Exhibition Center, Singapore. Info: info@singaporeairshow.com; www.singaporeairshow.com/public/.

▲●◆ **HELI-EXPO**…February 26-March 1, Las Vegas Convention Center, Las Vegas, NV. Info: heliexpo@rotor.org; http://heliexpo.rotor.org/.

MARCH 2018

BUSINESS AIRCRAFT FINANCE, REGISTRATION & LEGAL CONFERENCE…March 18-20, Sanibel Harbour Marriott Resort & Spa, Fort Myers, FL. Info: sobrien@nbaa.org; www.nbaa.org/events/finance-registration-legal-conference/2018/.

WOMEN IN AVIATION CONFERENCE…March 22-24, Peppermill Reno, Reno, NV. Info: www.wai.org/conference.

NBAA INTERNATIONAL OPERATORS CONFERENCE…March 26-29, Las Vegas, NV. Info: info@nbaa.org; www.nbaa.org/events/ioc/2018/.

SINGAPORE AVIATION SEMINAR…March 26-28, Singapore Aviation Academy, Singapore. Info: https://flightsafety.org/event/4th-annual-singapore-aviation-seminar-sass/.

APRIL 2018

▲●◆ **ASIAN BUSINESS AVIATION CONFERENCE & EXHIBITION**…April 17-19, Shanghai Hawker Pacific Business Aviation Service Centre, Shanghai, China. Info: info@abace.aero; https://abace.aero/2018/.

AIRCRAFT RECORDS & TOTAL ASSET MANAGEMENT SEMINAR…April 18, Gibson Hotel Dublin, Dublin, Ireland. Info: www.everestevents.co.uk/event/aircraft-records-total-asset-management-seminar-2018/.

MAY 2018

NBAA MAINTENANCE CONFERENCE…May 1-3, Albuquerque Convention Center, Albuquerque, NM. Info: info@nbaa.org; www.nbaa.org/events/maintenance-conference/2018/.

NBAA BUSINESS AVIATION TAXES SEMINAR…May 10-11, Dallas, Texas. Info: info@nbaa.org; www.nbaa.org/events/taxes-seminar/2018/.

63RD ANNUAL BUSINESS AVIATION SAFETY SUMMIT…May 10-11, Radisson Blu Aqua Hotel, Chicago, IL. Info: solorzano@flightsafety.org; https://flightsafety.org/event/bass-2018/.

▲●◆ **EUROPEAN BUSINESS AVIATION CONVENTION & EXHIBITION…** May 29-31, Palexpo Convention Center, Geneva, Switzerland. Info: info@ebace.aero; https://ebace.aero/2018/.

JUNE 2018

PILATUS OWNERS AND PILOTS ASSOCIATION ANNUAL CONVENTION…June 7-9, The Roosevelt Hotel, New Orleans, LA. Info: http://pilatusowners.org/popa-annual-convention-off-season/.

◆ Indicates events at which **AIN** will publish on-site issues or distribute special reports.
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